Scribble: The Racket Documentation Tool

Version 6.0

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Scribble is a collection of tools for creating prose documents—papers, books, library documentation, etc.—in HTML or PDF (via Latex) form. More generally, Scribble helps you write programs that are rich in textual content, whether the content is prose to be typeset or any other form of text to be generated programmatically.

This document is itself written using Scribble. You can see its source at http://git.racket-lang.org/plt/tree/HEAD:/pkgs/scribble-pkgs/scribble-doc/scribblings/scribble, starting with the "scribble.scrbl" file.

Contents

1 Getting Started

No matter what you want to do with Scribble, it's best to start by generating a few simple HTML and/or PDF documents. This chapter steps you through the basics, and it ends in §1.10 "Next Steps" with goal-specific advice on how to continue.

1.1 A First Example

Create a file `"mouse.scrbl"` with this content:

```
#lang scribble/base

@title{On the Cookie-Eating Habits of Mice}

If you give a mouse a cookie, he's going to ask for a
glass of milk.
```

The first line's `#lang scribble/base` indicates that the file implements a Scribble document. The document starts in "text mode," and the `@` character escapes to operators like `title`, where the curly braces return to text mode for the arguments to the operator. The rest is document content.

Now run the `scribble` command-line program, specifying a mode for the kind of document that you want as output:

- Run

      scribble mouse.scrbl

  to generate HTML as `"mouse.html"`. You may notice that the apostrophe in "he's" turned into a curly apostrophe.

- Run

      scribble --htmls mouse.scrbl

  to generate HTML as `"mouse/index.html"`. Sub-sections (which we add next) will appear as separate HTML files in the `"mouse"` directory.

- Run

      scribble --pdf mouse.scrbl

  to generate PDF as `"mouse.pdf"`. This will work only if you have `pdflatex` installed. If you'd like to see the intermediate Latex, try

      scribble --latex mouse.scrbl

  to generate `"mouse.tex"`.

See §8 "Running `scribble`" for more information on the `scribble` command-line tool.

1.2 Multiple Sections

Add more text to `"mouse.scrbl"` so that it looks like this:

```
#lang scribble/base

@title{On the Cookie-Eating Habits of Mice}

If you give a mouse a cookie, he's going to ask for a
glass of milk.

@section{The Consequences of Milk}

That ``squeak'' was the mouse asking for milk. Let's
suppose that you give him some in a big glass.

He's a small mouse. The glass is too big---way too
big. So, he'll probably ask you for a straw. You might as
well give it to him.

@section{Not the Last Straw}

For now, to handle the milk moustache, it's enough to give
him a napkin. But it doesn't end there... oh, no.
```

Now, after the first paragraph of the paper, we have two sub-sections, each created by calling `section` to generate a sub-section declaration. The first sub-section has two paragraphs. The second section, as initiated by the result of the second `section` call, has a single paragraph.

Run the `scribble` command(s) from §1.1 "A First Example" again. You may notice the curly double-quotes in the output, and the `---` turned into an em dash.

1.3 Splitting the Document Source

As a document grows larger, it's better to split sections into separate source files. The `include-section` operation incorporates a document defined by a `".scrbl"` file into a larger document.

To split the example document into multiple files, change `"mouse.scrbl"` to just

```
#lang scribble/base

@title{On the Cookie-Eating Habits of Mice}

If you give a mouse a cookie, he's going to ask for a
glass of milk.

@include-section["milk.scrbl"]
@include-section["straw.scrbl"]
```

Create `"milk.scrbl"` and `"straw.scrbl"` in the same directory as `"mouse.scrbl"`. In `"milk.scrbl"`, put

```
#lang scribble/base

@title{The Consequences of Milk}

That ''squeak'' was the mouse asking for milk...
```

and in `"straw.scrbl"`, put

```
#lang scribble/base

@title{Not the Last Straw}

For now, to handle the milk moustache, ...
```

Notice that the new files both start with `#lang`, like the original document, and the `section`s from the original document become `title`s in the new documents. Both `"milk.scrbl"` and `"straw.scrbl"` are documents in their own right with their own titles, and they can be individually rendered using `scribble`. Running `scribble` on `"mouse.scrbl"`, meanwhile, incorporates the smaller documents into one document that is the same as before.

1.4   Document Styles

Scribble currently supports only one form of HTML output. You can replace the `"scribble.css"` file for the generated pages, and that's about it. (We expect to add more styles in the future.)

For Latex-based PDF output, Scribble includes support for multiple page-layout configurations. The `"mouse.scrbl"` example so far uses the default Latex style. If you plan on submitting the paper to a workshop on programming languages, then—well, you probably need a different topic. But you can start making the current content look right by changing the first line to

```
#lang scribble/sigplan
```

If you're instead working toward Racket library documentation, try changing the first line to

```
#lang scribble/manual
```

which produces output with a separate title page, initial content on that page (intended as a brief orientation to the document), and top-level sections turned into chapters that each start on a new page. If you have split the document into multiple files, the first line of the main document file determines the output format.

Using `scribble/sigplan` or `scribble/manual` does not change the rendered HTML for a document—aside from `scribble/manual` adding a version number—but it changes the set of bindings available in the document body. For example, with `scribble/sigplan`, the introductory text can be marked as an abstract:

```
#lang scribble/sigplan

@title{On the Cookie-Eating Habits of Mice}

@abstract{If you give a mouse a cookie, he's going to
          ask for a glass of milk.}

@section{The Consequences of Milk}

....
```

When rendered as HTML, the abstract shows up as an inset paragraph. If you try to use `abstract` with the `scribble/base` or `scribble/manual` language, then you get an error, because `abstract` is not defined.

When a document is implemented across multiple files, changing the language of the main document can set the style for all of the parts, but it does not introduce bindings into the other part files. For example, if you change the language of `"mouse.scrbl"` to `scribble/sigplan`, then `abstract` becomes available in `"mouse.scrbl"` but not in `"milk.scrbl"` or `"straw.scrbl"`. In other words, operator names are lexically scoped.

1.5   More Functions

The `scribble/base` language provides a collection of basic operations (and The `scribble/sigplan` and `scribble/manual` are supersets of `scribble/base`). Many of the operations are style variations that you can apply to text:

```
He's a @smaller{small mouse}. The glass is too
@larger{big}---@bold{way @larger{too @larger{big}}}. So, he'll
@italic{probably} ask you for a straw.
```

which renders as

> He's a small mouse. The glass is too big—**way too big**. So, he'll *probably* ask you for a straw.

As you would expect, calls to functions like `smaller`, `larger`, and `bold` can be nested in other calls. They can also be nested within calls to `title` or `section`:

```
@section{@italic{Not} the Last Straw}
```

1.5.1   Centering

The `centered` operation centers a flow of text:

```
If a mouse eats all your cookies, put up a sign that says
@centered{
  @bold{Cookies Wanted}

  @italic{Chocolate chip preferred!}
}
and see if anyone brings you more.
```

which renders as

> If a mouse eats all your cookies, put up a sign that says
>
> <div align="center">
>
> **Cookies Wanted**
>
> *Chocolate chip preferred!*
>
> </div>
>
> and see if anyone brings you more.

1.5.2   Margin Notes

The `margin-note` operation is used in a similar way, but the rendered text is moved to the margins.

If you use `margin-note`, then the content shows up over here.

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1.5.3 Itemizations

The `itemlist` operation creates a sequence of bulleted text, where the `item` operation groups text to appear in a single bullet. The `itemlist` operation is different from the others that we have seen before, because it only accepts values produced by `item` instead of arbitrary text. This difference is reflected in the use of `[...]` for the arguments to `itemlist` instead of `{...}`:

```
@centered{@bold{Notice to Mice}}

@itemlist[@item{We have cookies for you.}
          @item{If you want to eat a cookie,
                you must bring your own straw.}]
```

which renders as

<div align="center">

Notice to Mice

</div>

- We have cookies for you.
- If you want to eat a cookie, you must bring your own straw.

1.5.4 Tables

The `tabular` function takes a list of lists to organize into a two-dimensional table. By default, no spacing is added between columns, so supply a `#:sep` argument to acts as a column separator. For example,

```
@tabular[#:sep @hspace[1]
         (list (list @bold{Animal} @bold{Food})
               (list "mouse"       "cookie")
               (list "moose"       "muffin"))]
```

renders as

Animal	Food
mouse	cookie
moose	muffin

1.6   Text Mode vs. Racket Mode for Arguments

When `[...]` surrounds the arguments of an operation, the argument expressions are in Racket mode rather than text mode. Even in Racket mode, `@` can be used to apply operations; once

the @ syntax is enabled through a language like `scribble/base` (as opposed to `racket`), it behaves the same in both Racket mode and text mode.

One advantage of using Racket mode for the arguments to `itemlist` is that we can pass a keyword-tagged optional argument to `itemlist`. In particular, if you want a list with numbers instead of bullets, supply the `'ordered` style to `itemlist` using the `#:style` keyword:

```
@itemlist[#:style 'ordered
          @item{Eat cookie.}
          @item{Drink milk.}
          @item{Wipe mouth.}
          @item{...}]
```

An operation doesn't care whether it's used with [...] or {...}. Roughly, {...} forms an argument that is a string. (Only roughly, though. Newlines or uses of @ within {...} complicate the picture, and we'll get back to that soon.) So,

```
@italic{Yummy!}
```

is equivalent to

```
@italic["Yummy!"]
```

which is equivalent to the Racket expression

```
(italic "Yummy!")
```

These equivalences explain why Scribble functions are documented in Racket notation. If you're reading this in HTML format, you can click `italic` above to access its documentation. The documentation won't completely make sense, yet, but it will by the end of this chapter.

What if you want to provide arguments in text mode, but you also want to supply other optional arguments? You can use both [...] and {...} for an operation, as long as the [...] is first, and as long as no character separate the closing] from the opening {. For example, calling `italic` is the same as using `elem` with the `'italic` style:

```
@elem[#:style 'italic]{Yummy!}
```

You can also *omit* both [...] and {...}. In that case, the Racket expression after @ is used directly instead of applied as an operation. For example,

```
1 plus 2 is @(number->string (+ 1 2)).
```

renders as

> 1 plus 2 is 3.

The call to `number->string` is needed because a naked number is not valid as document content.

1.7   @ Syntax Basics

The @ notation provided by Scribble is just another way of writing Racket expressions. Scribble documents could be constructed using normal Racket notation, without using @ at all, but that would be inconvenient for most purposes. The @ notation makes dealing with textual content much easier.

Whether in text mode or Racket mode, `@` in a document provides an escape to Racket mode. The basic syntax of `@` is

> `@` ⟨*cmd*⟩ `[` ⟨*datum*⟩* `]` `{` ⟨*text-body*⟩ `}`

where all three parts after `@` are optional, but at least one must be present. No spaces are allowed between

- `@` and ⟨*cmd*⟩, `[`, or `{`
- ⟨*cmd*⟩ and `[` or `{`; or
- `]` and `{`.

A ⟨*cmd*⟩ or ⟨*datum*⟩ is normal Racket notation, while a ⟨*text-body*⟩ is itself in text mode. A ⟨*cmd*⟩ obviously must not start with `[` or `{`, even though Racket forms could otherwise start with those characters.

The expansion of just `@`⟨*cmd*⟩ into Racket code is

> ⟨*cmd*⟩

When either `[ ]` or `{ }` are used, the expansion is

> (⟨*cmd*⟩ ⟨*datum*⟩* ⟨*parsed-body*⟩*)

where ⟨*parsed-body*⟩* is the parse result of the ⟨*text-body*⟩. The ⟨*parsed-body*⟩* part often turns out to be a sequence of Racket strings.

In practice, the ⟨*cmd*⟩ is normally a Racket identifier that is bound to a procedure or syntactic form. If the procedure or form expects further text to typeset, then {...} supplies the text. If the form expects other data, typically [...] is used to surround Racket arguments, instead. Even if an operation's argument is a string, if the string is not used as content text (but instead used as, say, a hyperlink label), then the string is typically provided through [...] instead of {...}. Sometimes, both [...] and {...} are used, where the former surround Racket arguments that precede text to typeset. Finally, if a form is a purely Racket-level form with not typeset result, such as a `require` to import more operations, then typically just @ is used.

For example the text-mode stream

```
@(require scriblib/figure)

@section[#:tag "poetry"]{Of Mice and Cookies}
See @secref["milk"].

@section[#:tag "milk"]{@italic{Important} Milk Supplies}
@figure["straw" @elem{A straw}]{@image["straw.png"]}
```

is equivalent to the Racket-mode sequence

```
(require scriblib/figure) "\n"
"\n"
(section #:tag "poetry" "Of Mice and Cookies") "\n"
"See " (secref "milk") "." "\n"
"\n"
(section #:tag "milk" (italic "Important") " Milk Supplies") "\n"
(figure "straw" (elem "A straw") (image "straw.png")) "\n"
```

Besides showing how different argument conventions are used for different operations, the above example illustrates how whitespace is preserved in the Racket form of a text-mode stream—including newlines preserved as their own strings. Notice how the second `section` gets two arguments for its content, since the argument content for `section` in the source stream includes both the use of an operator and additional text. When an operation like `section` or `italic` accepts content to typeset, it normally accepts an arbitrary number of arguments that together form the content.

In addition to its role for command, a @ can be followed by ; to start a comment. If the character after ; is {, then the comment runs until a matching }, otherwise the comment runs until the end-of-line:

```
@;{ ⟨comment⟩ }
@; ⟨line-comment⟩
```

For more information on the syntax of @, see §2 "@ Syntax". The full syntax includes a few more details, such as brackets like |{...}| for text-mode arguments while disabling @ between the brackets.

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1.8 Decoding Sequences

In a document that starts `#lang` `scribble/base`, the top level is a text-mode stream, just like the ⟨*text-body*⟩ in a `@` form. As illustrated in the previous section, such a top-level sequence corresponds to a mixture of Racket-mode strings and operation applications. There's an implicit operation, `decode`, that wraps the whole document to consume this mixture of strings and other values and turn them into a document description.

The `decode` operation implements *flow decoding*, which takes a document stream and breaks it up into sections and paragraphs. Blank lines delimit paragraphs, and the results of operations like `title` and `section` generate "here's the title" or "a new section starts here" declarations that are recognized by `decode`.

A different but related *content decoding* takes place within a paragraph or section title. Content decoding is responsible for converting `---` to an em dash or for converting `"` and `'` to suitable curly quotes.

The decoding process for document's stream is ultimately determined by the `#lang` line that starts the document. The `scribble/base`, `scribble/manual`, and `scribble/sigplan` languages all use the same `decode` operation. The `scribble/text` language, however, acts more like a plain-text generator and preprocessor, and it does not perform any such decoding rules. (For more on `scribble/text`, see §6 "Text Generation".)

More precisely, languages like `scribble/base` apply `decode` only after lifting out all definitions and imports from the document stream.

When the flow decoder is used, after it breaks the input stream into paragraphs, it applies content decoding to strings within the paragraph. When content is wrapped with an operation, however, content decoding does not apply automatically. An operation is responsible for calling a content or flow decoder as it sees fit. Most operations call the decoder; for example, `italic`, `bold`, `smaller`, etc., all decode their arguments. Similarly, `title` and `section` decode the given content for the title or section name. The `literal` and `verbatim` operators, however, do not decode the given strings. For example,

```
@verbatim{---}
```

renders as

```
---
```

Don't confuse decoding with the expansion of @ notation. The source form

```
@verbatim{@(number->string (+ 1 2))}
```

renders as

```
3
```

because the source is equivalent to

```
(verbatim (number->string (+ 1 2)))
```

where `(number->string (+ 1 2))` is evaluated to produce the argument to `verbatim`. The `|{...}|` style of brackets is often used with `verbatim`, because `|{...}|` disables @ notation for arguments. For example,

```
@verbatim|{@(number->string (+ 1 2))}|
```

renders as

```
@(number->string (+ 1 2))
```

1.9 Pictures

Any value that is convertable to an image can be used directly within a Scribble document. Functions from the `pict` and `2htdp/image` libraries, for example, generate images. For example,

```
@(require pict)

This cookie has lost its chocolate chips:
@(colorize (filled-ellipse 40 40) "beige").
```

renders as

This cookie has lost its chocolate chips: .

1.10 Next Steps

If your immediate goal is to document a Racket library or write literate programs, skip to §4.1 "Getting Started with Documentation", and then go back to §2 "@ Syntax" and other chapters.

If you are more interested in producing documents unrelated to Racket, continue with §2 "@ Syntax" and then §3 "High-Level Scribble API". Move on to §7 "Low-Level Scribble API" when you need more power.

If you are interested in text generation and preprocessing, continue with §2 "@ Syntax", but then skip to §6 "Text Generation".

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2 @ Syntax

The Scribble @ notation is designed to be a convenient facility for free-form text in Racket code, where "@" was chosen as one of the least-used characters in existing Racket code. An @-expression is simply an S-expression in disguise.

Typically, @ notation is enabled through `scribble/base` or similar languages, but you can also add @ notation to an S-expression-based language using the `at-exp` meta-language. For example,

```
#lang at-exp racket
(define v '@op{str})
```

is equivalent to

```
#lang racket
(define v '(op "str"))
```

Using `#lang at-exp racket` is probably the easiest way to try the examples in this chapter.

2.1 The Scribble Syntax at a Glance

To review §1.7 "@ Syntax Basics", the concrete syntax of @-*forms* is roughly

> @ ⟨*cmd*⟩ [⟨*datum*⟩*] { ⟨*text-body*⟩* }

where all three parts after @ are optional, but at least one should be present. (Spaces are not allowed between the three parts.) Roughly, a form matching the above grammar is read as

> (⟨*cmd*⟩ ⟨*datum*⟩* ⟨*parsed-body*⟩*)

where ⟨*parsed-body*⟩ is the translation of each ⟨*text-body*⟩ in the input. Thus, the initial ⟨*cmd*⟩ determines the Racket code that the input is translated into. The common case is when ⟨*cmd*⟩ is a Racket identifier, which reads as a plain Racket form, with datum arguments and/or string arguments.

Here is one example:

> `@foo{blah blah blah}`   reads as   `(foo "blah blah blah")`

The example shows how an input syntax is read as Racket syntax, not what it evaluates to. If you want to see the translation of an example into S-expression form, add a quote in front of it in a `#lang at-exp racket` module. For example, running

```
#lang at-exp racket
'@foo{blah blah blah}
```

in DrRacket prints the output

```
(foo "blah blah blah")
```

while omitting the quote

```
#lang at-exp racket
@foo{blah blah blah}
```

triggers a syntax error because `foo` is not bound, and

```
#lang at-exp racket
(define (foo str) (printf "He wrote ~s.\n" str))
@foo{blah blah blah}
```

prints the output

```
He wrote "blah blah blah".
```

Here are more examples of @-forms:

`@foo{blah "blah" (‘blah’?)}`	reads as	`(foo "blah \"blah\" (‘blah’?)")`
`@foo[1 2]{3 4}`	reads as	`(foo 1 2 "3 4")`
`@foo[1 2 3 4]`	reads as	`(foo 1 2 3 4)`
`@foo[#:width 2]{blah blah}`	reads as	`(foo #:width 2 "blah blah")`
`@foo{blah blah` `     yada yada}`	reads as	`(foo "blah blah" "\n"` `     "yada yada")`

`@foo{`
`  blah blah`
`  yada yada`
`}`
	reads as	`(foo`
		`  "blah blah" "\n"`
		`  "yada yada")`

As seen in the last example, multiple lines and the newlines that separate them are parsed to multiple Racket strings. More generally, a ⟨*text-body*⟩ is made of text, newlines, and nested @-forms, where the syntax for @-forms is the same whether it's in a ⟨*text-body*⟩ context as in a Racket context. A ⟨*text-body*⟩ that isn't an @-form is converted to a string expression for its ⟨*parsed-body*⟩; newlines and following indentations are converted to `"\n"` and all-space string expressions.

```
@foo{bar @baz{3}            reads as    (foo "bar " (baz "3") "\n"
    blah}                                    "blah")

@foo{@b{@u[3] @u{4}}        reads as    (foo (b (u 3) " " (u "4")) "\n"
    blah}                                    "blah")

@C{while (*(p++))           reads as    (C "while (*(p++))" "\n" "   "
    *p = '\n';}                             "*p = '\\n';")
```

The command part of an @-form is optional as well. In that case, the @-form is read as a
list, which usually counts as a function application, but it also useful when quoted with the
usual Racket quote:

```
@{blah blah}   reads as   ("blah blah")

@{blah @[3]}   reads as   ("blah " (3))

'@{foo                     '("foo" "\n"
    bar        reads as          "bar" "\n"
    baz}                         "baz")
```

Finally, we can also drop the datum and text parts, which leaves us with only the command—
which is read as is, not within a parenthesized form. This is not useful when reading Racket
code, but it can be used inside a text block to escape a Racket identifier. A vertical bar (|)
can be used to delimit the escaped identifier when needed.

```
@foo                    reads as   foo
@{blah @foo blah}       reads as   ("blah " foo " blah")
@{blah @foo: blah}      reads as   ("blah " foo: " blah")
@{blah @|foo|: blah}    reads as   ("blah " foo ": blah")
```

Actually, the command part can be any Racket expression (that does not start with [, {, or |),
which is particularly useful with such escapes since they can be used with any expression.

```
@foo{(+ 1 2) -> @(+ 1 2)!}   reads as   (foo "(+ 1 2) -> " (+ 1 2) "!")
@foo{A @"string" escape}     reads as   (foo "A string escape")
```

Note that an escaped Racket string is merged with the surrounding text as a special case.
This is useful if you want to use the special characters in your string, but escaping braces are
not necessary if they are balanced.

```
@foo{eli@"@"barzilay.org}     reads as   (foo "eli@barzilay.org")

@foo{A @"{" begins a block}   reads as   (foo "A { begins a block")
```

```
@C{while (*(p++)) {                     (C "while (*(p++)) {" "\n" "   "
    *p = '\n';          reads as        "*p = '\\n';" "\n"
  }}                                    "}")
```

In some cases, a text contains many literal @s, which can be cumbersome to quote individually. For such case, braces have an alternative syntax: A block of text can begin with a "`|{`" and terminated accordingly with a "`}|`". Furthermore, any nested @-forms must begin with a "`|@`".

```
@foo|{bar}@{baz}|          reads as   (foo "bar}@{baz}")
@foo|{bar |@x{X} baz}|     reads as   (foo "bar " (x "X") " baz")
@foo|{bar |@x|{@}| baz}|   reads as   (foo "bar " (x "@") " baz")
```

In cases when even this is not convenient enough, punctuation characters can be added between the `|` and the braces and the @ in nested forms. (The punctuation is mirrored for parentheses and `<>`s.) With this extension, Scribble syntax can be used as a "here string" replacement.

```
@foo|--{bar}@|{baz}--|   reads as   (foo "bar}@|{baz")
@foo|<<{bar}@|{baz}>>|   reads as   (foo "bar}@|{baz")
```

On the flip side of this is, how can an @ sign be used in Racket code? This is almost never an issue, because Racket strings and characters are still read the same, and `@` is set as a non-terminating reader macro so it can be used in Racket identifiers anywhere except in the first character of an identifier. When `@` must appear as the first character of an identifier, you must quote the identifier just like other non-standard characters in normal S-expression syntax: with a backslash or with vertical bars.

```
(define \@email "foo@bar.com")   reads as   (define @email "foo@bar.com")
(define |@atchar| #\@)           reads as   (define @atchar #\@)
```

Note that spaces are not allowed before a `[` or a `{`, or they will be part of the following text (or Racket code). (More on using braces in body texts below.)

```
@foo{bar @baz[2 3] {4 5}}   reads as   (foo "bar " (baz 2 3) " {4 5}")
```

Finally, remember that the Scribble is just an alternate for S-expressions. Identifiers still get their meaning, as in any Racket code, through the lexical context in which they appear. Specifically, when the above @-form appears in a Racket expression context, the lexical environment must provide bindings for `foo` as a procedure or a macro; it can be defined, required, or bound locally (with `let`, for example).

```
> (let* ([formatter (lambda (fmt)
           (lambda args (format fmt (apply string-append args))))]
          [bf (formatter "*~a*")]
          [it (formatter "/~a/")]
          [ul (formatter "_~a_")]
          [text string-append])
```

```
     @text{@it{Note}: @bf{This is @ul{not} a pipe}.})
  "/Note/: *This is _not_ a pipe*."
```

2.2   The Command Part

Besides being a Racket identifier, the ⟨*cmd*⟩ part of an @-form can have Racket punctuation prefixes, which will end up wrapping the *whole* expression.

```
@'',@foo{blah}      reads as   '',@(foo "blah")
@#'#'#,@foo{blah}   reads as   #'#'#,@(foo "blah")
```

When writing Racket code, this means that `@'',@foo{blah}` is exactly the same as `'@',@foo{blah}` and `'',@@foo{blah}`, but unlike the latter two, the first construct can appear in body texts with the same meaning, whereas the other two would not work (see below).

After the optional punctuation prefix, the ⟨*cmd*⟩ itself is not limited to identifiers; it can be *any* Racket expression.

```
@(lambda (x) x){blah}   reads as   ((lambda (x) x) "blah")
@'(unquote foo){blah}   reads as   '(,foo   "blah")
```

In addition, the command can be omitted altogether, which will omit it from the translation, resulting in an S-expression that usually contains, say, just strings:

```
@{foo bar                  ("foo bar" "\n"
   baz}    reads as                 "baz")
```

```
@'{foo bar                 '("foo bar" "\n"
   baz}    reads as                 "baz")
```

If the command part begins with a `;` (with no newline between the `@` and the `;`), then the construct is a comment. There are two comment forms, one for arbitrary-text and possibly nested comments, and another one for line comments:

```
@;{ ⟨any⟩* }
```

```
@; ⟨anything-else-without-newline⟩*
```

In the first form, the commented body must still parse correctly; see the description of the body syntax below. In the second form, all text from the `@;` to the end of the line *and* all following spaces (or tabs) are part of the comment (similar to `%` comments in TeX).

```
@foo{bar @; comment
     baz@;              reads as   (foo "bar bazblah")
     blah}
```

Tip: if you use an editor in some Scheme mode without support for @-forms, balanced comments can be confusing, since the open brace looks commented out, and the closing one isn't. In such cases it is useful to "comment" out the closing brace too:

```
@;{
  ...
;}
```

so the editor does not treat the file as having unbalanced parentheses.

If only the ⟨*cmd*⟩ part of an @-form is specified, then the result is the command part only, without an extra set of parenthesis. This makes it suitable for Racket escapes in body texts. (More on this below, in the description of the body part.)

```
@foo{x @y z}          reads as   (foo "x " y " z")
@foo{x @(* y 2) z}    reads as   (foo "x " (* y 2) " z")
@{@foo bar}           reads as   (foo " bar")
```

Finally, note that there are currently no special rules for using `@` in the command itself, which can lead to things like:

```
@@foo{bar}{baz}   reads as   ((foo "bar") "baz")
```

2.3   The Datum Part

The datum part can contains arbitrary Racket expressions, which are simply stacked before the body text arguments:

```
@foo[1 (* 2 3)]{bar}   reads as   (foo 1 (* 2 3) "bar")
@foo[@bar{...}]{blah}  reads as   (foo (bar "...") "blah")
```

The body part can still be omitted, which is essentially an alternative syntax for plain (non-textual) S-expressions:

```
@foo[bar]             reads as   (foo bar)
@foo{bar @f[x] baz}   reads as   (foo "bar " (f x) " baz")
```

The datum part can be empty, which makes no difference, except when the body is omitted. It is more common, however, to use an empty body for the same purpose.

```
@foo[]{bar}  reads as   (foo "bar")
@foo[]       reads as   (foo)
@foo         reads as   foo
@foo{}       reads as   (foo)
```

The most common use of the datum part is for Racket forms that expect keyword-value arguments that precede the body of text arguments.

```
@foo[#:style 'big]{bar}   reads as   (foo #:style 'big  "bar")
```

2.4   The Body Part

The syntax of the body part is intended to be as convenient as possible for free text. It can contain almost any text—the only characters with special meaning is `@` for sub-@-forms, and `}` for the end of the text. In addition, a `{` is allowed as part of the text, and it makes the matching `}` be part of the text too—so balanced braces are valid text.

```
@foo{f{o}o}     reads as   (foo "f{o}o")
@foo{{{}}{}}    reads as   (foo "{{}}{}")
```

As described above, the text turns to a sequence of string arguments for the resulting form. Spaces at the beginning and end of lines are discarded, and newlines turn to individual `"\n"` strings (i.e., they are not merged with other body parts); see also the information about newlines and indentation below. Spaces are *not* discarded if they appear after the open `{` (before the closing `}`) when there is also text that follows (precedes) it; specifically, they are preserved in a single-line body.

```
@foo{bar}          reads as   (foo "bar")
@foo{ bar }        reads as   (foo " bar ")
@foo[1]{ bar }     reads as   (foo 1 " bar ")
```

If `@` appears in a body, then it is interpreted as Racket code, which means that the @-reader is applied recursively, and the resulting syntax appears as part of the S-expression, among other string contents.

```
@foo{a @bar{b} c}   reads as   (foo "a " (bar "b") " c")
```

If the nested @ construct has only a command—no body or datum parts—it will not appear in a subform. Given that the command part can be any Racket expression, this makes @ a general escape to arbitrary Racket code.

```
@foo{a @bar c}        reads as   (foo "a " bar " c")
@foo{a @(bar 2) c}    reads as   (foo "a " (bar 2) " c")
```

This is particularly useful with strings, which can be used to include arbitrary text.

```
@foo{A @"}" marks the end}   reads as   (foo "A } marks the end")
```

Note that the escaped string is (intentionally) merged with the rest of the text. This works for `@` too:

```
@foo{The prefix: @"@".}      reads as   (foo "The prefix: @.")
@foo{@"@x{y}" --> (x "y")}   reads as   (foo "@x{y} --> (x \"y\")")
```

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2.4.1 Alternative Body Syntax

In addition to the above, there is an alternative syntax for the body, one that specifies a new marker for its end: use `|{` for the opening marker to have the text terminated by a `}|`.

```
@foo|{...}|                   reads as   (foo "...")
@foo|{"}" follows "{"}|       reads as   (foo "\"}\" follows \"{\"")
@foo|{Nesting |{is| ok}|      reads as   (foo "Nesting |{is| ok")
```

This applies to sub-@-forms too—the `@` must be prefixed with a `|`:

```
@foo|{Maze                              (foo "Maze" "\n"
      |@bar{is}              reads as         (bar "is") "\n"
      Life!}|                                 "Life!")


@t|{In |@i|{sub|@"@"s}| too}|   reads as   (t "In " (i "sub@s") " too")
```

Note that the subform uses its own delimiters, `{...}` or `|{...}|`. This means that you can copy and paste Scribble text with @-forms freely, just prefix the `@` if the immediate surrounding text has a prefix.

For even better control, you can add characters in the opening delimiter, between the `|` and the `{`. Characters that are put there (non alphanumeric ASCII characters only, excluding `{` and `@`) should also be used for sub-@-forms, and the end-of-body marker should have these characters in reverse order with paren-like characters (`(`, `[`, `<`) mirrored.

```
@foo|<<<{@x{foo} |@{bar}|.}>>>|   reads as   (foo "@x{foo} |@{bar}|.")
@foo|!!{X |!!@b{Y}...}!!|         reads as   (foo "X " (b "Y") "...")
```

Finally, remember that you can use an expression escape with a Racket string for confusing situations. This works well when you only need to quote short pieces, and the above works well when you have larger multi-line body texts.

2.4.2 Racket Expression Escapes

In some cases, you may want to use a Racket identifier (or a number or a boolean etc.) in a position that touches the following text; in these situations you should surround the escaped Racket expression by a pair of `|` characters. The text inside the bars is parsed as a Racket expression.

```
@foo{foo@bar.}       reads as   (foo "foo" bar.)
@foo{foo@|bar|.}     reads as   (foo "foo" bar ".")
@foo{foo@3.}         reads as   (foo "foo" 3.0)
@foo{foo@|3|.}       reads as   (foo "foo" 3 ".")
```

This form is a generic Racket expression escape, there is no body text or datum part when

you use this form.

```
@foo{foo@|(f 1)|{bar}}    reads as   (foo "foo" (f 1) "{bar}")
@foo{foo@|bar|[1]{baz}}   reads as   (foo "foo" bar "[1]{baz}")
```

This works for string expressions too, but note that unlike the above, the string is (intention-ally) not merged with the rest of the text:

```
@foo{x@"y"z}      reads as   (foo "xyz")
@foo{x@|"y"|z}    reads as   (foo "x" "y" "z")
```

Expression escapes also work with *any* number of expressions,

```
@foo{x@|1 (+ 2 3) 4|y}   reads as   (foo "x" 1 (+ 2 3) 4 "y")
```

```
@foo{x@|*                          (foo "x" *
        *|y}     reads as             * "y")
```

It seems that `@||` has no purpose—but remember that these escapes are never merged with the surrounding text, which can be useful when you want to control the sub expressions in the form.

```
@foo{Alice@||Bob@|        (foo "Alice" "Bob"
     |Carol}     reads as     "Carol")
```

Note that `@|{...}|` can be parsed as either an escape expression or as the Racket command part of an @-form. The latter is used in this case (since there is little point in Racket code that uses braces.

```
@|{blah}|    reads as   ("blah")
```


2.4.3   Comments

As noted above, there are two kinds of Scribble comments: `@;{...}` is a (nestable) com-ment for a whole body of text (following the same rules for @-forms), and `@;...` is a line-comment.

```
@foo{First line@;{there is still a          (foo "First line"
                   newline here;}    reads as    "\n"
      Second line}                             "Second line")
```

One useful property of line-comments is that they continue to the end of the line *and* all following spaces (or tabs). Using this, you can get further control of the subforms.

```
@foo{A long @;
     single-@;        reads as   (foo "A long single-string arg.")
     string arg.}
```

Note how this is different from using `@||`s in that strings around it are not merged.

2.4.4 Spaces, Newlines, and Indentation

The Scribble syntax treats spaces and newlines in a special way is meant to be sensible for dealing with text. As mentioned above, spaces at the beginning and end of body lines are discarded, except for spaces between a `{` and text, or between text and a `}`.

```
@foo{bar}        reads as   (foo "bar")

@foo{ bar }   reads as   (foo " bar ")

@foo{ bar                 (foo " bar" "\n"
      baz }   reads as          "baz ")
```

A single newline that follows an open brace or precedes a closing brace is discarded, unless there are only newlines in the body; other newlines are read as a `"\n"` string

```
@foo{bar
}        reads as   (foo "bar")

@foo{
   bar      reads as   (foo
}                         "bar")

@foo{
                         (foo
   bar      reads as     "\n"
                         "bar" "\n")
}

@foo{
   bar                   (foo
              reads as   "bar" "\n"
   baz                   "\n"
}                        "baz")

@foo{
}        reads as   (foo "\n")

@foo{
                         (foo "\n"
              reads as        "\n")
}
```

```
@foo{ bar                 (foo " bar" "\n"
      baz }   reads as         "baz ")
```

Spaces at the beginning of body lines do not appear in the resulting S-expressions, but the column of each line is noticed, and all-space indentation strings are added so the result has the same indentation. A indentation string is added to each line according to its distance from the leftmost syntax object (except for empty lines). (Note: if you try these examples on a Racket REPL, you should be aware that the reader does not know about the "> " prompt.)

```
@foo{
  bar                     (foo
  baz       reads as       "bar" "\n"
  blah                     "baz" "\n"
}                          "blah")


@foo{                     (foo
  begin                    "begin" "\n" "   "
    x++;    reads as       "x++;" "\n"
  end}                     "end")


@foo{                     (foo "   "
    a                         "a" "\n" " "
  b         reads as          "b" "\n"
  c}                          "c")
```

If the first string came from the opening { line, it is not prepended with an indentation (but it can affect the leftmost syntax object used for indentation). This makes sense when formatting structured code as well as text (see the last example in the following block).

```
@foo{bar                     (foo "bar" "\n" "   "
       baz       reads as         "baz" "\n"
     bbb}                          "bbb")


@foo{ bar                    (foo " bar" "\n" "    "
       baz       reads as         "baz" "\n" " "
     bbb}                          "bbb")


@foo{bar                     (foo "bar" "\n"
  baz          reads as          "baz" "\n"
  bbb}                           "bbb")


@foo{ bar                    (foo " bar" "\n"
  baz          reads as          "baz" "\n"
  bbb}                           "bbb")
```

```
@foo{ bar                       (foo " bar" "\n"
   baz              reads as       "baz" "\n" "   "
     bbb}                           "bbb")


@text{Some @b{bold              (text "Some " (b "bold" "\n"
   text}, and       reads as                 "text")", and" "\n"
   more text.}                                "more text.")
```

Note that each @-form is parsed to an S-expression that has its own indentation. This means that Scribble source can be indented like code, but if indentation matters then you may need to apply indentation of the outer item to all lines of the inner one. For example, in

```
@code{
  begin
    i = 1, r = 1
    @bold{while i < n do
            r *= i++
         done}
  end
}
```

a formatter will need to apply the 2-space indentation to the rendering of the `bold` body.

Note that to get a first-line text to be counted as a leftmost line, line and column accounting should be on for the input port (`use-at-readtable` turns them on for the current input port). Without this,

```
@foo{x1
       x2
       x3}
```

will not have 2-space indentations in the parsed S-expression if source accounting is not on, but

```
@foo{x1
       x2
     x3}
```

will (due to the last line). Pay attention to this, as it can be a problem with Racket code, for example:

```
@code{(define (foo x)
        (+ x 1))}
```

For rare situations where spaces at the beginning (or end) of lines matter, you can begin (or end) a line with a `@||`.

```
@foo{                         (foo
  @|| bar @||   reads as      " bar " "\n"
  @|| baz}                     " baz")
```

3 High-Level Scribble API

3.1 Base Document Format

 `#lang scribble/base`   package: `scribble-lib`

The `scribble/base` language provides functions and forms that can be used from code written either in Racket or with @ expressions. It essentially extends `racket/base`, except that top-level forms within a module using the `scribble/base` language are treated as document content (like `scribble/doclang`).

The `scribble/base` name can also be used as a library with `require`, in which case it provides only the bindings defined in this section, and it also does not set the reader or set the default rendering format to the Racket manual format.

Functions provided by this library, such as `title` and `italic`, might be called from Racket as

```
(title #:tag "how-to"
       "How to Design " (italic "Great") " Programs")
```

They can also be called with @ notation as

```
@title[#:tag "how-to"]{How to Design @italic{Great} Programs}
```

Although the procedures are mostly designed to be used from @ mode, they are easier to document in Racket mode (partly because we have `scribble/manual`).

3.1.1 Document Structure

```
(title [#:tag tag
        #:tag-prefix tag-prefix
        #:style style
        #:version vers
        #:date date]
        pre-content ...+)          → title-decl?
  tag : (or/c #f string? (listof string?)) = #f
  tag-prefix : (or/c #f string? module-path?) = #f
  style : (or/c style? #f string? symbol? (listof symbol?)) = #f
  vers : (or/c string? #f) = #f
  date : (or/c string? #f) = #f
  pre-content : pre-content?
```

Generates a `title-decl` to be picked up by `decode` or `decode-part`. The decoded *pre-content* (i.e., parsed with `decode-content`) supplies the title content. If *tag* is `#f`, a

tag string is generated automatically from the content. The tag string is combined with the symbol 'part to form the full tag.

The *style* argument can be a style structure, or it can be one of the following: a #f that corresponds to a "plain" style, a string that is used as a style name, a symbol that is used as a style property, or a list of symbols to be used as style properties. For information on styles, see part. For example, a style of 'toc causes sub-sections to be generated as separate pages in multi-page HTML output.

The *tag-prefix* argument is propagated to the generated structure (see §7.3.2 "Tags"). If *tag-prefix* is a module path, it is converted to a string using module-path-prefix->string.

The *vers* argument is propagated to the title-decl structure. Use "" as *vers* to suppress version rendering in the output.

The *date* argument is propagated to the title-decl structure via a document-date style property. Use "" as *date* to suppress date rendering in Latex output.

The section title is automatically indexed by decode-part. For the index key, leading whitespace and a leading "A", "An", or "The" (followed by more whitespace) is removed.

```
(section [#:tag tag
          #:tag-prefix tag-prefix
          #:style style]
          pre-content ...+)          → part-start?
  tag : (or/c #f string? (listof string?)) = #f
  tag-prefix : (or/c #f string? module-path?) = #f
  style : (or/c style? #f string? symbol? (listof symbol?)) = #f
  pre-content : pre-content?
```

Like title, but generates a part-start of depth 0 to be by decode or decode-part.

```
(subsection [#:tag tag
             #:tag-prefix tag-prefix
             #:style style]
             pre-content ...+)          → part-start?
  tag : (or/c #f string? (listof string?)) = #f
  tag-prefix : (or/c #f string? module-path?) = #f
  style : (or/c style? #f string? symbol? (listof symbol?)) = #f
  pre-content : pre-content?
```

Like section, but generates a part-start of depth 1.

```
(subsubsection [#:tag tag
                #:tag-prefix tag-prefix
                #:style style]
                pre-content ...+)          → part-start?
```

```
  tag : (or/c #f string? (listof string?)) = #f
  tag-prefix : (or/c #f string? module-path?) = #f
  style : (or/c style? #f string? symbol? (listof symbol?)) = #f
  pre-content : pre-content?
```

Like section, but generates a part-start of depth 2.

```
(subsubsub*section [#:tag tag
                    #:tag-prefix tag-prefix
                    #:style style]
                   pre-content ...+)          → paragraph?
  tag : (or/c #f string? (listof string?)) = #f
  tag-prefix : (or/c #f string? module-path?) = #f
  style : (or/c style? #f string? symbol? (listof symbol?)) = #f
  pre-content : pre-content?
```

Similar to section, but merely generates a paragraph that looks like an unnumbered section heading (for when the nesting gets too deep to include in a table of contents).

```
(include-section module-path)
```

Requires *module-path* and returns its doc export (without making any imports visible to the enclosing context). Since this form expands to require, it must be used in a module or top-level context.

```
(author auth ...) → block?
  auth : content?
```

Generates a paragraph with style name 'author to show the author(s) of a document, where each author is represented by content. Normally, this function is used after title for the beginning of a document. See also author+email.

```
(author+email  author-name
               email
               [#:obfuscate? obfuscate?]) → element?
  author-name : content?
  email : string?
  obfuscate? : any/c = #f
```

Combines an author name with an e-mail address. If *obfuscate?* is true, then the result obscures the e-mail address slightly to avoid address-harvesting robots.

Note that author+email is not a replacement for author. The author+email function is often used in combination with author.

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3.1.2 Blocks

```
(para [#:style style] pre-content ...) → paragraph?
  style : (or/c style? string? symbol? #f) = #f
  pre-content : pre-content?
```

Creates a paragraph containing the decoded *pre-content* (i.e., parsed with decode-paragraph).

The *style* argument can be a style, #f to indicate a "plain" style, a string that is used as a style name, or a symbol that is used as a style name. (Note that section and para treat symbols differently as *style* arguments.)

```
(nested [#:style style] pre-flow ...) → nested-flow?
  style : (or/c style? string? symbol? #f) = #f
  pre-flow : pre-flow?
```

Creates a nested flow containing the decoded *pre-flow* (i.e., parsed with decode-flow).

The *style* argument is handled the same as para. The 'inset and 'code-inset styles cause the nested flow to be inset compared to surrounding text, with the latter particularly intended for insetting code.

```
(centered pre-flow ...) → nested-flow?
  pre-flow : pre-flow?
```

Produces a nested flow whose content is centered.

```
(margin-note pre-flow ... [#:left? left?]) → block?
  pre-flow : pre-flow?
  left? : any/c = #f
```

Produces a nested flow that is typeset in the margin, instead of inlined.

If *left?* is true, then the note is shown on the opposite as it would normally be shown (which is the left-hand side for HTML output). Beware of colliding with output for a table of contents.

```
(margin-note* pre-content ... [#:left? left?]) → element?
  pre-content : pre-content?
  left? : any/c = #f
```

Produces an element that is typeset in the margin, instead of inlined. Unlike margin-note, margin-note* can be used in the middle of a paragraph; at the same time, its content is constrained to form a single paragraph in the margin.

```
(itemlist itm ... [#:style style]) → itemization?
  itm : items/c
  style : (or/c style? string? symbol? #f) = #f
```

Constructs an `itemization` given a sequence of items. Typical each `itm` is constructed by `item`, but an `itm` can be a block that is coerced to an `item`. Finally, `itm` can be a list or `splice` whose elements are spliced (recursively, if necessary) into the `itemlist` sequence.

The `style` argument is handled the same as `para`. The `'ordered` style numbers items, instead of just using a bullet.

```
items/c : flat-contract?
```

A contract that is equivalent to the following recursive specification:

```
  (or/c item? block? (listof items/c) (spliceof items/c))
```

```
(item pre-flow ...) → item?
  pre-flow : pre-flow?
```

Creates an item for use with `itemlist`. The decoded `pre-flow` (i.e., parsed with `decode-flow`) is the item content.

```
(item? v) → boolean?
  v : any/c
```

Returns `#t` if `v` is an item produced by `item`, `#f` otherwise.

```
(tabular cells [#:style style #:sep sep]) → table?
  cells : (listof (listof (or/c block? content? 'cont)))
  style : (or/c style? string? symbol? #f) = #f
  sep : (or/c block? content? #f) = #f
```

Creates a table with the given content, which is supplies as a list of rows, where each row has a list of cells. The length of all rows must match.

If `sep` is not `#f`, it is inserted between every column in the table. Otherwise, the default style places no space between table columns.

Use `'cont` as a cell to continue the content of the preceding cell in a row in the space that would otherwise be used for a new cell. A `'cont` must not appear as the first cell in a row.

The `style` argument is handled the same as `para`.

Examples:

```
@tabular[#:sep @hspace[1]
         (list (list "soup" "gazpacho")
               (list "soup" "tonjiru"))]

@tabular[#:style 'boxed
         (list (list @bold{recipe}   @bold{vegetable})
               (list "caldo verde"   "kale")
               (list "kinpira gobō"  "burdock")
               (list "makizushi"      'cont))]
```

Renders like:

soup gazpacho
soup tonjiru

| **recipe** | **vegetable** |
| caldo verde | kale |
| kinpira gobōburdock |
| makizushi |

```
(verbatim [#:indent indent] elem ...+) → block?
  indent : exact-nonnegative-integer? = 0
  elem : content?
```

Typesets string *elem*s in typewriter font with linebreaks specified by newline characters in string *elem*s. Consecutive spaces in the string *elem*s are converted to hspace to ensure that they are all preserved in the output. Additional space (via hspace) as specified by *indent* is added to the beginning of each line. A non-string *elem* is treated as content within a single line.

The string *elem*s are *not* decoded with decode-content, so (verbatim "---") renders with three hyphens instead of an em dash. Beware, however, that *reading* @verbatim converts @ syntax within the argument, and such reading occurs well before arguments to verbatim are delivered at run-time. To disable simple @ notation within the verbatim argument, verbatim is typically used with |{...}| or similar brackets, like this:

```
@verbatim|{
  Use @bold{---} like this...
}|
```

which renders as

```
  Use @bold{---} like this...
```

while

```
@verbatim|{
  Use |@bold{---} like this...
```

```
  }|
```

renders as

```
  Use — like this...
```

Even with brackets like `|{...}|`, beware that consistent leading whitespace is removed by the parser; see §2.4.1 "Alternative Body Syntax" for more information.

See also `literal`.

3.1.3 Text Styles and Content

```
(elem pre-content ... [#:style style]) → element?
  pre-content : pre-content?
  style : (or/c style? string? symbol? #f) = #f
```

Wraps the decoded *pre-content* as an element with style *style*.

```
(italic pre-content ...) → element?
  pre-content : pre-content?
```

Like `elem`, but with style `'italic`.

```
(bold pre-content ...) → element?
  pre-content : pre-content?
```

Like `elem`, but with style `'bold`.

```
(tt pre-content ...) → element?
  pre-content : pre-content?
```

Like `elem`, but with style `'tt`.

```
(subscript pre-content ...) → element?
  pre-content : pre-content?
```

Like `elem`, but with style `'subscript`.

```
(superscript pre-content ...) → element?
  pre-content : pre-content?
```

Like `elem`, but with style `'superscript`.

```
(smaller pre-content ...) → element?
  pre-content : pre-content?
```

Like `elem`, but with style `'smaller`. When uses of `smaller` are nested, text gets progressively smaller.

```
(larger pre-content ...) → element?
  pre-content : pre-content?
```

Like `elem`, but with style `'larger`. When uses of `larger` are nested, text gets progressively larger.

```
(emph pre-content ...) → element?
  pre-content : pre-content?
```

The same as `italic`.

```
(literal str ...+) → element?
  str : string?
```

Produces an element containing literally *str*s with no decoding via `decode-content`.

Beware that `@` for a `literal` call performs some processing before delivering arguments to `literal`. The `literal` form can be used with `|{...}|` or similar brackets to disable `@` notation within the `literal` argument, like this:

```
@literal|{@bold{---}}|
```

which renders as

```
@literal|{@bold{---}}|
```

See also `verbatim`.

```
(image  path
        [#:scale scale
         #:suffixes suffixes]
         pre-content ...)      → element?
  path : (or/c path-string? (cons/c 'collects (listof bytes?)))
  scale : real? = 1.0
  suffixes : (listof #rx"^[.]") = null
  pre-content : pre-content?
```

Creates an image element from the given path. The decoded *pre-content* serves as the alternate text for contexts where the image cannot be displayed.

If *path* is a relative path, it is relative to the current directory, which is set by `raco setup` and `scribble` to the directory of the main document file. Instead of a path or string, the *path* argument can be a result of `path->main-collects-relative`.

The strings in *suffixes* are filtered to those supported by given renderer, and then the acceptable suffixes are tried in order. The HTML renderer supports `".png"`, `".gif"`, and `".svg"`, while the Latex renderer supports `".png"`, `".pdf"`, and `".ps"` (but `".ps"` works only when converting Latex output to DVI, and `".png"` and `".pdf"` work only for converting Latex output to PDF).

Note that when the *suffixes* library is non-empty, then the *path* argument should not have a suffix.

3.1.4 Spacing

`(linebreak)` → `element?`

Produces an element that forces a line break.

`(nonbreaking pre-content ...)` → `element?`
  `pre-content` : `pre-content?`

Like `elem`, but line breaks are suppressed while rendering the content.

`(hspace n)` → `element?`
  `n` : `exact-nonnegative-integer?`

Produces an element containing *n* spaces and style `'hspace`.

`~` : `string?`

A string containing the non-breaking space character, which is equivalent to `'nbsp` as an element.

`-~-` : `string?`

A string containing the non-breaking hyphen character.

`?-` : `string?`

A string containing the soft-hyphen character (i.e., a suggestion of where to hyphenate a word to break it across lines when rendering).

`._` : `element?`

Generates a period that ends an abbreviation in the middle of a sentence, as opposed to a period that ends a sentence (since the latter may be typeset with extra space). Use `@._` in a document instead of just `.` for an abbreviation-ending period that is preceded by a lowercase letter and followed by a space.

See `.__` for an example.

```
.__ : element?
```

Generates a period that ends a sentence (which may be typeset with extra space), as opposed to a period that ends an abbreviation in the middle of a sentence. Use `@.__` in a document instead of just `.` for a sentence-ending period that is preceded by an uppercase letter.

The following example illustrates both `._` and `.__`:

```
#lang scribble/base
My name is Mr@._ T@.__ I pity the fool who can't typeset punctuation.
```

3.1.5 Links

```
(hyperlink  url
            pre-content ...
            [#:underline? underline?
             #:style style])              → element?
  url : string?
  pre-content : pre-content?
  underline? : any/c = #t
  style : (or/c style? string? symbol? #f)
        = (if underline? #f "plainlink")
```

The decoded *pre-content* is hyperlinked to *url*. If *style* is not supplied, then *underline?* determines how the link is rendered.

```
(url dest) → element?
  dest : string?
```

Generates a literal hyperlinked URL.

```
(secref  tag
        [#:doc module-path
         #:tag-prefixes prefixes
         #:underline? underline?]) → element?
  tag : string?
  module-path : (or/c module-path? #f) = #f
  prefixes : (or/c (listof string?) #f) = #f
  underline? : any/c = #t
```

Inserts a reference to the section tagged `tag`.

If `#:doc` `module-path` is provided, the `tag` refers to a tag with a prefix deter-
mined by `module-path`. When `setup-plt` renders documentation, it automatically
adds a tag prefix to the document based on the source module. Thus, for exam-
ple, to refer to a section of the Racket reference, `module-path` would be `'(lib
"scribblings/reference/reference.scrbl")`.

The `#:tag-prefixes` `prefixes` argument similarly supports selecting a particular section
as determined by a path of tag prefixes. When a `#:doc` argument is provided, then `prefixes`
should trace a path of tag-prefixed subsections to reach the `tag` section. When `#:doc` is not
provided, the `prefixes` path is relative to any enclosing section (i.e., the youngest ancestor
that produces a match).

For HTML output, the generated reference is the hyperlinked title of the elements in the
section's title content, except that elements with the `'aux` style property are omitted in the
hyperlink label. If `underline?` is `#f`, then the hyperlink is rendered in HTML without an
underline.

For Latex output, the generated reference's format depends on the document style. By de-
fault, only the section number is shown in the reference, but the `scribble/manual` style
shows the title after the section number. Customize the output (see §7.10 "Extending and
Configuring Scribble Output") by redefining the `\BookRef`, etc., macros (see §7.10.3 "Pre-
defined Latex Macros").

```
(Secref  tag
         [#:doc module-path
          #:tag-prefixes prefixes
          #:underline? underline?]) → element?
  tag : string?
  module-path : (or/c module-path? #f) = #f
  prefixes : (or/c (listof string?) #f) = #f
  underline? : any/c = #t
```

Like `secref`, but if the rendered form of the reference starts with a word (e.g., "section"),
then the word is capitalized.

```
(seclink  tag
          [#:doc module-path
           #:tag-prefixes prefixes
           #:underline? underline?
           #:indirect? indirect?]
          pre-content ...)          → element?
  tag : string?
  module-path : (or/c module-path? #f) = #f
  prefixes : (or/c (listof string?) #f) = #f
  underline? : any/c = #t
```

```
  indirect? : any/c = #f
  pre-content : pre-content?
```

Like `secref`, but the link label is the decoded *pre-content* instead of the target section's name.

In addition to `secref`'s arguments, `seclink` supports a *indirect?* argument. When *indirect?* is true, then the section hyperlink's resolution in HTML is potentially delayed; see `'indirect-link` for `link-element`.

```
(other-doc  module-path
            [#:underline? underline?
             #:indirect indirect])    → element?
  module-path : module-path?
  underline? : any/c = #t
  indirect : (or/c #f content?) = #f
```

Like `secref` for the document's implicit `"top"` tag. Use this function to refer to a whole manual instead of `secref`, in case a special style in the future is used for manual titles.

If *indirect* is not `#f`, then the link's resolution in HTML can be delayed, like `seclink` with `#:indirect? #t`. The *indirect* content is prefixed with "the" and suffixed with "documentation" to generate the rendered text of the link.

```
(elemtag t pre-content ...) → element?
  t : (or/c tag? string?)
  pre-content : pre-content?
```

The tag *t* refers to the content form of *pre-content*.

```
(elemref  t
          pre-content ...
          [#:underline? underline?]) → element?
  t : (or/c tag? string?)
  pre-content : pre-content?
  underline? : any/c = #t
```

The decoded *pre-content* is hyperlinked to *t*, which is normally defined using `elemtag`.

3.1.6 Indexing

```
(index words pre-content ...) → index-element?
  words : (or/c string? (listof string?))
  pre-content : pre-content?
```

Creates an index element given a plain-text string—or list of strings for a hierarchy, such as `'("strings" "plain")` for a "plain" entry below a more general "strings" entry. As index keys, the strings are "cleaned" using `clean-up-index-strings`. The strings (without clean-up) also serve as the text to render in the index. The decoded *pre-content* is the text to appear inline as the index target.

Use `index` when an index entry should point to a specific word or phrase within the typeset document (i.e., the *pre-content*). Use `section-index`, instead, to create an index entry that leads to a section, instead of a specific word or phrase within the section.

```
(index* words word-contents pre-content ...) → index-element?
  words : (listof string?)
  word-contents : (listof list?)
  pre-content : pre-content?
```

Like `index`, except that *words* must be a list, and the list of contents render in the index (in parallel to *words*) is supplied as *word-contents*.

```
(as-index pre-content ...) → index-element?
  pre-content : pre-content?
```

Like `index`, but the word to index is determined by applying `content->string` on the decoded *pre-content*.

```
(section-index word ...) → part-index-decl?
  word : string?
```

Creates a `part-index-decl` to be associated with the enclosing section by `decode`. The *word*s serve as both the keys and as the rendered forms of the keys within the index.

```
(index-section [#:tag tag]) → part?
  tag : (or/c #f string?) = "doc-index"
```

Produces a part that shows the index the enclosing document. The optional *tag* argument is used as the index section's tag.

3.1.7 Tables of Contents

```
(table-of-contents) → delayed-block?
```

Returns a delayed flow element that expands to a table of contents for the enclosing section. For Latex output, however, the table of contents currently spans the entire enclosing document.

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```
(local-table-of-contents [#:style style]) → delayed-block?
  style : (or/c symbol? #f) = #f
```

Returns a delayed flow element that may expand to a table of contents for the enclosing section, depending on the output type. For multi-page HTML output, the flow element is a table of contents; for Latex output, the flow element is empty.

The meaning of the *style* argument depends on the output type, but `'immediate-only` normally creates a table of contents that contains only immediate sub-sections of the enclosing section. See also the `'quiet` style of `part` (i.e., in a `part` structure, not supplied as the *style* argument to `local-table-of-contents`), which normally suppresses sub-part entries in a table of contents.

3.1.8   Tags

The exports of `scribble/tag` are all re-exported by `scribble/base`.

3.2   Racket Manual Format

The `scribble/manual` language is a major component of Scribble, and it is documented in its own chapter: §4 "Scribbling Documentation".

3.3   Book Format

```
 #lang scribble/book        package: at-exp-lib
```

The `scribble/book` language is like `scribble/base`, but configured with Latex style defaults to use the standard `book` class. Top-level sections are rendered as Latex chapters.

3.4   Report Format

```
 #lang scribble/report        package: at-exp-lib
```

The `scribble/report` language is like `scribble/book`, but configured with Latex style defaults to use the standard `report` class.

3.5 SIGPLAN Paper Format

`#lang scribble/sigplan` package: `scribble-lib`

The `scribble/sigplan` language is like `scribble/base`, but configured with Latex style defaults to use the `"sigplanconf.cls"` class file that is included with Scribble.

| `preprint`

Enables the `preprint` option. Use `preprint` only on the same line as `#lang`, with only whitespace (or other options) between `scribble/sigplan` and `preprint`:

    #lang scribble/sigplan @preprint

| `10pt`

Enables the `10pt` option. Use `10pt` only on the same line as `#lang`, with only whitespace (or other options) between `scribble/sigplan` and `10pt`:

    #lang scribble/sigplan @10pt

| `nocopyright`

Enables the `nocopyright` option. Use `nocopyright` only on the same line as `#lang`, with only whitespace (or other options) between `scribble/sigplan` and `nocopyright`:

    #lang scribble/sigplan @nocopyright

| `onecolumn`

Enables the `onecolumn` option. Use `onecolumn` only on the same line as `#lang`, with only whitespace (or other options) between `scribble/sigplan` and `onecolumn`:

    #lang scribble/sigplan @onecolumn

| `notimes`

Disables the use of `\usepackage{times}` in the generated LaTeX output. Use `onecolumn` only on the same line as `#lang`, with only whitespace (or other options) between `scribble/sigplan` and `notimes`:

    #lang scribble/sigplan @notimes

| `noqcourier`

Disables the use of \usepackage{qcourier} in the generated LaTeX output. Use `onecolumn` only on the same line as `#lang`, with only whitespace (or other options) between `scribble/sigplan` and `noqcourier`:

```
#lang scribble/sigplan @noqcourier
```

The `10pt`, `preprint`, `nocopyright`, `onecolumn`, `notimes`, and `noqcourier` options can be used together and may appear in any order.

```
(abstract pre-content ...) → block?
  pre-content : pre-content?
```

Generates a nested flow for a paper abstract.

```
(include-abstract module-path)
```

Similar to `include-section`, but incorporates the document in the specified module as an abstract. The document must have no title or sub-parts.

```
(subtitle pre-content ...) → element?
  pre-content : pre-content?
```

Use as the last argument to `title` to specify a subtitle.

```
(authorinfo name affiliation email) → block?
  name : pre-content?
  affiliation : pre-content?
  email : pre-content?
```

A replacement for `author` that associates an affiliation and e-mail address with the author name.

```
(conferenceinfo conference location) → block?
  conference : pre-content?
  location : pre-content?
(copyrightyear content ...) → block?
  content : pre-content?
(copyrightdata content ...) → block?
  content : pre-content?
(doi content ...) → block?
  content : pre-content?
(exclusive-license) → block?
```

Declares information that is collected into the copyright region of the paper.

```
(category  CR-number
          subcategory
          third-level
          [fourth-level]) → content?
  CR-number : pre-content?
  subcategory : pre-content?
  third-level : pre-content?
  fourth-level : (or/c #f pre-content?) = #f
(terms content ...) → content?
  content : pre-content?
(keywords content ...) → content?
  content : pre-content?
```

Typesets category, term, and keyword information for the paper, which is normally placed immediately after an `abstract` form. See also `http://www.acm.org/about/class/how-to-use`.

For `category`, the *subcategory* argument should be in titlecase (i.e., capitalize the first letter of each word) and a phrase at the level of "Programming Languages" or "Software Engineering" (as opposed to a category like "Software" or a third-level name like "Concurrent Programming" or "Processors"). A *third-level* phrase should be in titlecase. A *fourth-level* phrase, if any, should not be capitalized.

For `terms`, each general term should be in titlecase. Terms are usually drawn from a fixed list, and they are usually optional.

For `keywords`, capitalize only the first letter of the first word, separate phrases by commas, and do not include "and" before the last one. Keywords should be noun phrases, not adjectives.

3.6   JFP Paper Format

 #lang scribble/jfp   package: scribble-lib

The `scribble/jfp` language is like `scribble/base`, but configured with Latex style defaults to use the `"jfp1.cls"` class file. The class file is not included with Scribble due to license issues, but if the file is not manually installed into the `scribble/jfp` collections, then it is downloaded on demand to `(find-system-path 'addon-dir)`.

Latex output with `scribble/jfp` uses a main-document version supplied to `title` as the short-form document name (to be used in page headers).

```
(abstract pre-content ...) → block?
  pre-content : pre-content?
```

Generates a nested flow for a paper abstract.

```
(include-abstract module-path)
```

Similar to `include-section`, but incorporates the document in the specified module as an abstract. The document must have no title or sub-parts.

```
(author name ...) → block?
  name : pre-content?
```

A replacement for `author` from `scribble/base`.

```
((author/short short-name ...) long-name ...) → block?
  short-name : pre-content?
  long-name : pre-content?
```

Like `author`, but allows the short-form names (to be used in page headers) to be specified separately from the long-form name.

```
(affiliation place ...) → element?
  place : pre-content?
(affiliation-mark mark ...) → element?
  mark : pre-content?
(affiliation-sep) → element?
```

Use `affiliation` within `author` or the long-name part of `author/short` to specify affiliations after all authors. If different authors have different affiliations, use `affiliation-mark` with a number after each author, and then use `affiliation-mark` before each different affiliation within a single `affiliation`, using `(affiliation-sep)` to separate affiliations.

3.7   LNCS Paper Format

 #lang scribble/lncs   package: at-exp-lib

The `scribble/lncs` language is like `scribble/base`, but configured with Latex style defaults to use the `"llncs.cls"` class file. The class file is not included with Scribble due to license issues, but if the file is not manually installed into the `scribble/lncs` collection, then it is downloaded on demand to `(find-system-path 'addon-dir)`.

```
(abstract pre-content ...) → block?
  pre-content : pre-content?
```

Generates a nested flow for a paper abstract.

```
(include-abstract module-path)
```

Similar to `include-section`, but incorporates the document in the specified module as an abstract. The document must have no title or sub-parts.

```
(authors auth ...)

auth = (author pre-content-expr ...)
     | (author #:inst str-expr pre-content-expr ...)

  pre-content-expr : pre-content?
  str-expr : string?
```

A replacement for `author` from `scribble/base`.

The `#:inst` should be a number that matches up to one of the arguments to `institutes`.

```
author
```

For use only in `authors`.

```
(institutes (institute pre-content-expr ...) ...)

  pre-content-expr : pre-content?
```

The *pre-content-expr*s are used as the institutions of the authors.

```
institute
```

For use only in `institutes`.

```
(email pre-content-expr ...)
```

Specifies an email address; must be used inside `institute`.

3.7.1 Example

Here is an example of a paper written in the LNCS format:

```
#lang scribble/lncs

@authors[@author[#:inst "1"]{Lauritz Darragh}
```

For more randomly generated papers, see SCIgen: `http://pdos.csail.mit.edu/scigen`

```
        @author[#:inst "2"]{Nikolaj Kyran}
        @author[#:inst "2"]{Kirsten Gormlaith}
        @author[#:inst "2"]{Tamaz Adrian}}

@institutes[
  @institute["University of Southeast Boston"
             @linebreak[]
             @email|{darragh@cs.seboston.edu}|]
  @institute["University of Albion"
             @linebreak[]
             @email|{{nkyran,gorm,tamaz}@cs.albion.ac.uk}|]]
```

```
@title{Arak: Low-Energy, Interposable Theory}
```

```
@abstract{The implications of client-server symmetries have been
far-reaching and pervasive. Given the current status of
constant-time theory, mathematicians daringly desire the synthesis
of rasterization, which embodies the essential principles of
algorithms. In this work, we describe a client-server tool for
investigating flip-flop gates (Arak), verifying that the
producer-consumer problem can be made homogeneous, secure, and
wireless.}
```

4 Scribbling Documentation

The `scribble/manual` language and associated libraries provide extensive support for documenting Racket libraries. The most significant aspect of support for documentation is the way that source-code bindings are connected to documentation sites through the module namespace—a connection that is facilitated by the fact that Scribble documents are themselves modules that reside in the same namespace. §4.1 "Getting Started with Documentation" provides an introduction to using Scribble for documentation, and the remaining sections document the relevant libraries and APIs in detail.

4.1 Getting Started with Documentation

Although the `scribble` command-line utility generates output from a Scribble document, documentation of Racket libraries is normally built by `raco setup`. This chapter emphasizes the `raco setup` approach, which more automatically supports links across documents.

See §1 "Getting Started" for information on using the `scribble` command-line utility.

4.1.1 Setting Up Library Documentation

To document a collection or PLaneT package:

- Create a file in your collection or planet package with the file extension `".scrbl"`. Beware that the file name you choose will determine the output directory's name. The remainder of these instructions assume that the file is called `"manual.scrbl"`.

- Start `"manual.scrbl"` like this:

  ```
  #lang scribble/manual

  @title{My Library}

  Welcome to my documentation: @racket[(list 'testing 1 2 3)].
  ```

  The first line starts the file in "text" mode and selects the Racket manual output format. It also introduces bindings like `title` and `racket` for writing Racket documentation.

- Add the following entry to your collect or package's `"info.rkt"`:

  ```
  (define scribblings '(("manual.scrbl" ())))
  ```

  The `()` above is a list of options. When your document gets large enough that you want it split into multiple pages, add the `'multi-page` option (omitting the quote, since the whole right-hand side of the definition is already quoted).

  If you do not already have an `"info.rkt"` module, here's a suitable complete module:

```
#lang info
(define scribblings '(("manual.scrbl" ()))) 
```

- Run `raco setup` to build your documentation. For a collection, optionally supply `-l` followed by the collection name to limit the build process to that collection. For a PLaneT package, optionally supply `-P` followed by the package information to limit the build process to that package.

- The generated documentation is normally `"doc/manual/index.html"` within the collection or PLaneT package directory. If the collection is in Racket's main `"collects"` directory, however, then the documentation is generated as `"manual/index.html"` in the installation's main `"doc"` directory.

4.1.2   Racket Typesetting and Hyperlinks

In the document source at the start of this chapter (§4.1.1 "Setting Up Library Documentation"), the Racket expression `(list 'testing 1 2 3)` is typeset properly, but the `list` identifier is not hyperlinked to the usual definition. To cause `list` to be hyperlinked, add a `require` form like this:

```
@(require (for-label racket))
```

This `require` with `for-label` declaration introduces a document-time binding for each export of the `racket` module. When the document is built, the `racket` form detects the binding for `list`, and so it generates a reference to the specification of `list`. The setup process detects the reference, and it finds the matching specification in the existing documentation, and ultimately directs the hyperlink to that specification.

Hyperlinks based on `for-label` and `racket` are the preferred mechanism for linking to information outside of a single document. Such links require no information about where and how a binding is documented elsewhere:

```
#lang scribble/manual
@(require (for-label racket))

@title{My Library}

See also @racket[list].
```

The `racket` form typesets a Racket expression for inline text, so it ignores the source formatting of the expression. The `racketblock` form, in contrast, typesets inset Racket code, and it preserves the expression's formatting from the document source.

```
#lang scribble/manual
@(require (for-label racket))
```

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```
@title{My Library}

Some example Racket code:

@racketblock[
(define (nobody-understands-me what)
  (list "When I think of all the"
        what
        "I've tried so hard to explain!"))
(nobody-understands-me "glorble snop")
]
```

4.1.3   Section Hyperlinks

A `section` declaration in a document can include a `#:tag` argument that declares a hyperlink-target tag. The `secref` function generates a hyperlink, using the section name as the text of the hyperlink. Use `seclink` to create a hyperlink with text other than the section title.

The following example illustrates section hyperlinks:

```
#lang scribble/manual
@(require (for-label racket))


@title{My Library}

Welcome to my documentation: @racket[(list 'testing 1 2 3)].

@table-of-contents[]


@section[#:tag "chickens"]{Philadelphia Chickens}

Dancing tonight!


@section{Reprise}

See @secref{chickens}.
```

Since the page is so short, the hyperlinks in the above example are more effective if you change the `"info.rkt"` file to add the `'multi-file` flag:

```
(define scribblings '(("manual.scrbl" (multi-page))))
```

A section can have a tag prefix that applies to all tags as seen from outside the section. Such a prefix is automatically given to each top-level document as processed by `raco setup`. Thus, referencing a section tag in a different document requires using a prefix, which is based on the target document's main source file. The following example links to a section in the Racket reference manual:

```
#lang scribble/manual
@(require (for-label racket))
@(define ref-src
    '(lib "scribblings/reference/reference.scrbl"))

@title{My Library}

See also @italic{@secref[#:doc ref-src]{pairs}}.
```

As mentioned in §4.1.2 "Racket Typesetting and Hyperlinks", however, cross-document references based on `(require (for-label ....))` and `racket` are usually better than cross-document references using `secref`.

4.1.4 Defining Racket Bindings

Use `defproc` to document a procedure, `defform` to document a syntactic form, `defstruct` to document a structure type, etc. These forms provide consistent formatting of definitions, and they declare hyperlink targets for `racket`-based hyperlinks.

To document a `my-helper` procedure that is exported by `"helper.rkt"` in the `"my-lib"` collection that contains `"manual.scrbl"`:

- Use `(require (for-label "helper.rkt"))` to import the binding information about the bindings of `"helper.rkt"` for use when typesetting identifiers. A relative reference `"helper.rkt"` works since it is relative to the documentation source.

- Add a `@defmodule[my-lib/helper]` declaration, which specifies the library that is being documented within the section. The `defmodule` form needs an absolute module name `mylib/helper`, instead of a relative reference `"helper.rkt"`, since the module path given to `defmodule` appears verbatim in the generated documentation.

- Use `defproc` to document the procedure.

Adding these pieces to `""manual.scrbl""` gives us the following:

```
#lang scribble/manual
@(require (for-label racket
                    "helper.rkt"))
```

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```
@title{My Library}

@defmodule[my-lib/helper]

@defproc[(my-helper [lst list?])
         (listof
          (not/c (one-of/c 'cow)))]{

 Replaces each @racket['cow] in @racket[lst] with
 @racket['aardvark].}
```

In `defproc`, a contract is specified with each argument to the procedure. In this example, the contract for the `lst` argument is `list?`, which is the contract for a list. After the closing parenthesis that ends the argument sequence, the contract of the result must be given; in this case, `my-helper` guarantees a result that is a list where none of the elements are `'cow`.

Some things to notice in this example and the documentation that it generates:

- The `list?`, `listof`, etc. elements of contracts are hyperlinked to their documentation.

- The result contract is formatted in the generated documentation in the same way as in the source. That is, the source layout of contracts is preserved. (In this case, putting the contract all on one line would be better.)

- In the prose that documents `my-helper`, `lst` is automatically typeset in italic, matching the typesetting in the blue box. The `racket` form essentially knows that it's used in the scope of a procedure with argument `lst`.

- If you hover the mouse pointer over `my-helper`, a popup reports that it is provided from `my-lib/helper`.

- If you use `my-helper` in any documentation now, as long as that documentation source also has a `(require (for-label ....))` of "helper.rkt", then the reference is hyperlinked to the definition above.

See `defproc*`, `defform`, etc. for more information on forms to document Racket bindings.

4.1.5 Showing Racket Examples

The `examples` form from `scribble/eval` helps you generate examples in your documentation. **Warning:** the `examples` form is especially likely to change or be replaced.

To use `examples`, the procedures to document must be suitable for use at documentation time; in fact, `examples` uses bindings introduced into the document source by `require`. Thus, to generate examples using `my-helper` from the previous section, "helper.rkt" must be imported both via `require-for-label` and `require`:

```
#lang scribble/manual
@(require scribble/eval     ; <--- added
          "helper.rkt"      ; <--- added
          (for-label racket
                     "helper.rkt"))

@title{My Library}

@defmodule[my-lib/helper]{The @racketmodname[my-lib/helper]
module---now with extra cows!}

@defproc[(my-helper [lst list?])
         (listof (not/c (one-of/c 'cow)))]{

 Replaces each @racket['cow] in @racket[lst] with
 @racket['aardvark].

 @examples[
   (my-helper '())
   (my-helper '(cows such remarkable cows))
 ]}
```

4.1.6 Multi-Page Sections

Setting the `'multi-page` option (see §4.1.3 "Section Hyperlinks") causes each top-level section of a document to be rendered as a separate HTML page.

To push sub-sections onto separate pages, use the `'toc` style for the enclosing section (as started by `title`, `section`, `subsection`, etc.) and use `local-table-of-contents` to generate hyperlinks to the sub-sections.

Revising `"cows.scrbl"` from the previous section:

```
#lang scribble/manual

@title[#:style '(toc)]{Cows}

@local-table-of-contents[]

@section[#:tag "singing"]{Singing}
Wherever they go, it's a quite a show.

@section{Dancing}
See @secref["singing"].
```

To run this example, remember to change `"info.rkt"` to add the `'multi-page` style. You may also want to add a call to `table-of-contents` in `"manual.scrbl"`.

The difference between `table-of-contents` and `local-table-of-contents` is that the latter is ignored for Latex output.

When using `local-table-of-contents`, it often makes sense to include introductory text before the call of `local-table-of-contents`. When the introductory text is less important and when local table of contents is short, putting the introductory text after the call of `local-table-of-contents` may be appropriate.

4.2 Style Guide

Consistent style—for terms, typesetting, and prose—makes documentation clearer. As much as possible, follow the rules listed in this section. Many of the rules are arbitrary in the sense that a different choice of rule could work fine, but the only way to make our documentation consistent is to pick one of the choices.

There are too many rules to absorb easily on a first reading. Re-read this section after writing documentation for a library or two, and revisit the section periodically to refresh your memory and check for new rules.

4.2.1 Prose and Terminology

In the descriptive body of `defform`, `defproc`, etc., do not start with "This ..." Instead, start with a sentence whose implicit subject is the form or value being described (but only start the first sentence that way). Capitalize the first word. Thus, the description will often start with "Returns" or "Produces." Refer to arguments and sub-forms by name.

Do not use the word "argument" to describe a sub-form in a syntactic form; use the term "sub-form" instead, reserving "argument" for values or expressions in a function call. Refer to libraries and languages as such, rather than as "modules" (even though the form to typeset a library or language name is called `racketmodname`). Do not call an identifier (i.e., a syntactic element) a "variable" or a "symbol." Do not use the word "expression" for a form that is a definition or might be a definition; use the word "form," instead. Prefer "function" to "procedure."

Use the word "list" only when you mean a run-time value consisting of the empty list and cons cells; use the word "sequence" in other cases, if you must use any word. For example, do not write that `begin` has a "list of sub-forms;" instead, it has a "sequence of sub-forms." Similarly, do not refer to a "list of arguments" in a function call; just write "arguments" if possible, or write "sequence of argument expressions." (Unfortunately, "sequence" has acquired a specific run-time meaning, too, but the collision is less severe than the historical

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confusion between lists and other entities in Lisp.)

Avoid cut-and-paste for descriptive text. If two functions are similar, consider documenting them together with `deftogether`. To abstract a description, consider using explicit prose abstraction, such as "x is like y, except that ...," instead of abstracting the source and instantiating it multiple times; often, a prose abstraction is clearer to the reader than a hidden abstraction in the document implementation.

Hyphenate the words "sub-form" and "sub-expression."

Use "Windows," "Mac OS X," and "Unix" for the three "platforms" (as opposed to "systems") on which Racket runs. Use "Unix" as a generic term for Unix-like operating systems—notably including Linux—other than Mac OS X. Use "Unix" even when "Gtk" or "the X11 windowing system" would be more precisely correct, but use "X11" as adjective when necessary, such as "X11 display." Racket runs "on" a platform, as opposed to "under" a platform.

4.2.2 Typesetting Code

Use `id` or a name that ends `-id` in `defform` to mean an identifier, not `identifier`, `variable`, `name`, or `symbol`. Similarly, use `expr` or something that ends `-expr` for an expression position within a syntactic form. Use `body` for a form (definition or expression) in an internal-definition position—always followed by `...+` in a grammar description. Do not use `expr` for something that isn't exactly an expression, `id` for something that isn't exactly an identifier, etc.; instead, use `defform/subs` to define a new non-terminal.

Beware of using `deftogether` to define multiple variants of a syntactic form or procedure, because each `defform` or `defproc` creates a definition point, but each form or procedure should have a single definition point. (Scribble issues a warning when a binding has multiple definition points.) Instead, use `defproc*` or `defform*`.

For function arguments, use `v` as the meta-variable for "any value." Use `x` as a meta-variable only for numerical values. Other conventions include `lst` for a list and `proc` for a procedure.

Pay attention to the difference between identifiers and meta-variables when using `racket`, especially outside of `defproc` or `defform`. Prefix a meta-variable with `_`; for example,

    @racket[(rator-expr rand-expr ...)]

would be the wrong way to refer to the grammar of a function call, because it produces (rator-expr rand-expr ...), where rator-expr and rand-expr are typeset as variables. The correct description is

    @racket[(_rator-expr _rand-expr ...)]

which produces (*rator-expr rand-expr* ...), where *rator-expr* and *rand-expr* are

typeset as meta-variables. The `defproc`, `defform`, etc. forms greatly reduce this burden in descriptions, since they automatically set up meta-variable typesetting for non-literal identifiers. In `defform`, be sure to include literal identifiers (i.e., those not meant as variables, other than the form name being defined) in a `#:literals` clause.

To typeset an identifier with no particular interpretation—syntax, variable, meta-variable, etc.—use `racketidfont` (e.g., as in `rand-expr` above). Otherwise, use `litchar`, not merely `racketfont` or `verbatim`, to refer to a specific sequence of characters.

When a syntactic form synthesizes an identifier from a given identifier, use a combination of `racketidfont` and `racket` to describe the identifiers. For example, if *id* is combined with `is-` and `?` to form `is-`*id*`?`, then implement that identifier as `@racketidfont{is-}@racket[id]@racketidfont{?}`.

When using `defform` to describe a syntactic form, don't confuse the `#:contracts` clause with a grammar specification. Use `#:contracts` only for expressions within the syntactic form, and the contract is a run-time constraint—not a syntactic constraint, such as requiring a sub-form to be an identifier. Use `defform/subs` for syntactic constraints.

When showing example evaluations, use the REPL-snapshot style:

```
@interaction[
(+ 1 2)
]
```

See also the `scribble/eval` library and §4.2.6 "Examples".

Use four dots, `....`, in place of omitted code, since `...` means repetition.

4.2.3 Typesetting Prose

Refrain from referring to documentation "above" or "below," and instead have a hyperlink point to the right place.

In prose, use `‘` and `’` quotation marks instead of `"`. Use `---` for an em dash, and do not include spaces on either side. Use American style for quotation marks and punctuation at the end of quotation marks (i.e., a sentence-terminating period goes inside the quotation marks). Of course, this rule does not apply for quotation marks that are part of code.

Do not use a citation reference (as created by `cite`) as a noun; use it as an annotation.

Do not start a sentence with a Racket variable name, since it is normally lowercase. For example, use "The *thing* argument is..." instead of "*thing* is..."

Use `etc` for "etc." when it does not end a sentence, and include a comma after "etc." unless it ends a sentence of is followed by other punctuation (such as a parenthesis).

4.2.4 Section Titles

Capitalize all words except articles ("the," "a," etc.), prepositions, and conjunctions that are not at the start of the title.

A manual title should normally start with a suitable keyword or key phrase (such as "Scribble" for this manual) that is in boldface. If the key word is primarily an executable name, use `exec` instead of `bold`. Optionally add further descriptive text in the title after a colon, where the text starting with the colon is not in boldface.

4.2.5 Indexing

Document and section titles, identifiers that are documented with `defproc`, `defform`, etc. are automatically indexed, as are terms defined with `deftech`.

Symbols are not indexed automatically. Use `indexed-racket` instead of `racket` for the instance of a symbol that roughly defines the use. For an example, try searching for "truncate" to find `'truncate` as used with `open-output-file`. Do no use something like `(index "'truncate")` to index a symbol, because it will not typeset correctly (i.e., in a fixed-width font with the color of a literal).

Use `index`, `as-index`, and `section-index` as a last resort. Create index entries for terms that are completely different from terms otherwise indexed. Do not try to index minor variations of a term or phrase in an attempt to improve search results; if search fails to find a word or phrase due to a minor variation, then the search algorithm should be fixed, not the index entry.

4.2.6 Examples

Strive to include examples (using `examples`) with the documentation of every function and syntactic form. When writing examples, refrain from using nonsense words like "foo" and "bar." For example, when documenting `member`, resist the temptation to write

```
> (member "foo" '("bar" "foo" "baz"))
'("foo" "baz")
```

and instead write something like

```
> (member "Groucho" '("Harpo" "Groucho" "Zeppo"))
'("Groucho" "Zeppo")
```

4.3   Manual Forms

 `#lang scribble/manual`   package: `scribble-lib`

The `scribble/manual` language provides all of `scribble/base` plus many additional
functions that are specific to writing Racket documentation. It also associates style prop-
erties with the generated `doc` export to select the default Racket manual style for rendering;
see §4.3.13 "Manual Rendering Style" for more information.

The `scribble/manual` name can also be used as a library with `require`, in which case
it provides all of the same bindings, but without setting the reader or setting the default
rendering format to the Racket manual format.

4.3.1   Typesetting Code

The `codeblock` and `code` forms (see §4.3.1.1 "`#lang`-Specified Code") typeset code ver-
batim, adding a layer of color to the code based on the same syntax-coloring parsers that are
used by DrRacket. Input that is parsed as an identifier is further given a lexical context and
hyperlinked via `for-label` imports.

The `racketblock` and `racket` forms (see §4.3.1.2 "Racket Code") typeset S-expression
code roughly verbatim, but roughly by quoting the source term with `syntax`. Identifiers in
the quoted S-expression are hyperlinked via `for-label` imports.

The two different approaches to typesetting code—`codeblock` and `code` versus `racket-
block` and `racket`—have different advantages and disadvantages:

- The `codeblock` and `code` forms work with non-S-expression syntax, and they give
  authors more control over output (e.g., the literal number `2/4` is not normalized to
  `1/2`). The `codeblock` and `code` forms do not yet support escapes to Scribble element
  mode, and they cannot adapt spacing based on the width of elements in escapes.

- The `racketblock` and `racket` forms are more efficient and allow escapes to Scribble
  element mode. The `racketblock` and `racket` forms are tied to S-expression syntax,
  however, and they are based on a syntax representation that tends to normalize source
  terms (e.g., the literal number `2/4` is normalized to `1/2`).

`#lang`-Specified Code

```
(codeblock option ... str-expr ...+)
```

```
option = #:keep-lang-line? keep-expr
       | #:indent indent-expr
       | #:expand expand-expr
       | #:context context-expr
       | #:line-numbers line-number-expr
       | #:line-number-sep line-number-sep-expr

  keep-expr : any/c

  indent-expr : exact-nonnegative-integer?

  expand-expr : (or/c #f (syntax? . -> . syntax?))

  context-expr : syntax?

  line-number-expr : (or/c #f exact-nonnegative-integer?)

  line-number-sep-expr : exact-nonnegative-integer?
```

Parses the code formed by the strings produced by the *str-expr*s as a Racket module (roughly) and produces a block that typesets the code inset via `nested` with the style `'code-inset`.

The *str-expr*s should normally start with #lang to determine the reader syntax for the module, but the resulting "module" need not expand or compile—except as needed by *expand-expr*. If *expand-expr* is omitted or produces false, then the input formed by *str-expr* is read until an end-of-file is encountered, otherwise a single form is read from the input.

When *keep-expr* produces a true value (the default), the first line in the input (which is typically #lang) is preserved in the typeset output, otherwise the first line is dropped. The typeset code is indented by the amount specified by *indent-expr*, which defaults to 0.

When *expand-expr* produces #f (which is the default), identifiers in the typeset code are colored and linked based on for-label bindings in the lexical environment of the syntax object provided by *context-expr*. The default *context-expr* has the same lexical context as the first *str-expr*. When *line-number-expr* is true, line number is enabled starting from *line-number-expr*, and `line-number-sep` controls the separation (in spaces; defaults to 1) between the line numbers and code.

When *expand-expr* produces a procedure, it is used to macro-expand the parsed program, and syntax coloring is based on the parsed program.

For example,

```
@codeblock|{
  #lang scribble/manual
  @codeblock{
    #lang scribble/manual
    @title{Hello}
```

```
    }
  }|
```

produces the typeset result

```
  #lang scribble/manual
  @codeblock{
    #lang scribble/manual
    @title{Hello}
  }
```

```
(codeblock0 option ... str-expr ...+)
```

Like `codeblock`, but without the `'code-inset` `nested` wrapper.

```
(code option ... str-expr ...+)

option = #:lang lang-line-expr
       | #:expand expand-expr
       | #:context context-expr

  lang-line-expr : (or/c #f string?)
  expand-expr : (or/c #f (syntax? . -> . syntax?))
  context-expr : syntax?
```

Like `codeblock`, but produces content instead of a block. No `#lang` line should appear in the string content; instead, it should be provided `#:lang` (as a string without `"#lang "`) if needed, and the `#lang` line is always stripped from the output when provided. Also, each newline in *str-expr*s is collapsed along with all surrounding whitespace to a single space.

For example,

```
  This is @code[#:lang "at-exp racket"]|{@bold{Hi}}|'s result:
  @bold{Hi}.
```

produces the typeset result

> This is @bold{Hi}'s result: **Hi**.

Racket Code

```
(racketblock maybe-escape datum ...)

maybe-escape =
             | #:escape escape-id
```

Typesets the *datum* sequence as a table of Racket code inset via `nested` with the style `'code-inset`. The source locations of the *datum*s determine the generated layout. For example,

```
(racketblock
 (define (loop x)
   (loop (not x))))
```

produces the output

```
(define (loop x)
  (loop (not x)))
```

with the `(loop (not x))` indented under `define`, because that's the way it is idented the use of `racketblock`. Source-location span information is used to preserve `#true` versus `#t` and `#false` versus `#f`, and syntax-object properties are used to preserve square brackets and curly braces versus parentheses; otherwise, using syntax objects tends to normalize the form of S-expression elements.

In the above example, `define` is typeset as a keyword (in black) and as a hyperlink to `define`'s definition in the reference manual, because this document was built using a `for-label` binding of `define` (in the source) that matches a definition in the reference manual. Similarly, `not` is a hyperlink to its definition in the reference manual.

Like other forms defined via `define-code`, `racketblock` expands identifiers that are bound as element transformers.

An `#:escape` clause specifies an identifier to escape back to an expression that produces an `element`. By default, the escape identifier is `unsyntax`. For example,

```
(racketblock
  (+ 1 #,(elem (racket x) (subscript "2"))))
```

produces

```
(+ 1 x₂)
```

The *escape-id* that defaults to `unsyntax` is regonized via `free-identifier=?`, so a binding can hide the escape behavior:

```
(racketblock
  (let ([unsyntax #f])
    (racketblock
      #'(+ 1 #,x))))
```

The RACKETBLOCK form's default escape is UNSYNTAX instead of unsyntax.

A few other escapes are recognized symbolically:

- (code:line *datum* ...) typesets as the sequence of *datum*s (i.e., without the code:line wrapper).

- (code:comment *datum*) typesets like *datum*, but colored as a comment and pre-fixed with a semi-colon. A typical *datum* escapes from Racket-typesetting mode using unsyntax and produces a paragraph using t:

  (code:comment @#,t{this is a comment})

  (Note that @#,foo{...} reads as #,(foo "...").)

- code:blank typesets as a blank space.

- (code:hilite *datum*) typesets like *datum*, but with a background highlight.

- (code:quote *datum*) typesets like (quote *datum*), but without rendering the quote as '.

- _id typesets as id, but colored as a variable (like racketvarfont); this escape applies only if _id has no for-label binding and is not specifically colored as a subform non-terminal via defform, a variable via defproc, etc.

See also scribble/comment-reader.

```
(RACKETBLOCK maybe-escape datum ...)
```

Like racketblock, but with the default expression escape UNSYNTAX instead of unsyntax.

```
(racketblock0 maybe-escape datum ...)
```

Like racketblock, but without insetting the code via nested.

```
(RACKETBLOCK0 maybe-escape datum ...)
```

Like RACKETBLOCK, but without insetting the code via nested.

```
(racketresultblock maybe-escape datum ...)
(racketresultblock0 maybe-escape datum ...)
(RACKETRESULTBLOCK maybe-escape datum ...)
(RACKETRESULTBLOCK0 maybe-escape datum ...)
```

Like racketblock, etc., but colors the typeset text as a result (i.e., a single color with no hyperlinks) instead of code.

```
(racketinput maybe-escape datum ...)
(RACKETINPUT maybe-escape datum ...)
```

Like `racketblock` and `RACKETBLOCK`, but the *datum*s are typeset after a prompt representing a REPL.

```
(racketinput0 maybe-escape datum ...)
(RACKETINPUT0 maybe-escape datum ...)
```

Like `racketinput` and `RACKETINPUT`, but without insetting the code via `nested`.

```
(racketmod maybe-file maybe-escape lang datum ...)

  maybe-file =
             | #:file filename-expr

maybe-escape =
             | #:escape escape-id
```

Like `racketblock`, but the *datum* are typeset inside a #lang-form module whose language is *lang*.

The source location of *lang* (relative to the body *datum*s) determines the relative positioning of the #lang line in the typeset output. So, line up *lang* with the left end of the content code.

If `#:file` is provided, then the code block is typeset using `filebox` with *filename-expr* as the filename argument.

```
(racketmod0 maybe-file maybe-escape lang datum ...)
```

Like `racketmod`, but without insetting the code via `nested`.

```
(racket maybe-escape datum ...)
```

Like `racketblock`, but typeset on a single line and wrapped with its enclosing paragraph, independent of the formatting of *datum*.

```
(RACKET maybe-escape datum ...)
```

Like `racket`, but with the `UNSYNTAX` escape like `racketblock`.

```
(racketresult maybe-escape datum ...)
```

Like `racket`, but typeset as a result (i.e., a single color with no hyperlinks).

```
(racketid maybe-escape datum ...)
```

Like `racket`, but typeset as an unbound identifier (i.e., no coloring or hyperlinks).

```
(schemeblock maybe-escape datum ...)
(SCHEMEBLOCK maybe-escape datum ...)
(schemeblock0 maybe-escape datum ...)
(SCHEMEBLOCK0 maybe-escape datum ...)
(schemeinput maybe-escape datum ...)
(schememod lang maybe-escape datum ...)
(scheme maybe-escape datum ...)
(SCHEME maybe-escape datum ...)
(schemeresult maybe-escape datum ...)
(schemeid maybe-escape datum ...)
```

Compatibility aliases. Each `scheme...` name is an alias for the corresponding `racket...` binding.

Preserving Comments

`#reader scribble/comment-reader`   package: `scribble-lib`

As a reader module, `scribble/comment-reader` reads a single S-expression that contains `;`-based comment lines, and it wraps the comments with `code:comment` for use with forms like `racketblock`. More precisely, `scribble/comment-reader` extends the current reader to adjust the parsing of `;`.

For example, within a Scribble document that imports `scribble/manual`,

```
@#reader scribble/comment-reader
 (racketblock
  ;; This is not a pipe
  (make-pipe)
 )
```

generates

```
; This is not a pipe
(make-pipe)
```

The initial `@` is needed above to shift into S-expression mode, so that `#reader` is recognized as a reader declaration instead of literal text. Also, the example uses `(racketblock ....)` instead of `@racketblock[....]` because the @-reader would drop comments within the `racketblock` before giving `scribble/comment-reader` a chance to convert them.

Code Fonts and Styles

```
(racketmodname datum maybe-indirect)
(racketmodname (unsyntax expr) maybe-indirect)

maybe-indirect =
                | #:indirect
```

Like `racket`, but typeset as a module path. If *datum* is an identifier or *expr* produces a symbol, then it is hyperlinked to the module path's definition as created by `defmodule`.

If `#:indirect` is specified, then the hyperlink is given the `'indirect-link` style property, which makes the hyperlink's resolution in HTML potentially delayed; see `'indirect-link` for `link-element`.

```
(racketmodlink datum pre-content-expr ...)
```

Like `racketmod`, but separating the module path to link from the content to be linked. The *datum* module path is always linked, even if it is not an identifier.

```
(litchar str ...) → element?
  str : string?
```

Typesets *str*s as a representation of literal text. Use this when you have to talk about the individual characters in a stream of text, as when documenting a reader extension.

```
(racketfont pre-content ...) → element?
  pre-content : pre-content?
```

Typesets decoded *pre-content* as uncolored, unhyperlinked Racket. This procedure is useful for typesetting things like #lang, which are not `read`able by themselves.

```
(racketvalfont pre-content ...) → element?
  pre-content : pre-content?
```

Like `racketfont`, but colored as a value.

```
(racketresultfont [#:decode? decode?]
                   pre-content ...)  → element?
  decode? : boolean? = #t
  pre-content : pre-content?
```

Like `racketfont`, but colored as a REPL result when *decode?* is `#t`. When *decode?* is `#f`, it also avoids `decode`ing its argument.

```
(racketidfont pre-content ...) → element?
  pre-content : pre-content?
```

Like `racketfont`, but colored as an identifier.

```
(racketvarfont pre-content ...) → element?
  pre-content : pre-content?
```

Like `racketfont`, but colored as a variable (i.e., an argument or sub-form in a procedure being documented).

```
(racketkeywordfont pre-content ...) → element?
  pre-content : pre-content?
```

Like `racketfont`, but colored as a syntactic form name.

```
(racketparenfont pre-content ...) → element?
  pre-content : pre-content?
```

Like `racketfont`, but colored like parentheses.

```
(racketmetafont pre-content ...) → element?
  pre-content : pre-content?
```

Like `racketfont`, but colored as meta-syntax, such as backquote or unquote.

```
(racketcommentfont pre-content ...) → element?
  pre-content : pre-content?
```

Like `racketfont`, but colored as a comment.

```
(racketerror pre-content ...) → element?
  pre-content : pre-content?
```

Like `racketfont`, but colored as error-message text.

```
(racketmodfont pre-content ...) → element?
  pre-content : pre-content?
```

Like `racketfont`, but colored as module name.

```
(racketoutput pre-content ...) → element?
  pre-content : pre-content?
```

Like `racketfont`, but colored as output.

```
(procedure pre-content ...) → element?
  pre-content : pre-content?
```

Typesets decoded *pre-content* as a procedure name in a REPL result (e.g., in typewriter font with a `#<procedure:` prefix and `>` suffix.).

```
(var datum)
```

Typesets *datum* as an identifier that is an argument or sub-form in a procedure being documented. Normally, the `defproc` and `defform` arrange for `racket` to format such identifiers automatically in the description of the procedure, but use `var` if that cannot work for some reason.

```
(svar datum)
```

Like `var`, but for subform non-terminals in a form definition.

```
(schememodname datum)
(schememodname (unsyntax expr))
(schememodlink datum pre-content-expr ...)
(schemefont pre-content ...) → element?
  pre-content : pre-content?
(schemevalfont pre-content ...) → element?
  pre-content : pre-content?
(schemeresultfont pre-content ...) → element?
  pre-content : pre-content?
(schemeidfont pre-content ...) → element?
  pre-content : pre-content?
(schemevarfont pre-content ...) → element?
  pre-content : pre-content?
(schemekeywordfont pre-content ...) → element?
  pre-content : pre-content?
(schemeparenfont pre-content ...) → element?
  pre-content : pre-content?
(schememetafont pre-content ...) → element?
  pre-content : pre-content?
(schemeerror pre-content ...) → element?
  pre-content : pre-content?
(schememodfont pre-content ...) → element?
  pre-content : pre-content?
(schemeoutput pre-content ...) → element?
  pre-content : pre-content?
```

Compatibility aliases. Each `scheme...` name is an alias for the corresponding `racket...` binding.

4.3.2 Documenting Modules

```
(defmodule maybe-req one-or-multi option ... pre-flow ...)

    maybe-req =
               | #:require-form content-expr

one-or-multi = module-spec
               | #:multi (module-spec ...+)

 module-spec = module-path
               | content-expr

      option = #:module-paths (module-path ...)
               | #:no-declare
               | #:use-sources (src-module-path ...)
               | #:link-target? link-target?-expr
               | #:indirect
               | #:lang
               | #:reader
               | #:packages (pkg-expr ...)
```

Produces a sequence of flow elements (in a `splice`) to start the documentation for a module—or for multiple modules, if the `#:multi` form is used.

Each documented module specified as either a *module-path* (in the sense of `require`), in which case the module path is typeset using `racketmodname`, or by a *content-expr*. The latter case is triggered by the presence of a `#:module-paths` clause, which provides a plain *module-path* for each *module-spec*, and the plain *module-path* is used for cross-referencing.

If a `#:require-form` clause is provided and if `#:lang` and `#:reader` are not provided, the given expression produces content to use instead of `require` for the declaration of the module. The `#:require-form` clause is useful to suggest a different way of accessing the module instead of through `require`.

Besides generating text, unless `#:no-declare` appears as an option, this form expands to a use of `declare-exporting` with *module-path*s; the `#:use-sources` clause, if provided, is propagated to `declare-exporting`. Consequently, `defmodule` should be used at most once in a section without `#:no-declare`, though it can be shadowed with `defmodules` in sub-sections. Use `#:no-declare` form when you want to provide a more specific list of modules (e.g., to name both a specific module and one that combines several modules) via your own `declare-exporting` declaration

When `#:link-target?` is specified with an expression that produces a true value, then the *module-path*s are also declared as link targets though a `part-tag-decl` (which means

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that the `defmodule` form must appear before any sub-parts). These link targets are referenced via `racketmodname`, which thus points to the enclosing section, rather than the individual *module-path*s.

Specifying `#:indirect` normally makes sense only when `#:link-target?` is specified with a true value. Specifying `#:indirect` makes the module path that is displayed (and that normally refers to some other declaration of the module) use `racketmodname` with `#:indirect`.

If `#:lang` is provided as an option, then the module name is shown after `#lang` (instead of in a `require` form) to indicate that the *module-path*s are suitable for use by either `require` or `#lang`. If the module path for `require` is syntactically different from the `#lang` form, use `#:module-paths` to provide the `require` variant (and make each *module-spec* a *content-expr*).

If `#:reader` is provided, then the module name is shown after `#reader` to indicate that the module path is intended for use as a reader module.

By default, the package (if any) that supplies the documented module is determined automatically, but a set of providing packages can be specified explicitly with `#:packages`. Each *pkg-expr* result is passed on to a function like `tt` for typesetting. Provide an empty sequence after `#:packages` to suppress any package name in the output.

Each *option* form can appear at most once, and `#:lang` and `#:reader` are mutually exclusive.

The decoded *pre-flow*s introduce the module, but need not include all of the module content.

```
(declare-exporting module-path ... maybe-sources)

maybe-sources =
              | #:use-sources (module-path ...)
```

Associates the *module-path*s to all bindings defined within the enclosing section, except as overridden by other `declare-exporting` declarations in nested sub-sections. The list of *module-path*s before `#:use-sources` is shown, for example, when the user hovers the mouse over one of the bindings defined within the section.

More significantly, the first *module-path* before `#:use-sources` plus the *module-path*s after `#:use-sources` determine the binding that is documented by each `defform`, `defproc`, or similar form within the section that contains the `declare-exporting` declaration:

- If no `#:use-sources` clause is supplied, then the documentation applies to the given name as exported by the first *module-path*.

- If `#:use-sources` *module-path*s are supplied, then they are tried in order before the first *module-path*. The *module-path* that provides an export with the same

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symbolic name and `free-label-identifier=?` to the given name is used as the documented binding. This binding is assumed to be the same as the identifier as exported by the first *module-path* in the `declare-exporting` declaration.

Use `#:use-sources` sparingly, but it is needed when

- bindings are documented as originating from a module *M*, but the bindings are actually re-exported from some module *P*; and

- other documented modules also re-export the bindings from *P*, but they are documented as re-exporting from *M*.

For example, the `parameterize` binding of `mzscheme` is documented as re-exported from `racket/base`, but `parameterize` happens to be implemented in a private module and re-exported by both `racket/base` and `mzscheme`. Importing `parameterize` from `mzscheme` does not go through `racket/base`, so a search for documentation on `parameterize` in `mzscheme` would not automatically connect to the documentation of `racket/base`. To make the connection, the documentation of `racket/base` declares the private module to be a source through `#:use-sources`, so that any re-export of `parameterize` from the private module connects to the documentation for `racket/base` (unless a re-export has its own documentation, which would override the automatic connection when searching for documentation).

The initial *module-path*s sequence can be empty if *module-path*s are given with `#:use-sources`. In that case, the rendered documentation never reports an exporting module for identifiers that are documented within the section, but the *module-path*s in `#:use-sources` provide a binding context for connecting (via hyperlinks) definitions and uses of identifiers.

The `declare-exporting` form should be used no more than once per section, since the declaration applies to the entire section, although overriding `declare-exporting` forms can appear in sub-sections.

```
(defmodulelang one-or-multi maybe-sources option ... pre-flow ...)
(defmodulelang one-or-multi #:module-path module-path
               option ... pre-flow ...)
```

Equivalent to `defmodule` with `#:lang`. The `#:module-path` *module-path* is provided, it is converted to `#:module-paths` (*module-path*).

```
(defmodulereader one-or-multi option ... pre-flow ...)
```

Equivalent to `defmodule` with `#:reader`.

```
(defmodule* maybe-req (module-spec ...+) option ... pre-flow ...)
(defmodulelang* (module-spec ...+) option ... pre-flow ...)
(defmodulereader* (module-spec ...+) option ... pre-flow ...)
```

Equivalent to `defmodule` variants with `#:multi`.

```
(defmodule*/no-declare maybe-req (module-spec ...) option ... pre-
flow ...)
(defmodulelang*/no-declare (module-spec ...) option ... pre-flow ...)
(defmodulereader*/no-declare (module-spec ...) option ... pre-
flow ...)
```

Equivalent to `defmodule` variants `#:no-declare`.

4.3.3 Documenting Forms, Functions, Structure Types, and Values

```
(defproc options prototype
         result-contract-expr-datum
         pre-flow ...)

 prototype = (id arg-spec ...)
           | (prototype arg-spec ...)

  arg-spec = (arg-id contract-expr-datum)
           | (arg-id contract-expr-datum default-expr)
           | (keyword arg-id contract-expr-datum)
           | (keyword arg-id contract-expr-datum default-expr)
           | ellipses
           | ellipses+

   options = maybe-kind maybe-link maybe-id

maybe-kind =
           | #:kind kind-string-expr

maybe-link =
           | #:link-target? link-target?-expr

  maybe-id =
           | #:id [src-id dest-id-expr]

  ellipses = ...

 ellipses+ = ...+
```

Produces a sequence of flow elements (encapsulated in a `splice`) to document a procedure
named *id*. Nesting *prototype*s corresponds to a curried function, as in `define`. Unless
link-target?-expr is specified and produces `#f`, the *id* is indexed, and it also registered

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so that `racket`-typeset uses of the identifier (with the same for-label binding) are hyper-linked to this documentation.

Examples:

```
@defproc[(make-sandwich [ingredients (listof ingredient?)])
         sandwich?]{
  Returns a sandwich given the right ingredients.
}

@defproc[#:kind "sandwich-maker"
         (make-reuben [ingredient sauerkraut?] ...
                      [#:veggie? veggie? any/c #f])
         sandwich?]{
  Produces a reuben given some number of @racket[ingredient]s.

  If @racket[veggie?] is @racket[#f], produces a standard
  reuben with corned beef. Otherwise, produces a vegetable
  reuben.
}
```

Renders like:

> (make-sandwich *ingredients*) → sandwich?
>   *ingredients* : (listof ingredient?)
>
>   Returns a sandwich given the right ingredients.

> (make-reuben *ingredient*
>   ...
>   [#:veggie? *veggie?*]) → sandwich?
>   *ingredient* : sauerkraut?
>   *veggie?* : any/c = #f
>
>   Produces a reuben given some number of *ingredient*s.
>   If *veggie?* is #f, produces a standard reuben with corned beef. Other-
>   wise, produces a vegetable reuben.

When *id* is indexed and registered, a `defmodule` or `declare-exporting` form (or one of the variants) in an enclosing section determines the *id* binding that is being defined. The *id* should also have a for-label binding (as introduced by `(require (for-label ....)))` that matches the definition binding; otherwise, the defined *id* will not typeset correctly within the definition.

Each *arg-spec* must have one of the following forms:

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`(arg-id contract-expr-datum)`

> An argument whose contract is specified by `contract-expr-datum` which is typeset via `racketblock0`.

`(arg-id contract-expr-datum default-expr)`

> Like the previous case, but with a default value. All arguments with a default value must be grouped together, but they can be in the middle of required arguments.

`(keyword arg-id contract-expr-datum)`

> Like the first case, but for a keyword-based argument.

`(keyword arg-id contract-expr-datum default-expr)`

> Like the previous case, but with a default value.

`...`

> Any number of the preceding argument. This form is normally used at the end, but keyword-based arguments can sensibly appear afterward. See also the documentation for `append` for a use of `...` before the last argument.

`...+`

> One or more of the preceding argument (normally at the end, like `...`).

The `result-contract-expr-datum` is typeset via `racketblock0`, and it represents a contract on the procedure's result.

The decoded `pre-flow` documents the procedure. In this description, references to `arg-id`s using `racket`, `racketblock`, etc. are typeset as procedure arguments.

The typesetting of all information before the `pre-flow`s ignores the source layout, except that the local formatting is preserved for contracts and default-values expressions. The information is formatted to fit (if possible) in the number of characters specified by the `current-display-width` parameter.

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An optional #:kind specification chooses the decorative label, which defaults to "proce-dure". A #f result for *kind-string-expr* uses the default, otherwise *kind-string-expr* should produce a string. An alternate label should be all lowercase.

If #:id [*src-id dest-id-expr*] is supplied, then *src-id* is the identifier as it appears in the *prototype* (to be replaced by a defining instance), and *dest-id-expr* produces the identifier to be documented in place of *src-id*. This split between *src-id* and *dest-id-expr* roles is useful for functional abstraction of defproc.

```
(defproc* options
          ([prototype
            result-contract-expr-datum] ...)
          pre-flow ...)
```

Like defproc, but for multiple cases with the same id. Multiple distinct ids can also be defined by a single defproc*, for the case that it's best to document a related group of procedures at once (but multiple defprocs grouped by deftogether also works for that case).

When an id has multiple calling cases, either they must be defined with a single defproc*, so that a single definition point exists for the id, or else all but one definition should use #:link-target? #f.

Examples:

```
@defproc[((make-pb&j)
          (make-pb&j [jelly jelly?]))
         sandwich?]{
  Returns a peanut butter and jelly sandwich. If @racket[jelly]
  is provided, then it is used instead of the standard (grape)
  jelly.
}
```

Renders like:

```
((make-pb&j make-pb&j) → sandwich?
  make-pb&j : [jelly jelly?]
```

> Returns a peanut butter and jelly sandwich. If jelly is provided, then it is used instead of the standard (grape) jelly.

```
(defform options form-datum
  maybe-grammar maybe-contracts
  pre-flow ...)
```

```
       options = maybe-kind maybe-link maybe-id maybe-literals

   maybe-kind =
               | #:kind kind-string-expr

   maybe-link =
               | #:link-target? link-target?-expr

     maybe-id =
               | #:id id
               | #:id [id id-expr]

 maybe-literals =
               | #:literals (literal-id ...)

  maybe-grammar =
               | #:grammar ([nonterm-id clause-datum ...+] ...)

maybe-contracts =
               | #:contracts ([subform-datum contract-expr-datum]
                              ...)
```

Produces a sequence of flow elements (encapsulated in a `splice`) to document a syntatic
form named by *id* (or the result of *id-expr*) whose syntax is described by *form-datum*.
If no `#:id` is used to specify *id*, then *form-datum* must have the form (`id` . `datum`).

If `#:kind` *kind-string-expr* is supplied, it is used in the same way as for `defproc`, but
the default kind is `"syntax"`.

If `#:id [id id-expr]` is supplied, then *id* is the identifier as it appears in the *form-
datum* (to be replaced by a defining instance), and *id-expr* produces the identifier to be
documented. This split between *id* and *id-expr* roles is useful for functional abstraction
of `defform`.

Unless *link-target?-expr* is specified and produces `#f`, the *id* (or result of *id-expr*) is
indexed, and it is also registered so that `racket`-typeset uses of the identifier (with the same
for-label binding) are hyperlinked to this documentation. The `defmodule` or `declare-
exporting` requirements, as well as the binding requirements for *id* (or result of *id-expr*),
are the same as for `defproc`.

The decoded *pre-flow* documents the form. In this description, a reference to any identi-
fier in *form-datum* via `racket`, `racketblock`, etc. is typeset as a sub-form non-terminal.
If `#:literals` clause is provided, however, instances of the *literal-id*s are typeset nor-
mally (i.e., as determined by the enclosing context).

If a `#:grammar` clause is provided, it includes an auxiliary grammar of non-terminals shown

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```

with the `id` form. Each *nonterm-id* is specified as being any of the corresponding *clause-datum*s.

If a `#:contracts` clause is provided, each *subform-datum* (typically an identifier that serves as a meta-variable in *form-datum* or *clause-datum*) is shown as producing a value that must satisfy the contract described by *contract-expr-datum*. Use `#:contracts` only to specify constraints on a *value* produced by an expression; for constraints on the *syntax* of a *subform-datum*, use grammar notation instead, possibly through an auxiliary grammar specified with `#:grammar`.

The typesetting of *form-datum*, *clause-datum*, *subform-datum*, and *contract-expr-datum* preserves the source layout, like `racketblock`.

Examples:

```
@defform[(sandwich-promise sandwich-expr)
         #:contracts ([sandwich-expr sandwich?])]{
  Returns a promise to construct a sandwich. When forced, the promise
  will produce the result of @racket[sandwich-expr].
}

@defform[#:literals (sandwich mixins)
         (sandwich-promise* [sandwich sandwich-expr]
                            [mixins ingredient-expr ...])
         #:contracts ([sandwich-expr sandwich?]
                      [ingreient-expr ingredient?])]{
  Returns a promise to construct a sandwich. When forced, the promise
  will produce the result of @racket[sandwich-
expr]. Each result of
  the @racket[ingredient-expr]s will be mixed into the resulting
  sandwich.
}

@defform[(sandwich-factory maybe-name factory-component ...)
         #:grammar
         [(maybe-name (code:line)
                      name)
          (factory-component (code:line #:protein protein-expr)
                             [vegetable vegetable-expr])]]{
  Constructs a sandwich factory. If @racket[maybe-
name] is provided,
  the factory will be named. Each of the @racket[factory-
component]
  clauses adds an additional ingredient to the sandwich pipeline.
}
```

Renders like:

```
(sandwich-promise sandwich-expr)

  sandwich-expr : sandwich?
```

> Returns a promise to construct a sandwich. When forced, the promise will produce the result of *sandwich-expr*.

```
(sandwich-promise* [sandwich sandwich-expr]
                   [mixins ingredient-expr ...])

  sandwich-expr : sandwich?
  ingreient-expr : ingredient?
```

> Returns a promise to construct a sandwich. When forced, the promise will produce the result of *sandwich-expr*. Each result of the *ingredient-expr*s will be mixed into the resulting sandwich.

```
(sandwich-factory maybe-name factory-component ...)

        maybe-name =
                   | name

factory-component = #:protein protein-expr
                  | [vegetable vegetable-expr]
```

> Constructs a sandwich factory. If *maybe-name* is provided, the factory will be named. Each of the *factory-component* clauses adds an additional ingredient to the sandwich pipeline.

```
(defform* options [form-datum ...+]
  maybe-grammar maybe-contracts
  pre-flow ...)
```

Like `defform`, but for multiple forms using the same *id*.

Examples:

```
@defform*[((call-with-current-sandwich expr)
           (call-with-current-sandwich expr sandwich-handler-
expr))]{
  Runs @racket[expr] and passes it the value of the current
  sandwich. If @racket[sandwich-handler-expr] is provided, its result
  is invoked when the current sandwich is eaten.
}
```

Renders like:

```
(call-with-current-sandwich expr)
(call-with-current-sandwich expr sandwich-handler-expr)
```

> Runs *expr* and passes it the value of the current sandwich. If
> *sandwich-handler-expr* is provided, its result is invoked when the
> current sandwich is eaten.

```
(defform/none maybe-kind maybe-literal form-datum
  maybe-grammar maybe-contracts
  pre-flow ...)
```

Like `defform` with `#:link-target?` `#f`.

```
(defidform maybe-kind maybe-link id pre-flow ...)
```

Like `defform`, but with a plain *id* as the form.

```
(defidform/inline id)
(defidform/inline (unsyntax id-expr))
```

Like `defidform`, but *id* (or the result of *id-expr*, analogous to `defform`) is typeset as an
inline element. Use this form sparingly, because the typeset form does not stand out to the
reader as a specification of *id*.

```
(specform maybe-literals datum maybe-grammar maybe-contracts
  pre-flow ...)
```

Like `defform` with `#:link-target?` `#f`, but with indenting on the left for both the speci-
fication and the *pre-flow*s.

```
(specsubform maybe-literals datum maybe-grammar maybe-contracts
  pre-flow ...)
```

Similar to `defform` with `#:link-target?` `#f`, but without the initial identifier as an im-
plicit literal, and the table and flow are typeset indented. This form is intended for use when
refining the syntax of a non-terminal used in a `defform` or other `specsubform`. For exam-
ple, it is used in the documentation for `defproc` in the itemization of possible shapes for
arg-spec.

The *pre-flow*s list is parsed as a flow that documents the procedure. In this description, a
reference to any identifier in *datum* is typeset as a sub-form non-terminal.

```
(specspecsubform maybe-literals datum maybe-grammar maybe-contracts
  pre-flow ...)
```

Like `specsubform`, but indented an extra level. Since using `specsubform` within the body of `specsubform` already nests indentation, `specspecsubform` is for extra indentation without nesting a description.

```
(defform/subs options form-datum
  ([nonterm-id clause-datum ...+] ...)
  maybe-contracts
  pre-flow ...)
(defform*/subs options [form-datum ...+]
  ([nonterm-id clause-datum ...+] ...)
  maybe-contracts
  pre-flow ...)
(specform/subs maybe-literals datum
  ([nonterm-id clause-datum ...+] ...)
  maybe-contracts
  pre-flow ...)
(specsubform/subs maybe-literals datum
  ([nonterm-id clause-datum ...+] ...)
  maybe-contracts
  pre-flow ...)
(specspecsubform/subs maybe-literals datum
 ([nonterm-id clause-datum ...+] ...)
 maybe-contracts
 pre-flow ...)
```

Like `defform`, `defform*`, `specform`, `specsubform`, and `specspecsubform`, respectively, but the auxiliary grammar is mandatory and the `#:grammar` keyword is omitted.

Examples:

```
@defform/subs[(sandwich-factory maybe-name factory-component ...)
              [(maybe-name (code:line)
                           name)
               (factory-component (code:line #:protein protein-
expr)
                                  [vegetable vegetable-expr])]]{
  Constructs a sandwich factory. If @racket[maybe-
name] is provided,
  the factory will be named. Each of the @racket[factory-
component]
  clauses adds an additional ingredient to the sandwich pipeline.
}
```

Renders like:

```
(sandwich-factory maybe-name factory-component ...)

       maybe-name =
                  | name

factory-component = #:protein protein-expr
                  | [vegetable vegetable-expr]
```

> Constructs a sandwich factory. If `maybe-name` is provided, the factory
> will be named. Each of the `factory-component` clauses adds an ad-
> ditional ingredient to the sandwich pipeline.

```
(defparam maybe-link id arg-id contract-expr-datum pre-flow ...)
```

Like `defproc`, but for a parameter. The `contract-expr-datum` serves as both the result
contract on the parameter and the contract on values supplied for the parameter. The `arg-id`
refers to the parameter argument in the latter case.

Examples:

```
@defparam[current-sandwich sandwich sandwich?]{
  A parameter that defines the current sandwich for operations that
  involve eating a sandwich.
}
```

Renders like:

```
(current-sandwich) → sandwich?
(current-sandwich sandwich) → void?
  sandwich : sandwich?
```

> A parameter that defines the current sandwich for operations that in-
> volve eating a sandwich.

```
(defparam* maybe-link id arg-id
  in-contract-expr-datum out-contract-expr-datum
  pre-flow ...)
```

Like `defparam`, but with separate contracts for when the parameter is being set versus when
it is being retrieved (for the case that a parameter guard coerces values matching a more
flexible contract to a more restrictive one; `current-directory` is an example).

```
(defboolparam maybe-link id arg-id pre-flow ...)
```

Like `defparam`, but the contract on a parameter argument is `any/c`, and the contract on the parameter result is `boolean?`.

```
(defthing options id contract-expr-datum
  pre-flow ...)

    options = maybe-kind maybe-link maybe-id

maybe-kind =
             | #:kind kind-string-expr

maybe-link =
             | #:link-target? link-target?-expr

  maybe-id =
             | #:id id-expr
```

Like `defproc`, but for a non-procedure binding.

If `#:kind kind-string-expr` is supplied, it is used in the same way as for `defproc`, but the default kind is `"value"`.

If `#:id id-expr` is supplied, then the result of `id-expr` is used in place of `id`.

Examples:

```
@defthing[moldy-sandwich sandwich?]{
  Don't eat this. Provided for backwards compatibility.
}
```

Renders like:

```
moldy-sandwich : sandwich?
```

        Don't eat this. Provided for backwards compatibility.

```
(defstruct* maybe-link struct-name ([field-name contract-expr-datum] ...)
  maybe-mutable maybe-non-opaque maybe-constructor
  pre-flow ...)
```

```
(defstruct maybe-link struct-name ([field-name contract-expr-datum] ...)
  maybe-mutable maybe-non-opaque maybe-constructor
  pre-flow ...)

       maybe-link =
                  | #:link-target? link-target?-expr

      struct-name = id
                  | (id super-id)

    maybe-mutable =
                  | #:mutable

 maybe-non-opaque =
                  | #:prefab
                  | #:transparent
                  | #:inspector #f

maybe-constructor =
                  | #:constructor-name constructor-id
                  | #:extra-constructor-name constructor-id
                  | #:omit-constructor
```

Similar to `defform` or `defproc`, but for a structure definition. The `defstruct*` form corresponds to `struct`, while `defstruct` corresponds to `define-struct`.

Examples:

```
@defstruct[sandwich ([protein ingredient?] [sauce ingredient?])]{
  A strucure type for sandwiches. Sandwiches are a pan-
human foodstuff
  composed of a partially-enclosing bread material and various
  ingredients.
}
```

Renders like:

```
(struct sandwich (protein sauce)
        #:extra-constructor-name make-sandwich)
  protein : ingredient?
  sauce : ingredient?
```

> A strucure type for sandwiches. Sandwiches are a pan-human foodstuff composed of a partially-enclosing bread material and various ingredients.

```
(deftogether [def-expr ...] pre-flow ...)
```

Combines the definitions created by the *def-expr*s into a single definition box. Each *def-expr* should produce a definition point via `defproc`, `defform`, etc. Each *def-expr* should have an empty *pre-flow*; the decoded *pre-flow* sequence for the `deftogether` form documents the collected bindings.

Examples:

```
@deftogether[(@defthing[test-sandwich-1 sandwich?]
              @defthing[test-sandwich-2 sandwich?])]{
  Two high-quality sandwiches. These are provided for convenience
  in writing test cases
}
```

Renders like:

```
test-sandwich-1 : sandwich?
test-sandwich-2 : sandwich?
```

> Two high-quality sandwiches. These are provided for convenience in writing test cases

```
(racketgrammar maybe-literals id clause-datum ...+)

maybe-literals =
               | #:literals (literal-id ...)
```

Creates a table to define the grammar of *id*. Each identifier mentioned in a *clause-datum* is typeset as a non-terminal, except for the identifiers listed as *literal-id*s, which are typeset as with `racket`.

```
(racketgrammar* maybe-literals [id clause-datum ...+] ...)
```

Like `racketgrammar`, but for typesetting multiple productions at once, aligned around the = and |.

```
(defidentifier id
               [#:form? form?
                #:index? index?
                #:show-libs? show-libs?]) → element?
  id : identifier?
  form? : boolean? = #f
  index? : boolean? = #t
  show-libs? : boolean? = #t
```

Typesets *id* as a Racket identifier, and also establishes the identifier as the definition of a binding in the same way as `defproc`, `defform`, etc. As always, the library that provides the identifier must be declared via `defmodule` or `declare-exporting` for an enclosing section.

If *form?* is a true value, then the identifier is documented as a syntactic form, so that uses of the identifier (normally including *id* itself) are typeset as a syntactic form.

If *index?* is a true value, then the identifier is registered in the index.

If *show-libs?* is a true value, then the identifier's defining module may be exposed in the typeset form (e.g., when viewing HTML and the mouse hovers over the identifier).

```
(schemegrammar maybe-literals id clause-datum ...+)
(schemegrammar* maybe-literals [id clause-datum ...+] ...)
```

Compatibility aliases for `racketgrammar` and `racketgrammar*`.

```
(current-display-width) → exact-nonnegative-integer?
(current-display-width w) → void?
  w : exact-nonnegative-integer?
```

Specifies the target maximum width in characters for the output of `defproc` and `defstruct`.

4.3.4 Documenting Classes and Interfaces

```
(defclass id super (intf-id ...) pre-flow ...)

super = super-id
      | (mixin-id super)
```

Creates documentation for a class *id* that is a subclass of *super* and implements each interface *intf-id*. Each identifier in *super* (except `object%`) and *intf-id* must be documented somewhere via `defclass` or `definterface`.

The decoding of the *pre-flow* sequence should start with general documentation about the class, followed by constructor definition (see `defconstructor`), and then field and method definitions (see `defmethod`). In rendered form, the constructor and method specification are indented to visually group them under the class definition.

```
(defclass/title id super (intf-id ...) pre-flow ...)
```

Like `defclass`, also includes a `title` declaration with the style `'hidden`. In addition, the constructor and methods are not left-indented.

This form is normally used to create a section to be rendered on its own HTML. The 'hidden style is used because the definition box serves as a title.

```
(definterface id (intf-id ...) pre-flow ...)
```

Like defclass, but for an interfaces. Naturally, *pre-flow* should not generate a constructor declaration.

```
(definterface/title id (intf-id ...) pre-flow ...)
```

Like definterface, but for single-page rendering as in defclass/title.

```
(defmixin id (domain-id ...) (range-id ...) pre-flow ...)
```

Like defclass, but for a mixin. Any number of *domain-id* classes and interfaces are specified for the mixin's input requires, and any number of result classes and (more likely) interfaces are specified for the *range-id*. The *domain-id*s supply inherited methods.

```
(defmixin/title id (domain-id ...) (range-id ...) pre-flow ...)
```

Like defmixin, but for single-page rendering as in defclass/title.

```
(defconstructor (arg-spec ...) pre-flow ...)

arg-spec = (arg-id contract-expr-datum)
         | (arg-id contract-expr-datum default-expr)
```

Like defproc, but for a constructor declaration in the body of defclass, so no return contract is specified. Also, the new-style keyword for each *arg-spec* is implicit from the *arg-id*.

```
(defconstructor/make (arg-spec ...) pre-flow ...)
```

Like defconstructor, but specifying by-position initialization arguments (for use with make-object) instead of by-name arguments (for use with new).

```
(defconstructor*/make [(arg-spec ...) ...] pre-flow ...)
```

Like defconstructor/make, but with multiple constructor patterns analogous defproc*.

```
(defconstructor/auto-super [(arg-spec ...) ...] pre-flow ...)
```

Like defconstructor, but the constructor is annotated to indicate that additional initialization arguments are accepted and propagated to the superclass.

```
(defmethod maybe-mode (id arg-spec ...)
           result-contract-expr-datum
           pre-flow ...)

maybe-mode =
             | #:mode override
             | #:mode override-final
             | #:mode public-final
             | #:mode augment
             | #:mode augment-final
             | #:mode pubment
             | #:mode extend
             | #:mode extend-final
```

Like defproc, but for a method within a defclass or definterface body.

The *maybe-mode* specifies whether the method overrides a method from a superclass, and so on. (For these purposes, use #:mode override when refining a method of an implemented interface.) The extend mode is like override, but the description of the method should describe only extensions to the superclass implementation.

```
(defmethod* maybe-mode
            ([(id arg-spec ...)
               result-contract-expr-datum] ...)
            pre-flow ...)
```

Like defproc*, but for a method within a defclass or definterface body. The *maybe-mode* specification is as in defmethod.

```
(method class/intf-id method-id)
```

Creates a hyperlink to the method named by *method-id* in the class or interface named by *class/intf-id*. The hyperlink names the method, only; see also xmethod.

For-label binding information is used with *class/intf-id*, but not *method-id*.

```
(xmethod class/intf-id method-id)
```

Like method, but the hyperlink shows both the method name and the containing class/interface.

```
(this-obj)
```

Within a defmethod or similar form, typesets as a meta-variable that stands for the target of the method call. Use (this-obj) to be more precise than prose such as "this method's object."

4.3.5 Documenting Signatures

```
(defsignature id (super-id ...) pre-flow ...)
```

Defines a signature `id` that extends the `super-id` signatures. Any elements defined in decoded `pre-flow`s—including forms, procedures, structure types, classes, interfaces, and mixins—are defined as members of the signature instead of direct bindings. These definitions can be referenced through `sigelem` instead of `racket`.

The decoded `pre-flow`s inset under the signature declaration in the typeset output, so no new sections, etc. can be started.

```
(defsignature/splice id (super-id ...) pre-flow ...)
```

Like `defsignature`, but the decoded `pre-flow`s are not typeset under the signature declaration, and new sections, etc. can be started in the `pre-flow`s.

```
(signature-desc pre-flow ...) → any/c
  pre-flow : pre-flow?
```

Produces an opaque value that `defsignature` recognizes to outdent in the typeset form. This is useful for text describing the signature as a whole to appear right after the signature declaration.

```
(sigelem sig-id id)
```

Typesets the identifier `id` with a hyperlink to its definition as a member of the signature named by `sig-id`.

4.3.6 Various String Forms

```
(aux-elem pre-content ...) → element?
  pre-content : pre-content?
```

Like `elem`, but adds an `'aux` style property.

```
(defterm pre-content ...) → element?
  pre-content : pre-content?
```

Typesets the decoded `pre-content` as a defined term (e.g., in italic). Consider using `deftech` instead, though, so that uses of `tech` can hyper-link to the definition.

```
(onscreen pre-content ...) → element?
  pre-content : pre-content?
```

Typesets the decoded `pre-content` as a string that appears in a GUI, such as the name of a button.

```
(menuitem menu-name item-name) → element?
  menu-name : string?
  item-name : string?
```

Typesets the given combination of a GUI's menu and item name.

```
(filepath pre-content ...) → element?
  pre-content : pre-content?
```

Typesets the decoded `pre-content` as a file name (e.g., in typewriter font and in quotes).

```
(exec pre-content ...) → element?
  pre-content : pre-content?
```

Typesets the decoded `pre-content` as a command line (e.g., in typewriter font).

```
(envvar pre-content ...) → element?
  pre-content : pre-content?
```

Typesets the given decoded `pre-content` as an environment variable (e.g., in typewriter font).

```
(Flag pre-content ...) → element?
  pre-content : pre-content?
```

Typesets the given decoded `pre-content` as a flag (e.g., in typewriter font with a leading `-`).

```
(DFlag pre-content ...) → element?
  pre-content : pre-content?
```

Typesets the given decoded `pre-content` a long flag (e.g., in typewriter font with two leading `-`s).

```
(PFlag pre-content ...) → element?
  pre-content : pre-content?
```

Typesets the given decoded `pre-content` as a `+` flag (e.g., in typewriter font with a leading `+`).

```
(DPFlag pre-content ...) → element?
  pre-content : pre-content?
```

Typesets the given decoded `pre-content` a long `+` flag (e.g., in typewriter font with two leading `+`s).

4.3.7 Links

See also §3.1.5 "Links".

```
(racketlink id #:style style-expr pre-content ...)
(racketlink id pre-content ...)

  id : identifier?
  pre-content : pre-content?
```

An element where the decoded *pre-content* is hyperlinked to the definition of *id*.

```
(schemelink id pre-content ...)
```

Compatibility alias for `racketlink`.

```
(link  url
       pre-content ...
      [#:underline? underline?
       #:style style])              → element?
  url : string?
  pre-content : any/c
  underline? : any/c = #t
  style : (or/c style? string? symbol? #f)
        = (if underline? #f "plainlink")
```

Alias of `hyperlink` for backward compatibility.

```
(other-manual  module-path
               [#:underline? underline?]) → element?
  module-path : module-path?
  underline? : any/c = #t
```

Alias of `other-doc` for backward compatibility.

```
(deftech  pre-content
          ...
         [#:key key
          #:normalize? normalize?
          #:style? style?])         → element?
  pre-content : pre-content?
  key : (or/c string? #f) = #f
  normalize? : any/c = #t
  style? : any/c = #t
```

Produces an element for the decoded *pre-content*, and also defines a term that can be referenced elsewhere using `tech`.

When *key* is `#f`, the `content->string` result of the decoded *pre-content* is used as a key for references. If *normalize?* is true, then the key string is normalized as follows:

- The string is case-folded.

- A trailing "ies" is replaced by "y".

- A trailing "s" is removed.

- Consecutive hyphens and whitespaces are all replaced by a single space.

These normalization steps help support natural-language references that differ slightly from a defined form. For example, a definition of "bananas" can be referenced with a use of "banana".

If *style?* is true, then `defterm` is used on *pre-content*.

```
(tech  pre-content
       ...
      [#:key key
       #:normalize? normalize?
       #:doc module-path
       #:tag-prefixes prefixes]) → element?
  pre-content : pre-content?
  key : (or/c string? #f) = #f
  normalize? : any/c = #t
  module-path : (or/c module-path? #f) = #f
  prefixes : (or/c (listof string?) #f) = #f
```

Produces an element for the decoded *pre-content*, and hyperlinks it to the definition of the key as established by `deftech`. If *key* is false, the decoded content is converted to a string (using `content->string`) to use as a key; in either case, if *normalize?* is true, the key is normalized in the same way as for `deftech`. The `#:doc` and `#:tag-prefixes` arguments support cross-document and section-specific references, like in `secref`.

With the default style files, the hyperlink created by `tech` is somewhat quieter than most hyperlinks: the underline in HTML output is gray, instead of blue, and the term and underline turn blue only when the mouse is moved over the term.

In some cases, combining both natural-language uses of a term and proper linking can require some creativity, even with the normalization performed on the term. For example, if "bind" is defined, but a sentence uses the term "binding," the latter can be linked to the former using @tech{bind}ing.

```
(techlink  pre-content
            ...
          [#:key key
           #:normalize? normalize?
           #:doc module-path
           #:tag-prefixes prefixes]) → element?
  pre-content : pre-content?
  key : (or/c string? #f) = #f
  normalize? : any/c = #t
  module-path : (or/c module-path? #f) = #f
  prefixes : (or/c (listof string?) #f) = #f
```

Like tech, but the link is not quiet. For example, in HTML output, a hyperlink underline appears even when the mouse is not over the link.

4.3.8 Indexing

See also §3.1.6 "Indexing".

```
(indexed-racket datum ...)
```

A combination of racket and as-index, with the following special cases when a single datum is provided:

- If datum is a quote form, then the quote is removed from the key (so that it's sorted using its unquoted form).

- If datum is a string, then quotes are removed from the key (so that it's sorted using the string content).

```
(indexed-scheme datum ...)
```

Compatibility alias for indexed-racket.

```
(idefterm pre-content ...) → element?
  pre-content : pre-content?
```

Combines as-index and defterm. The content normally should be plural, rather than singular. Consider using deftech, instead, which always indexes.

```
(pidefterm pre-content ...) → element?
  pre-content : pre-content?
```

Like `idefterm`, but plural: adds an "s" on the end of the content for the index entry. Consider using `deftech`, instead.

```
(indexed-file pre-content ...) → element?
  pre-content : pre-content?
```

A combination of `file` and `as-index`, but where the sort key for the index iterm does not include quotes.

```
(indexed-envvar pre-content ...) → element?
  pre-content : pre-content?
```

A combination of `envvar` and `as-index`.

4.3.9   Images

```
(image/plain filename-relative-to-source
             pre-element ...)              → element?
  filename-relative-to-source : string?
  pre-element : any/c
```

An alias for `image` for backward compatibility.

4.3.10   Bibliography

```
(cite key ...+) → element?
  key : string?
```

Links to a bibliography entry, using the *key*s both to indicate the bibliography entry and, in square brackets, as the link text.

```
(bibliography [#:tag tag] entry ...) → part?
  tag : string? = "doc-bibliography"
  entry : bib-entry?
```

Creates a bibliography part containing the given entries, each of which is created with `bib-entry`. The entries are typeset in order as given.

```
(bib-entry #:key key
           #:title title
          [#:is-book? is-book?
           #:author author
           #:location location
           #:date date
           #:url url])           → bib-entry?
```

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```
key : string?
title : (or/c #f pre-content?)
is-book? : boolean? = #f
author : (or/c #f pre-content?) = #f
location : (or/c #f pre-content?) = #f
date : (or/c #f pre-content?) = #f
url : (or/c #f pre-content?) = #f
```

Creates a bibliography entry. The `key` is used to refer to the entry via `cite`. The other arguments are used as elements in the entry:

- `title` is the title of the cited work. It will be surrounded by quotes in typeset form if `is-book?` is #f, otherwise it is typeset via `italic`.

- `author` lists the authors. Use names in their usual order (as opposed to "last, first"), and separate multiple names with commas using "and" before the last name (where there are multiple names). The `author` is typeset in the bibliography as given, or it is omitted if given as #f.

- `location` names the publication venue, such as a conference name or a journal with volume, number, and pages. The `location` is typeset in the bibliography as given, or it is omitted if given as #f.

- `date` is a date, usually just a year (as a string). It is typeset in the bibliography as given, or it is omitted if given as #f.

- `url` is an optional URL. It is typeset in the bibliography using `tt` and hyperlinked, or it is omitted if given as #f.

```
(bib-entry? v) → boolean?
  v : any/c
```

Returns #t if `v` is a bibliography entry created by `bib-entry`, #f otherwise.

4.3.11 Miscellaneous

```
(t pre-content ...) → paragraph?
  pre-content : pre-content?
```

Wraps the decoded `pre-content` as a paragraph.

```
etc : element?
```

Like `"etc."`, but with an abbreviation-ending period for use in the middle of a sentence.

```
PLaneT : element?
```

"PLaneT" (to help make sure you get the letters in the right case).

```
manual-doc-style : style?
```

A style to be used for a document's main `part` to get the style configuration of `#lang`
`scribble/manual`. See §4.3.13 "Manual Rendering Style".

```
(hash-lang) → element?
```

Returns an element for `#lang` that is hyperlinked to an explanation.

```
void-const : element?
```

Returns an element for `#<void>`.

```
undefined-const : element?
```

Returns an element for `#<undefined>`.

```
(commandline pre-content ...) → paragraph?
  pre-content : pre-content?
```

Produces an inset command-line example (e.g., in typewriter font).

```
(centerline pre-flow ...) → nested-flow?
  pre-flow : pre-flow?
```

An alias for `centered` for backward compatibility.

```
(math pre-content ...) → element?
  pre-content : any/c
```

The decoded *pre-content* is further transformed:

- Any immediate `'rsquo` is converted to `'prime`.

- Parentheses and sequences of decimal digits in immediate strings are left as-is, but
  any other immediate string is italicized.

- When _ appears before a non-empty sequence of numbers and letters, the sequence is
  typeset as a subscript.

- When ⌃ appears before a non-empty sequence of numbers and letters, the sequence is typeset as a superscript.

```
(filebox filename pre-flow ...) → block?
  filename : (or/c string? element?)
  pre-flow : pre-flow?
```

Typesets the *pre-flow*s as the content of *filename*. For example, the content may be inset on the page with *filename* above it. If *filename* is a string, it is passed to `"filepath"` to obtain an `element`.

```
(deprecated [#:what what]
            replacement
            additional-notes ...) → block?
  what : content? = "library"
  replacement : content?
  additional-notes : content?
```

Produces an inset warning for deprecated libraries, functions, etc. (as described by *what*), where *replacement* describes a suitable replacement. The *additional-notes* are included after the initial deprecation message.

4.3.12 Index-Entry Descriptions

```
(require scribble/manual-struct)        package: scribble-lib
```

The `scribble/manual-struct` library provides types used to describe index entries created by `scribble/manual` functions. These structure types are provided separate from `scribble/manual` so that `scribble/manual` need not be loaded when deserializing cross-reference information that was generated by a previously rendered document.

```
(struct module-path-index-desc ()
        #:extra-constructor-name make-module-path-index-desc)
```

Indicates that the index entry corresponds to a module definition via `defmodule` and company.

```
(struct exported-index-desc (name from-libs)
        #:extra-constructor-name make-exported-index-desc)
  name : symbol?
  from-libs : (listof module-path?)
```

Indicates that the index entry corresponds to the definition of an exported binding. The `name` field and `from-libs` list correspond to the documented name of the binding and the

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primary modules that export the documented name (but this list is not exhaustive, because new modules can re-export the binding).

```
(struct form-index-desc exported-index-desc ()
        #:extra-constructor-name make-form-index-desc)
```

Indicates that the index entry corresponds to the definition of a syntactic form via `defform` and company.

```
(struct procedure-index-desc exported-index-desc ()
        #:extra-constructor-name make-procedure-index-desc)
```

Indicates that the index entry corresponds to the definition of a procedure binding via `def-proc` and company.

```
(struct thing-index-desc exported-index-desc ()
        #:extra-constructor-name make-thing-index-desc)
```

Indicates that the index entry corresponds to the definition of a binding via `defthing` and company.

```
(struct struct-index-desc exported-index-desc ()
        #:extra-constructor-name make-struct-index-desc)
```

Indicates that the index entry corresponds to the definition of a structure type via `defstruct` and company.

```
(struct class-index-desc exported-index-desc ()
        #:extra-constructor-name make-class-index-desc)
```

Indicates that the index entry corresponds to the definition of a class via `defclass` and company.

```
(struct interface-index-desc exported-index-desc ()
        #:extra-constructor-name make-interface-index-desc)
```

Indicates that the index entry corresponds to the definition of an interface via `definterface` and company.

```
(struct mixin-index-desc exported-index-desc ()
        #:extra-constructor-name make-mixin-index-desc)
```

Indicates that the index entry corresponds to the definition of a mixin via `defmixin` and company.

```
(struct method-index-desc exported-index-desc (method-name
                                                class-tag)
        #:extra-constructor-name make-method-index-desc)
  method-name : symbol?
  class-tag : tag?
```

Indicates that the index entry corresponds to the definition of an method via `defmethod` and company. The *name* field from `exported-index-desc` names the class or interface that contains the method. The `method-name` field names the method. The `class-tag` field provides a pointer to the start of the documentation for the method's class or interface.

```
(struct constructor-index-desc exported-index-desc (class-tag)
        #:extra-constructor-name make-constructor-index-desc)
  class-tag : tag?
```

Indicates that the index entry corresponds to a constructor via `defconstructor` and company. The *name* field from `exported-index-desc` names the class or interface that contains the method. The `class-tag` field provides a pointer to the start of the documentation for the method's class or interface.

4.3.13 Manual Rendering Style

Using `#lang scribble/manual` for the main `part` of a document associates style properties on the `doc` export to select the Racket manual style for rendering.

A `html-defaults` style property is added to `doc`, unless `doc`'s style already has a `html-defaults` style property (e.g., supplied to `title`). Similarly, a `latex-default` style property is added if one is not already present. Finally, an `css-style-addition` property is always added.

For HTML rendering:

- The document's prefix file is set to `"scribble-prefix.html"`, as usual, in `html-defaults`.

- The document's style file is set to `"manual-style.css"` from the `"scribble"` collection in `html-defaults`.

- The file `"manual-files.css"` from the `"scribble"` collection is designated as an additional accompanying file in `html-defaults`.

- The file `"manual-racket.css"` from the `"scribble"` collection is added as a `css-style-addition`.

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To obtain this configuration without using `#lang scribble/manual`, use `manual-doc-style`.

4.4 Racket

```
(require scribble/racket)        package: scribble-lib
 (require scribble/scheme)
```

The `scribble/racket` library (or `scribble/scheme` for backward compatibility) provides utilities for typesetting Racket code. The `scribble/manual` forms provide a higher-level interface.

```
(define-code id typeset-expr)
(define-code id typeset-expr uncode-id)
(define-code id typeset-expr uncode-id d->s-expr)
(define-code id typeset-expr uncode-id d->s-expr stx-prop-expr)
```

Binds `id` to a form similar to `racket` or `racketblock` for typesetting code. The form generated by `define-code` handles source-location information, escapes via `unquote` by default, preserves binding and property information, and supports element transformers.

The supplied *typeset-expr* expression should produce a procedure that performs the actual typesetting. This expression is normally `to-element` or `to-paragraph`. The argument supplied to *typeset-expr* is normally a syntax object, but more generally it is the result of applying *d->s-expr*.

The optional *uncode-id* specifies the default escape from literal code to be recognized by `id`, and the default for *uncode-id* is `unsyntax`. A use of the `id` form can specify an alternate escape via `#:escape`, as in `racketblock` and `racket`.

The optional *d->s-expr* should produce a procedure that accepts three arguments suitable for `datum->syntax`: a syntax object or `#f`, an arbitrary value, and a vector for a source location. The result should record as much or as little of the argument information as needed by *typeset-expr* to typeset the code. Normally, *d->s-expr* is `datum->syntax`.

The *stx-prop-expr* should produce a procedure for recording a `'paren-shape` property when the source expression uses with `id` has such a property. The default is `syntax-property`.

```
(to-paragraph  v
               [#:expr? expr?
                #:escapes? escapes?
                #:color? color?
                #:wrap-elem wrap-elem]) → block?
  v : any/c
  expr? : any/c = #f
```

```
    escapes? : any/c = #t
    color? : any/c = #t
    wrap-elem : (element? . -> . element?) = (lambda (e) e)
```

Typesets an S-expression that is represented by a syntax object, where source-location information in the syntax object controls the generated layout.

Identifiers that have `for-label` bindings are typeset and hyperlinked based on definitions declared elsewhere (via `defproc`, `defform`, etc.). Unless `escapes?` is `#f`, the identifiers `code:line`, `code:comment`, `code:blank`, `code:hilite`, and `code:quote` are handled as in `racketblock`, as are identifiers that start with `_`.

In addition, the given `v` can contain `var-id`, `shaped-parens`, `just-context`, or `literal-syntax` structures to be typeset specially (see each structure type for details), or it can contain `element` structures that are used directly in the output.

If `expr?` is true, then `v` is rendered in expression style, much like `print` with the `print-as-expression` parameter set to `#t`. In that case, `for-label` bindings on identifiers are ignored, since the identifiers are all quoted in the output. Typically, `expr?` is set to true for printing result values.

If `color?` is `#f`, then the output is typeset without coloring.

The `wrap-elem` procedure is applied to each element constructed for the resulting block. When combined with `#f` for `color?`, for example, the `wrap-elem` procedure can be used to give a style to an element.

```
((to-paragraph/prefix  prefix1
                       prefix
                       suffix)
                       v
                      [#:expr? expr?
                       #:escapes? escapes?
                       #:color? color?
                       #:wrap-elem wrap-elem]) → block?
  prefix1 : any/c
  prefix : any/c
  suffix : any/c
  v : any/c
  expr? : any/c = #f
  escapes? : any/c = #t
  color? : any/c = #f
  wrap-elem : (element? . -> . element?) = (lambda (e) e)
```

Like `to-paragraph`, but `prefix1` is prefixed onto the first line, `prefix` is prefix to any subsequent line, and `suffix` is added to the end. The `prefix1`, `prefix`, and `suffix`

arguments are used as content, except that if `suffix` is a list of elements, it is added to the end on its own line.

```
(to-element  v
             [#:expr? expr?
              #:escapes? escapes?
              #:defn? defn?])      → element?
  v : any/c
  expr? : any/c = #f
  escapes? : any/c = #t
  defn? : any/c = #f
```

Like `to-paragraph`, except that source-location information is mostly ignored, since the result is meant to be inlined into a paragraph. If `defn?` is true, then an identifier is styled as a definition site.

```
(to-element/no-color  v
                      [#:expr? expr?
                       #:escapes? escapes?]) → element?
  v : any/c
  expr? : any/c = #f
  escapes? : any/c = #t
```

Like `to-element`, but `for-syntax` bindings are ignored, and the generated text is uncolored. This variant is typically used to typeset results.

```
(struct var-id (sym)
        #:extra-constructor-name make-var-id)
  sym : (or/c symbol? identifier?)
```

When `to-paragraph` and variants encounter a `var-id` structure, it is typeset as `sym` in the variable font, like `racketvarfont`—unless the `var-id` appears under quote or quasiquote, in which case `sym` is typeset as a symbol.

```
(struct shaped-parens (val shape)
        #:extra-constructor-name make-shaped-parens)
  val : any/c
  shape : char?
```

When `to-paragraph` and variants encounter a `shaped-parens` structure, it is typeset like a syntax object that has a `'paren-shape` property with value `shape`.

```
(struct long-boolean (val)
        #:extra-constructor-name make-long-boolean)
  val : boolean?
```

When `to-paragraph` and variants encounter a `long-boolean` structure, it is typeset as `#true` or `#false`, as opposed to `#t` or `#f`.

```
(struct just-context (val context)
        #:extra-constructor-name make-just-context)
  val : any/c
  context : syntax?
```

When `to-paragraph` and variants encounter a `just-context` structure, it is typeset using the source-location information of `val` just the lexical context of `ctx`.

```
(struct literal-syntax (stx)
        #:extra-constructor-name make-literal-syntax)
  stx : any/c
```

When `to-paragraph` and variants encounter a `literal-syntax` structure, it is typeset as the string form of `stx`. This can be used to typeset a syntax-object value in the way that the default printer would represent the value.

```
(element-id-transformer? v) → boolean?
  v : any/c
```

Provided `for-syntax`; returns `#t` if *v* is an element transformer created by `make-element-id-transformer`, `#f` otherwise.

```
(make-element-id-transformer proc) → element-id-transformer?
  proc : (syntax? . -> . syntax?)
```

Provided `for-syntax`; creates an *element transformer*. When an identifier has a transformer binding to an element transformer, then forms generated by `define-code` (including `racket` and `racketblock`) typeset the identifier by applying the *proc* to the identifier. The result must be an expression whose value, typically an `element`, is passed on to functions like `to-paragraph` .

```
(variable-id? v) → boolean?
  v : any/c
```

Provided `for-syntax`; returns `#t` if *v* is an element transformer created by `make-variable-id`, `#f` otherwise.

```
(make-variable-id sym) → variable-id?
  sym : (or/c symbol? identifier?)
```

Provided `for-syntax`; like `make-element-id-transformer` for a transformer that produces *sym* typeset as a variable (like `racketvarfont`)—unless it appears under quote or quasiquote, in which case *sym* is typeset as a symbol.

```
output-color : style?
input-color : style?
input-background-color : style?
no-color : style?
reader-color : style?
result-color : style?
keyword-color : style?
comment-color : style?
paren-color : style?
meta-color : style?
value-color : style?
symbol-color : style?
variable-color : style?
opt-color : style?
error-color : style?
syntax-link-color : style?
value-link-color : style?
module-color : style?
module-link-color : style?
block-color : style?
highlighted-color : style?
```

Styles that are used for coloring Racket programs, results, and I/O.

4.5   Evaluation and Examples

```
(require scribble/eval)          package: scribble-lib
```

The `scribble/eval` library provides utilities for evaluating code at document-build time
and incorporating the results in the document, especially to show example uses of defined
procedures and syntax.

```
(interaction maybe-eval maybe-escape datum ...)

  maybe-eval  =
                | #:eval eval-expr

maybe-escape =
                | #:escape escape-id
```

Like `racketinput`, except that the result for each input `datum` is shown on the next line.
The result is determined by evaluating the `quoted` form of the `datum` using the evaluator
produced by `eval-expr`, if provided.

The *eval-expr* must produce a sandbox evaluator via `make-evaluator` or `make-module-evaluator` with the `sandbox-output` and `sandbox-error-output` parameters set to `'string`. If *eval-expr* is not provided, an evaluator is created using `make-base-eval`. See also `make-eval-factory`.

If the value of `current-print` in the sandbox is changed from its default value, or if `print-as-expression` in the sandbox is set to `#f`, then each evaluation result is formatted to a port by applying (`current-print`) to the value; the output port is set to a pipe that supports specials in the sense of `write-special`, and non-character values written to the port are used as content. Otherwise, when the default `current-print` is in place, result values are typeset using `to-element/no-color`.

Certain patterns in *datum* are treated specially:

- A *datum* of the form (`code:line` *code-datum* (`code:comment` *comment-datum* ...)) is treated as *code-datum* for evaluation.

- Other uses of `code:comment` and `code:blank` are stripped from each *datum* before evaluation.

- A *datum* of the form (`eval:alts` *show-datum* *eval-datum*) is treated as *show-datum* for typesetting and *eval-datum* for evaluation.

- A *datum* of the form (`eval:check` *eval-datum* *expect-datum*) is treated like *eval-datum*, but *check-datum* is also evaluated, and an error is raised if they are not `equal?`.

- A *datum* of the form (`eval:result` *content-expr* *out-expr* *err-expr*) involves no sandboxed evaluation; instead, the content result of *content-expr* is used as the typeset form of the result, *out-expr* is treated as output printed by the expression, and *err-expr* is error output printed by the expression. The *out-expr* and/or *err-expr* can be omitted, in which case they default to empty strings.

  Normally, `eval:result` is used in the second part of an `eval:alts` combination.

- A *datum* of the form (`eval:results` *content-list-expr* *out-expr* *err-expr*) is treated like an `eval:result` form, except that *content-list-expr* should produce a list of content for multiple results of evaluation. As with `eval:result`, *out-expr* and *err-expr* are optional.

As an example,

```
#lang scribble/manual
@(require racket/sandbox
          scribble/eval)
@(define my-evaluator
   (parameterize ([sandbox-output 'string]
                  [sandbox-error-output 'string])
```

```
      (make-evaluator 'typed/racket/base)))
 @interaction[#:eval my-evaluator

               (: my-sqr (Real -> Real))
               (define (my-sqr x)
                 (* x x))
               (my-sqr 42)]
```

uses an evaluator whose language is `typed/racket/base`.

> (interaction0 *maybe-eval* *maybe-escape* *datum* ...)

Like `interaction`, but without insetting the code via `nested`.

> (interaction/no-prompt *maybe-eval* *maybe-escape* *datum*)

Like `interaction`, but does not render the output with a prompt.

> (interaction-eval *maybe-eval* *maybe-escape* *datum*)

Like `interaction`, evaluates the quoted form of *datum*, but returns the empty string and does not catch errors.

> (interaction-eval-show *maybe-eval* *maybe-escape* *datum*)

Like `interaction-eval`, but produces an element representing the printed form of the evaluation result.

> (racketblock+eval *maybe-eval* *maybe-escape* *datum* ...)

Combines `racketblock` and `interaction-eval`.

> (racketblock0+eval *maybe-eval* *maybe-escape* *datum* ...)

Combines `racketblock0` and `interaction-eval`.

> (racketmod+eval *maybe-eval* *maybe-escape* *name* *datum* ...)

Combines `racketmod` and `interaction-eval`.

> (def+int *maybe-eval* *maybe-escape* *defn-datum* *expr-datum* ...)

Like `interaction`, except the *defn-datum* is typeset as for `racketblock` (i.e., no prompt) and a line of space is inserted before the *expr-datum*s.

```
(defs+int maybe-eval maybe-escape (defn-datum ...) expr-datum ...)
```

Like def+int, but for multiple leading definitions.

```
(examples maybe-eval maybe-escape datum ...)
```

Like interaction, but with an "Examples:" label prefixed.

```
(defexamples maybe-eval maybe-escape datum ...)
```

Like examples, but each definition using define or define-struct among the datums is typeset without a prompt, and with line of space after it.

```
(make-base-eval [#:pretty-print? pretty-print?
                 #:lang lang]
                input-program ...)
 → (any/c . -> . any)
  pretty-print? : any/c = #t
         (or/c module-path?
  lang :          (list/c 'special symbol?) = '(begin)
                 (cons/c 'begin list?))
  input-program : any/c
```

Creates an evaluator using (make-evaluator 'racket/base #:lang lang input-program ...), setting sandbox parameters to disable limits, setting the outputs to 'string, and not adding extra security guards.

If pretty-print? is true, the sandbox's printer is set to pretty-print-handler.

```
(make-base-eval-factory  mod-paths
                         [#:pretty-print? pretty-print?
                          #:lang lang])
 → (-> (any/c . -> . any))
  mod-paths : (listof module-path?)
  pretty-print? : any/c = #t
         (or/c module-path?
  lang :          (list/c 'special symbol?) = '(begin)
                 (cons/c 'begin list?))
```

Produces a function that is like make-base-eval, except that each module in mod-paths is attached to the evaluator's namespace. The modules are loaded and instantiated once (when the returned make-base-eval-like function is called the first time) and then attached to each evaluator that is created.

```
(make-eval-factory  mod-paths
                    [#:pretty-print? pretty-print?
                     #:lang lang])
 → (-> (any/c . -> . any))
  mod-paths : (listof module-path?)
  pretty-print? : any/c = #t
          (or/c module-path?
  lang :         (list/c 'special symbol?) = '(begin)
                 (cons/c 'begin list?))
```

Like `make-base-eval-factory`, but each module in *mod-paths* is also required into the top-level environment for each generated evaluator.

```
(close-eval eval) → (one-of/c "")
  eval : (any/c . -> . any)
```

Shuts down an evaluator produced by `make-base-eval`. Use `close-eval` when garbage collection cannot otherwise reclaim an evaluator (e.g., because it is defined in a module body).

```
(scribble-eval-handler)
 → ((any/c . -> . any) any/c boolean? . -> . any)
(scribble-eval-handler handler) → void?
  handler : ((any/c . -> . any) any/c boolean? . -> . any)
```

A parameter that serves as a hook for evaluation. The evaluator to use is supplied as the first argument to the parameter's value, and the second argument is the form to evaluate. The last argument is `#t` if exceptions are being captured (to display exception results), `#f` otherwise.

```
(scribble-exn->string) → (-> (or/c exn? any/c) string?)
(scribble-exn->string handler) → void?
  handler : (-> (or/c exn? any/c) string?)
```

A parameter that controls how exceptions are rendered by `interaction`. Defaults to

```
(λ (e)
  (if (exn? e)
      (exn-message e)
      (format "uncaught exception: ~s" e)))
```

```
(with-eval-preserve-source-locations expr ...)
```

By default, the evaluation forms provided by this module, such as `interaction` and `examples`, discard the source locations from the expressions they evaluate. Within a `with-eval-preserve-source-locations` form, the source locations are preserved. This can be useful for documenting forms that depend on source locations, such as Redex's typesetting macros.

4.6 In-Source Documentation

The `scribble/srcdoc` and `scribble/extract` libraries support writing documentation within the documented code along with an export contract, similar to using JavaDoc. With this approach, a single contract specification is used both for the run-time contract and the documentation of an exported binding.

The `scribble/srcdoc` library provides forms for exporting a binding with associated documentation. The `scribble/extract` library is used to pull `scribble/srcdoc`-based documentation into a Scribble document (perhaps for multiple libraries).

Although documentation is written with a library's implementation when using `scribble/srcdoc`, the documentation creates no run-time overhead for the library. Similarly, typesetting the documentation does not require running the library. The two phases (run time versus documentation time) are kept separate in much the same way that the module system keeps expansion-time code separate from run-time code, and documentation information is recorded in a submodule to be separately loadable from the enclosing module.

For an example use, see the `"file"` collection's `"gif.rkt"` source file and the corresponding extraction in `"scribblings/gif.scrbl"`. As that example illustrates, starting the module declaration with

```
#lang at-exp
```

enables the @-reader, which is handy for writing documentation expressions.

4.6.1 Source Annotations for Documentation

`(require scribble/srcdoc)`   package: `scribble-lib`

Documentation information generated by `scribble/srcdoc` forms are accumulated into a `srcdoc` submodule. The generated submodule is accessed by the bindings of `scribble/extract`.

`(for-doc require-spec ...)`

A `require` sub-form for bindings that are needed at documentation time (and documentation-expansion time, etc.) instead of run time (and expansion time, etc.). A

`for-doc` import has no effect on a normal use of the library; it affects only documentation extraction.

Typically, a library that uses `scribble/srcdoc` includes at least `(require (for-doc scribble/base scribble/manual))` to get core Racket forms and basic Scribble functions to use in documentation expressions.

```
(proc-doc/names id contract arg-specs (desc-expr ...))

arg-specs = ((arg-id ...) ((arg-id default-expr) ...))
          | (arg-id ...)

 contract = (-> arg ... result)
          | (->* (mandatory ...) (optional ...) result)
          | (case-> (-> arg ... result) ...)

mandatory = contract-expr
          | keyword contract-expr

 optional = contract-expr
          | keyword contract-expr
```

A `provide` sub-form that exports `id` with the contract described by `contract` just like using `contract-out`.

The `arg-spec` specifies the names of arguments and the default values, which are not normally written as part of a contract. They are combined with the contract expression to generate the description of the binding in the documentation via `defproc`. The (`arg-id default-expr`) pairs specify the names and default values of the optional arguments. If the contract supports optional arguments, then the first `arg-spec`s form must be used, otherwise the second must be used.

The `desc-expr` is a sequence of documentation-time expressions that produces prose to describe the exported binding—that is, the last part of the generated `defproc`, so the description can refer to the `arg-id`s using `racket`.

The normal `requires` of the enclosing library are effectively converted into `for-label` requires when generating documentation, so that identifiers in the `contract`s are linked to their corresponding documentation. Similarly, any binding that is available in the run-time phase of the enclosing library can be referenced in documentation prose using the `racket` form.

```
(proc-doc id contract maybe-defs (desc-expr ...))
```

```
  contract = (-> result)
            | (->i (arg ...) (opt ...) maybe-pre [id res])
            | (->i (arg ...) (opt ...) maybe-pre (values [id res] ...))
            | (->i (arg ...) (opt ...) #:rest rest [id result-expr])
            | (->d (arg ...) () maybe-pre (values [id result] ...))
            | (->d (arg ...) () maybe-pre [id result])
            | (->d (arg ...) () #:rest id rest [id result])

 maybe-pre =
            | #:pre (pre-id ...) condition

maybe-defs =
            | (default-expr default-expr ...)
```

Like `proc-doc/names`, but supporting contract forms that embed argument identifiers.
Only a subset of `->i` and `->d` forms are currently supported.

If the sequence of optional arguments, `(opt ...)` is empty then the `maybe-arg-desc` must
be not be present. If it is non-empty, then it must have as many default expressions are there
are optional arguments.

```
(thing-doc id contract-expr dec-expr)
```

Like `proc-doc`, but for an export of an arbitrary value.

```
(parameter-doc id (parameter/c contract-expr) arg-id (desc-
expr ...))
```

Like `proc-doc`, but for exporting a parameter.

```
(struct*-doc struct-name
             ([field-name contract-expr-datum] ...)
             maybe-omit-constructor
             maybe-mutable maybe-non-opaque maybe-constructor
             (desc-expr ...))

maybe-omit-constructor =
                       | #:omit-constructor
```

Like `proc-doc`, but for struct declarations that use `struct`.

The `maybe-mutable`, `maybe-non-opaque`, and `maybe-constructor` options are as in
`defstruct`.

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```
(struct-doc struct-name
            ([field-name contract-expr-datum] ...)
            maybe-omit-constructor
            maybe-mutable maybe-non-opaque maybe-constructor
            (desc-expr ...))
```

Like `struct*-doc`, but for struct declarations that use `define-struct`.

```
(begin-for-doc form ...)
```

Like to `begin-for-syntax`, but for documentation time instead of expansion time. The *form*s can refer to binding `required` with `for-doc`.

For example, a definition in `begin-for-doc` can be referenced by a *desc-expr* in `proc-doc/names`.

```
(generate-delayed-documents)
```

Causes documentation information to be recorded as a macro that is expanded (along with any `for-doc` imports) in the module that uses `include-extracted` or `provide-extracted`, instead of within (a submodule of) the module that declares the information.

Delaying document generation in this way allows `(for-doc (for-label ....))` imports that would otherwise create cyclic module dependencies.

To avoid problems with accumulated `for-doc` imports across modules, `generate-delayed-documents` declaration should appear before any `for-doc` import.

```
(require/doc require-spec ...)
```

A legacy shorthand for `(require (for-doc require-spec ...))`.

```
(provide/doc spec ...)
```

A legacy alternative to `(provide spec ...)`

4.6.2 Extracting Documentation from Source

`(require scribble/extract)`   package: `scribble-lib`

```
(include-extracted module-path)
```

Expands to a sequence of documentation forms extracted from *module-path*, which is expected to be a module that uses `scribble/srcdoc` (so that the module has a `srcdoc` submodule).

```
(provide-extracted module-path)
```

Similar to `include-extracted`, but the documentation is packaged and exported as `exported`, instead of left inline.

Use this form in combination with `include-previously-extracted` when documentation from a single source is to be split and typeset among multiple documentation locations. The `provide-extracted` form extracts the documentation once, and then `include-previously-extracted` form extracts documentation for specific bindings as needed.

```
(include-previously-extracted module-path regexp)
```

Similar to `include-extracted`, but instead of referring to the source that contains its own documentation, `module-path` refers to a module that uses `provide-extracted`. The `include-previously-extracted` form expands to documentation forms for all identifiers whose string forms match `regexp`.

4.7 BNF Grammars

```
(require scribble/bnf)        package: scribble-lib
```

The `scribble/bnf` library provides utilities for typesetting grammars.

For example,

```
@(let ([open @litchar{(}]
       [close @litchar{)}])
   @BNF[(list @nonterm{expr}
              @nonterm{id}
              @BNF-seq[open @kleeneplus[@nonterm{expr}] close]
              @BNF-seq[open @litchar{lambda}
                            open @kleenestar[@nonterm{id}] close
                            @nonterm{expr} close]
              @nonterm{val})
        (list @nonterm{val}
              @BNF-alt[@nonterm{number} @nonterm{primop}])
        (list @nonterm{id}
              @elem{any name except for @litchar{lambda}})])
```

produces the output

$\langle expr \rangle$ ::= $\langle id \rangle$
        | ($\langle expr \rangle^+$)
        | (lambda ($\langle id \rangle^*$) $\langle expr \rangle$)

| ⟨*val*⟩
⟨*val*⟩   ::= ⟨*number*⟩ | ⟨*primop*⟩
⟨*id*⟩   ::= any name except for `lambda`

See also `racketgrammar`.

```
(BNF prod ...) → table?
  prod : (cons element? (listof (or/c block? element?)))
```

Typesets a grammar table. Each production starts with an element (typically constructed with `nonterm`) for the non-terminal being defined, and then a list of possibilities (typically constructed with `BNF-seq`, etc.) to show on separate lines.

```
(nonterm pre-content ...) → element?
  pre-content : any/c
```

Typesets a non-terminal: italic in angle brackets.

```
(BNF-seq elem ...) → element?
  elem : element?
```

Typesets a sequence.

```
(BNF-seq-lines elems ...) → block?
  elems : (listof element?)
```

Typesets a sequence that is broken into multiple lines, where each *elems* is one line.

```
(BNF-group pre-content ...) → element?
  pre-content : any/c
```

Typesets a group surrounded by curly braces (so the entire group can be repeated, for example).

```
(optional pre-content ...) → element?
  pre-content : any/c
```

Typesets an optional element: in square brackets.

```
(kleenestar pre-content ...) → element?
  pre-content : any/c
```

Typesets a 0-or-more repetition.

```
(kleeneplus pre-content ...) → element?
  pre-content : any/c
```

Typesets a 1-or-more repetition.

```
(kleenerange n m pre-content ...) → element?
  n : any/c
  m : any/c
  pre-content : any/c
```

Typesets a n-to-m repetition. The n and m arguments are converted to a string using (`format` "~a" n) and (`format` "~a" m).

```
(BNF-alt elem ...) → element?
  elem : element?
```

Typesets alternatives for a production's right-hand side to appear on a single line. The result is normally used as a single possibility in a production list for BNF.

```
BNF-etc : string?
```

A string to use for omitted productions or content.

4.8   Compatibility Libraries

4.8.1   Compatibility Structures And Processing

(require scribble/struct)   package: scribble-lib

The scribble/struct compatibility library mostly re-exports scribble/core, but using some different names (e.g., blockquote instead of nested-flow).

The following structure types and functions are re-exported directly:

```
collect-info resolve-info tag? block?
delayed-block collected-info delayed-element
part-relative-element collect-info-parents
collect-element render-element generated-tag
tag-key content->string element->string
block-width element-width
info-key? part-collected-info collect-put!
resolve-get resolve-get/tentative resolve-get/ext?
resolve-search resolve-get-keys
```

The following structure types are re-exported, but the constructors and some selectors are replaced as documented further below:

```
part paragraph table itemization compound-paragraph
element toc-element target-element toc-target-element toc-target2-
element
page-target-element redirect-target-element link-element
index-element
```

Several additional compatibility functions and structure types are also exported.

```
(make-part tag-prefix
           tags
           title-content
           style
           to-collect
           blocks
           parts)          → part?
  tag-prefix : (or/c false/c string?)
  tags : (listof tag?)
  title-content : (or/c false/c list?)
  style : any/c
  to-collect : list?
  blocks : (listof block?)
  parts : (listof part?)
```

For backward compatibility. Compared to the normal constructor for `part`, parses `style` to convert old formats to the current one. Also, if `title-content` is a list with a single item, the item by itself is stored in the resulting `part`.

```
(part-flow p) → (listof block?)
  p : part?
```

For backward compatibility. An alias for `part-blocks`.

```
(part-title-content p) → list?
  p : part?
```

For backward compatibility. Like the normal selector, but if the result would not be a list, it is coerced to one.

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```
(make-versioned-part tag-prefix
                     tags
                     title-content
                     style
                     to-collect
                     blocks
                     parts
                     version)        → part?
  tag-prefix : (or/c false/c string?)
  tags : (listof tag?)
  title-content : (or/c false/c list?)
  style : any/c
  to-collect : list?
  blocks : (listof block?)
  parts : (listof part?)
  version : string?
(versioned-part? v) → boolean?
  v : any/c
```

For backward compatibility. Like `make-part`, but adds a the `document-version` style property using the given `version`. The `versioned-part?` predicate recognizes a `part` with a `document-version` property.

```
(make-unnumbered-part tag-prefix
                      tags
                      title-content
                      style
                      to-collect
                      blocks
                      parts)         → part?
  tag-prefix : (or/c false/c string?)
  tags : (listof tag?)
  title-content : (or/c false/c list?)
  style : any/c
  to-collect : list?
  blocks : (listof block?)
  parts : (listof part?)
(unnumbered-part? v) → boolean?
  v : any/c
```

For backward compatibility. Like `make-part`, but adds the `'unnumbered` style property. The `unnumbered-part?` predicate recognizes a `part` with the `'unnumbered` property.

```
(make-paragraph content) → paragraph?
  content : list?
```

For backward compatibility. Compared to the normal constructor for `paragraph`, omits a style argument. Also, if `content` is a list containing a single item, the item by itself is stored in the resulting `paragraph`.

```
(paragraph-content p) → list?
  p : paragraph?
```

For backward compatibility. Like the normal selector, but if the result would not be a list, it is coerced to one.

```
(make-styled-paragraph content style) → paragraph?
  content : list?
  style : any/c
(styled-paragraph? v) → boolean?
  v : any/c
(styled-paragraph-style p) → style?
  p : paragraph?
```

For backward compatibility. Compared to the normal constructor for `paragraph`, parses *style* to convert old formats to the current one. The `styled-paragraph?` predicate and `styled-paragraph-style` accessor are aliases for `paragraph?` and `paragraph-style`.

```
(make-omitable-paragraph content) → paragraph?
  content : list?
(omitable-paragraph? v) → boolean?
  v : any/c
```

For backward compatibility. Like `make-paragraph`, but adds the `'omitable` style property. The `omitable-paragraph?` predicate checks for a paragraph with the property.

```
(make-table style blocksss) → table?
  style : any/c
  blocksss : (listof (listof (or/c (listof block?) (one-of/c 'cont))))
```

For backward compatibility. Compared to the normal constructor for `table`, the style is converted, and each cell has a list of blocks instead of a single block. If any such list has multiple blocks, they are combined into a `nested-flow`.

```
(table-flowss table)
 → (listof (listof (or/c (listof block?) (one-of/c 'cont))))
  table : table?
```

For backward compatibility. Like `table-blockss`, but adds a list wrapper to be consistent with `make-table`.

```
(make-itemization blockss) → itemization?
  blockss : (listof (listof block?))
```

For backward compatibility. Compared to the normal constructor for `itemization`, omits a style argument.

```
(make-styled-itemization style blockss) → itemization?
  style : any/c
  blockss : (listof (listof block?))
(styled-itemization? v) → boolean?
  v : any/c
(styled-itemization-style i) → style?
  i : itemization?
```

For backward compatibility. Compared to the normal constructor for `itemization`, parses *style* to convert old formats to the current one. The `styled-itemization?` predicate is an alias for `itemization?`, and `styled-itemization-style` is an alias for `itemization-style`.

```
(make-blockquote style blocks) → nested-flow?
  style : any/c
  blocks : (listof block?)
```

For backward compatibility. Like `make-nested-flow`, but *style* is parsed to the current format.

```
(make-auxiliary-table style blocksss) → table?
  style : any/c
  blocksss : (listof (listof (or/c (listof block?) (one-of/c 'cont))))
(auxiliary-table? v) → boolean?
  v : any/c
```

For backward compatibility. Like `make-table`, but adds the `'aux` style property. The `auxiliary-table?` predicate recognizes tables with the `'aux` property.

```
(make-compound-paragraph style blocks) → compound-paragraph?
  style : any/c
  blocks : (listof block?)
```

For backward compatibility. Compared to the normal constructor for `compound-paragraph`, parses *style* to convert old formats to the current one.

```
(make-element style content) → element?
  style : any/c
  content : list?
```

```
(make-toc-element style content toc-content) → toc-element?
  style : any/c
  content : list?
  toc-content : list?
(make-target-element style content tag) → target-element?
  style : any/c
  content : list?
  tag : tag?
(make-toc-target-element style content tag) → toc-target-element?
  style : any/c
  content : list?
  tag : tag?
(make-toc-target2-element style
                          content
                          tag
                          toc-content) → toc-target2-element?
  style : any/c
  content : list?
  tag : tag?
  toc-content : content?
(make-page-target-element style content tag)
 → page-target-element?
  style : any/c
  content : list?
  tag : tag?
(make-redirect-target-element style
                              content
                              tag
                              alt-path
                              alt-anchor)
 → redirect-target-element?
  style : any/c
  content : list?
  tag : tag?
  alt-path : path-string?
  alt-anchor : string?
(make-link-element style content tag) → link-element?
  style : any/c
  content : list?
  tag : tag?
```

```
(make-index-element style
                    content
                    tag
                    plain-seq
                    entry-seq
                    desc)     → index-element?
  style : any/c
  content : list?
  tag : tag?
  plain-seq : (and/c pair? (listof string?))
  entry-seq : list?
  desc : any/c
```

For backward compatibility. Compared to the normal constructors, parses *style* to convert old formats to the current one.

```
(element? v) → boolean?
  v : any/c
(element-content e) → list?
  e : element?
(element-style e) → element-style?
  e : element?
```

For backward compatibility. A content list is treated as an element by these functions, and the result of `element-content` is always a list.

```
(make-aux-element style content) → element?
  style : any/c
  content : list?
```

For backward compatibility. Like `make-element`, but adds the `'aux` style property.

```
(make-hover-element style content text) → element?
  style : any/c
  content : list?
  text : string?
```

For backward compatibility. Like `make-element`, but adds `hover-property` containing *text* to the element's style.

```
(make-script-element style
                     content
                     type
                     script) → element?
  style : any/c
```

```
  content : list?
  type : string?
  script : (or/c path-string? (listof string?))
```

For backward compatibility. Like `make-element`, but adds `script-property` containing *type* and *script* to the element's style.

```
(struct with-attributes (style assoc)
        #:extra-constructor-name make-with-attributes)
  style : any/c
  assoc : (listof (cons/c symbol? string?))
```

For backward compatibility. Used for an `element`'s style to combine a base style with arbitrary HTML attributes. When the `style` field is itself an instance of `with-attributes`, its content is automatically flattened into the enclosing `with-attributes` when it is used (when, e.g., rendering an `element` or `paragraph`).

```
(struct target-url (addr style)
        #:extra-constructor-name make-target-url)
  addr : path-string?
  style : any/c
```

For backward compatibility. Used as a style for an `element`. The `style` at this layer is a style for the hyperlink.

```
(struct image-file (path scale)
        #:extra-constructor-name make-image-file)
  path :  (or/c path-string?
                (cons/c 'collects (listof bytes?)))
  scale : real?
```

For backward compatibility. Used as a style for an `element` to inline an image. The `path` field can be a result of `path->main-collects-relative`.

```
(element->string element) → string?
  element : content?
(element->string element renderer p info) → string?
  element : content?
  renderer : any/c
  p : part?
  info : resolve-info?
```

For backward compatibility. An alias for `content->string`.

4.8.2 Compatibility Basic Functions

  (require scribble/basic)   package: scribble-lib

The scribble/basic compatibility library mostly just re-exports scribble/base.

```
(span-class style-name pre-content ...) → element?
  style-name : string?
  pre-content : any/c
```

For backward compatibility. Wraps the decoded pre-content as an element with style style-name.

```
(itemize itm ... [#:style style]) → itemization?
  itm : (or/c whitespace? an-item?)
  style : (or/c style? string? symbol? #f) = #f
```

For backward compatibility. Like itemlist, but whitespace strings among the itms are ignored.

5 Literate Programming

Programs written using `scribble/lp` are simultaneously two things: a program and a document describing the program.

Programs in `scribble/lp` are viewed in two different ways, either by running the program directly or by including it with `lp-include`. When running the program, all of the `chunk` expressions are collected and stitched together into a program, and the rest of the module is discarded. When using `lp-include`, the entire contents of the module are preserved and are treated like an ordinary Scribble document, where `chunks` are typeset in a manner similar to `codeblock`.

For example, consider this program:

```
#lang scribble/lp

Literate programs have chunks of code, like this one:

@chunk[<f>
       (define (f x)
         <fs-body>)]

and this one:

@chunk[<fs-body>
       (* x x)]

that, when assembled, produce a complete program, in this case:

@racketblock[(define (f x)
               (* x x))]
```

When this file is `required` in the normal manner, it defines a function `f` that squares its argument, and the documentation is ignored. When it is included with `lp-include`, it looks like this:

Literate programs have chunks of code, like this one:

\<f\> ::=

```
(define (f x)
  <fs-body>)
```

---

and this one:

<fs-body> ::=

```
(* x x)
```

that, when assembled, produce a complete program, in this case:

```
(define (f x)
   (* x x))
```

5.1 `scribble/lp` **Language**

`#lang scribble/lp`   package: `scribble-lib`

The `scribble/lp` language provides core support for literate programming.

| `(chunk id form ...)`

Introduces a chunk, binding `id` for use in other chunks. Normally, `id` starts with `<` and ends with `>`.

When running a scribble program only the code inside the chunks is run; the rest is ignored.

If `id` is `<*>`, then this chunk is used as the main chunk in the file. If `<*>` is never used, then the first chunk in the file is treated as the main chunk. If some chunk is not referenced from the main chunk (possibly indirectly via other chunks that the main chunk references), then it is not included in the program and thus is not run.

| `(CHUNK id form ...)`

Like `chunk`, but allows the use of `unsyntax` in the code part. If you want to use `unsyntax` to escape to Scribble, use `UNSYNTAX`.

5.2 `scribble/lp-include` **Module**

`(require scribble/lp-include)`   package: `scribble-lib`

The `scribble/lp-include` library is normally used within a Scribble document—that is, a module that starts with something like #lang `scribble/base` or #lang `scribble/manual`, instead of #lang `racket`.

```
(lp-include filename)
```

Includes the source of `filename` as the typeset version of the literate program.

6 Text Generation

```
#lang scribble/text        package: scribble-text-lib
```

The `scribble/text` language provides everything from `racket/base` with a few changes that make it suitable as a text generation or a preprocessor language:

- The language uses `read-syntax-inside` to read the body of the module, similar to §7.7 "Document Reader". This means that by default, all text is read in as Racket strings; and @-forms can be used to use Racket functions and expression escapes.

- Values of expressions are printed with a custom `output` function. This function displays most values in a similar way to `display`, except that it is more convenient for a textual output.

6.1 Writing Text Files

The combination of the two features makes text in files in the `scribble/text` language be read as strings, which get printed out when the module is `required`, for example, when a file is given as an argument to `racket`. (In these example the left part shows the source input, and the right part the printed result.)

```
#lang scribble/text
Programming languages should
be designed not by piling          →
feature on top of feature, but
blah blah blah.
```

Programming languages should
be designed not by piling
feature on top of feature, but
blah blah blah.

Using @-forms, we can define and use Racket functions.

```
#lang scribble/text
@(require racket/list)
@(define Foo "Preprocessing")
@(define (3x . x)
   ;; racket syntax here          →
   (add-between (list x x x) " "))
@Foo languages should
be designed not by piling
feature on top of feature, but
@3x{blah}.
```

Preprocessing languages should
be designed not by piling
feature on top of feature, but
blah blah blah.

As demonstrated in this case, the `output` function simply scans nested list structures recursively, which makes them convenient for function results. In addition, `output` prints most values similarly to `display` — notable exceptions are void and false values which cause no output to appear. This can be used for convenient conditional output.

```
#lang scribble/text
@(define (errors n)
    (list n
          " error"
          (and (not (= n 1)) "s")))     →  You have 3 errors in your code,
You have @errors[3] in your code,        I fixed 1 error.
I fixed @errors[1].
```

Using the scribble @-forms syntax, you can write functions more conveniently too.

```
#lang scribble/text
@(define (errors n)
    ;; note the use of 'unless'         →  You have 3 errors in your code,
    @list{@n error@unless[(= n 1)]{s}})     I fixed 1 error.
You have @errors[3] in your code,
I fixed @errors[1].
```

Following the details of the scribble reader, you may notice that in these examples there are newline strings after each definition, yet they do not show in the output. To make it easier to write definitions, newlines after definitions and indentation spaces before them are ignored.

```
#lang scribble/text

@(define (plural n)
    (unless (= n 1) "s"))
                                        →  You have 3 errors in your code,
@(define (errors n)                        I fixed 1 error.
    @list{@n error@plural[n]})

You have @errors[3] in your code,
  @(define fixed 1)
I fixed @errors[fixed].
```

These end-of-line newline strings are not ignored when they follow other kinds of expressions, which may lead to redundant empty lines in the output.

```
#lang scribble/text
@(define (count n str)                  Start...
    (for/list ([i (in-range 1 (add1 n))])   1 Mississippi,
      @list{@i @str,@"\n"}))            →  2 Mississippi,
Start...                                   3 Mississippi,
@count[3]{Mississippi}
... and I'm done.                          ... and I'm done.
```

There are several ways to avoid having such empty lines in your output. The simplest way is to arrange for the function call's form to end right before the next line begins, but this is
```

often not too convenient. An alternative is to use a `@;` comment, which makes the scribble reader ignore everything that follows it up to and including the newline. (These methods can be applied to the line that precedes the function call too, but the results are likely to have what looks like erroneous indentation. More about this below.)

```
#lang scribble/text                        Start...
@(define (count n str)                      1 Mississippi,
   (for/list ([i (in-range 1 (+ n 1))])     2 Mississippi,
      @list{@i @str,@"\n"}))                 3 Mississippi,
Start...                                    ... done once.
@count[3]{Mississippi                  →
}... done once.                             Start again...
                                            1 Massachusetts,
Start again...                              2 Massachusetts,
@count[3]{Massachusetts}@;                  3 Massachusetts,
... and I'm done again.                     ... and I'm done again.
```

A better approach is to generate newlines only when needed.

```
#lang scribble/text
@(require racket/list)
@(define (counts n str)
   (add-between                             Start...
    (for/list ([i (in-range 1 (+ n 1))]) →  1 Mississippi,
       @list{@i @str,})                     2 Mississippi,
    "\n"))                                  3 Mississippi,
Start...                                    ... and I'm done.
@counts[3]{Mississippi}
... and I'm done.
```

In fact, this is common enough that the `scribble/text` language provides a convenient facility: `add-newlines` is a function that is similar to `add-between` using a newline string as the default separator, except that false and void values are filtered out before doing so.

```
#lang scribble/text
@(define (count n str)
   (add-newlines                            Start...
    (for/list ([i (in-range 1 (+ n 1))]) →  1 Mississippi,
       @list{@i @str,})))                   2 Mississippi,
Start...                                    3 Mississippi,
@count[3]{Mississippi}                      ... and I'm done.
... and I'm done.
```

```
#lang scribble/text
@(define (count n str)
   (add-newlines
    (for/list ([i (in-range 1 (+ n 1))])
      @(and (even? i) @list{@i @str,}))))
Start...
@count[6]{Mississippi}
... and I'm done.
```
$\rightarrow$
```
Start...
2 Mississippi,
4 Mississippi,
6 Mississippi,
... and I'm done.
```

The separator can be set to any value.

```
#lang scribble/text
@(define (count n str)
   (add-newlines #:sep ",\n"
    (for/list ([i (in-range 1 (+ n 1))])
      @list{@i @str})))
Start...
@count[3]{Mississippi}.
... and I'm done.
```
$\rightarrow$
```
Start...
1 Mississippi,
2 Mississippi,
3 Mississippi.
... and I'm done.
```

6.2   Defining Functions and More

(Note: most of the tips in this section are applicable to any code that uses the Scribble @-form syntax.)

Because the Scribble reader is uniform, you can use it in place of any expression where it is more convenient. (By convention, we use a plain S-expression syntax when we want a Racket expression escape, and an @-form for expressions that render as text, which, in the scribble/text language, is any value-producing expression.) For example, you can use an @-form for a function that you define.

```
#lang scribble/text
@(define @bold[text] @list{*@|text|*}) → An *important* note.
An @bold{important} note.
```

This is not commonly done, since most functions that operate with text will need to accept a variable number of arguments. In fact, this leads to a common problem: what if we want to write a function that consumes a number of "text arguments" rathen than a single "rest-like" body? The common solution for this is to provide the separate text arguments in the S-expression part of an @-form.

```
#lang scribble/text
@(define (choose 1st 2nd)
    @list{Either @1st, or @|2nd|@"."})
@(define who "us")                            → Either you're with us, or against us.
@choose[@list{you're with @who}
        @list{against @who}]
```

You can even use @-forms with a Racket quote or quasiquote as the "head" part to make it shorter, or use a macro to get grouping of sub-parts without dealing with quotes.

```
#lang scribble/text
@(define (choose 1st 2nd)
    @list{Either @1st, or @|2nd|@"."})
@(define who "us")
@choose[@list{you're with @who}                   Either you're with us, or against us.
        @list{against @who}]                      Shopping list:
@(define-syntax-rule (compare (x ...) ...) → * apples
   (add-newlines                                  * oranges
    (list (list "* " x ...) ...)))                * 6 bananas
Shopping list:
@compare[@{apples}
         @{oranges}
         @{@(* 2 3) bananas}]
```

Yet another solution is to look at the text values and split the input arguments based on a specific token. Using match can make it convenient — you can even specify the patterns with @-forms.

```
#lang scribble/text
@(require racket/match)
@(define (features . text)
    (match text
      [@list{@|1st|@...
             ---                    >> Pros <<
             @|2nd|@...}            fast,
       @list{>> Pros <<       →     reliable;
             @1st;                  >> Cons <<
             >> Cons <<             expensive,
             @|2nd|.}]))            ugly.
@features{fast,
          reliable
          ---
          expensive,
          ugly}
```

In particular, it is often convenient to split the input by lines, identified by delimiting "\n" strings. Since this can be useful, a split-lines function is provided.

```
#lang scribble/text
@(require racket/list)
@(define (features . text)
   (add-between (split-lines text)
                ", "))                   → red, fast, reliable.
@features{red
          fast
          reliable}.
```

Finally, the Scribble reader accepts *any* expression as the head part of an @-form — even an
@ form. This makes it possible to get a number of text bodies by defining a curried function,
where each step accepts any number of arguments. This, however, means that the number of
body expressions must be fixed.

```
#lang scribble/text
@(define ((choose . 1st) . 2nd)
   @list{Either you're @1st, or @|2nd|.}) → Either you're with me, or against me.
@(define who "me")
@@choose{with @who}{against @who}
```

6.3   Using Printouts

Because the text language simply displays each toplevel value as the file is run, it is possible
to print text directly as part of the output.

```
#lang scribble/text
First                    First
@display{Second}       → Second
Third                    Third
```

Taking this further, it is possible to write functions that output some text *instead* of returning
values that represent the text.

```
#lang scribble/text
@(define (count n)                          Start...
   (for ([i (in-range 1 (+ n 1))])           1 Mississippi,
     (printf "~a Mississippi,\n" i))) →      2 Mississippi,
Start...                                     3 Mississippi,
@count[3]@; avoid an empty line             ... and I'm done.
... and I'm done.
```

This can be used to produce a lot of output text, even infinite.

```
#lang scribble/text                   Start...
@(define (count n)                     1 Mississippi,
   (printf "~a Mississippi,\n" n)      2 Mississippi,
   (count (add1 n)))                 → 3 Mississippi,
Start...                               4 Mississippi,
@count[1]                              5 Mississippi,
this line is never printed!            ...
```

However, you should be careful not to mix returning values with printouts, as the results are rarely desirable.

```
#lang scribble/text
@list{1 @display{two} 3}  → two1  3
```

Note that you don't need side-effects if you want infinite output. The `output` function iterates thunks and (composable) promises, so you can create a loop that is delayed in either form.

```
#lang scribble/text
@(define (count n)                      Start...
    (cons @list{@n Mississippi,@"\n"}   1 Mississippi,
          (lambda ()                    2 Mississippi,
             (count (add1 n)))))      → 3 Mississippi,
Start...                                4 Mississippi,
@count[1]                               5 Mississippi,
this line is never printed!             ...
```

6.4   Indentation in Preprocessed output

An issue that can be very important in many text generation applications is the indentation of the output. This can be crucial in some cases, if you're generating code for an indentation-sensitive language (e.g., Haskell, Python, or C preprocessor directives). To get a better understanding of how the pieces interact, you may want to review how the Scribble reader section, but also remember that you can use quoted forms to see how some form is read.

```
#lang scribble/text
@(format "~s" '@list{
             a     → (list "a" "\n" "  " "b" "\n" "c")
               b
             c})
```

The Scribble reader ignores indentation spaces in its body. This is an intentional feature, since you usually do not want an expression to depend on its position in the source. But the question is whether we *can* render some output text with proper indentation. The `output` function achieves that by introducing `block`s. Just like a list, a `block` contains a list of elements, and when one is rendered, it is done in its own indentation level. When a newline

is part of a `block`'s contents, it causes the following text to appear with indentation that corresponds to the column position at the beginning of the block.

In addition, lists are also rendered as blocks by default, so they can be used for the same purpose. In most cases, this makes the output appear "as intended" where lists are used for nested pieces of text — either from a literal `list` expression, or an expression that evaluates to a list, or when a list is passed on as a value; either as a toplevel expression, or as a nested value; either appearing after spaces, or after other output.

```
#lang scribble/text          foo 1
foo @block{1                      2
           2                      3
           3}        →       foo 4
foo @list{4                       5
          5                       6
          6}
```

```
#lang scribble/text
@(define (code . text)    begin
    @list{begin              first
            @text            second
          end})              begin
@code{first         →        third
      second                 fourth
      @code{                 end
        third                last
        fourth}            end
      last}
```

```
#lang scribble/text
@(define (enumerate . items)
    (add-newlines #:sep ";\n"
     (for/list ([i (in-naturals 1)]          Todo: 1. Install Racket;
                [item (in-list items)])  →          2. Hack, hack, hack;
       @list{@|i|. @item})))                        3. Profit.
Todo: @enumerate[@list{Install Racket}
                 @list{Hack, hack, hack}
                 @list{Profit}].
```

There are, however, cases when you need more refined control over the output. The scribble/text language provides a few functions for such cases in addition to `block`. The `splice` function groups together a number of values but avoids introducing a new indentation context. Furthermore, lists are not always rendered as `block`s — instead, they are rendered as `splice`s when they are used inside one, so you essentially use `splice` to avoid the "indentation group" behavior, and `block` to restore it.

```
#lang scribble/text
@(define (blah . text)
   @splice{{
     blah(@block{@text});
   }})
start
  @splice{foo();
          loop:}
  @list{if (something) @blah{one,
                            two}}
end
```

→

```
start
  foo();
loop:
  if (something) {
    blah(one,
          two);
  }
end
```

The `disable-prefix` function disables all indentation printouts in its contents, including the indentation before the body of the `disable-prefix` value itself. It is useful, for example, to print out CPP directives.

```
#lang scribble/text
@(define (((IFFOO . var) . expr1) . expr2)
   (define (array e1 e2)
     @list{[@e1,
            @e2]})
   @list{var @var;
         @disable-prefix{#ifdef FOO}
         @var = @array[expr1 expr2];
         @disable-prefix{#else}
         @var = @array[expr2 expr1];
         @disable-prefix{#endif}})

function blah(something, something_else) {
  @disable-prefix{#include "stuff.inc"}
  @@@IFFOO{i}{something}{something_else}
}
```

→

```
function blah(something, something_else) {
#include "stuff.inc"
  var i;
#ifdef FOO
  i = [something,
        something_else];
#else
  i = [something_else,
        something];
#endif
}
```

If there are values after a `disable-prefix` value on the same line, they *will* get indented to the goal column (unless the output is already beyond it).

```
#lang scribble/text
@(define (thunk name . body)
   @list{function @name() {
           @body
         }})
@(define (ifdef cond then else)
   @list{@disable-prefix{#}ifdef @cond
           @then
         @disable-prefix{#}else
           @else
         @disable-prefix{#}endif})

@thunk['do_stuff]{
  init();
  @ifdef["HAS_BLAH"
    @list{var x = blah();}
    @thunk['blah]{
      @ifdef["BLEHOS"
        @list{@disable-prefix{#}@;
                include <bleh.h>
              bleh();}
        @list{error("no bleh");}]
    }]
  more_stuff();
}
```

$\rightarrow$

```
function do_stuff() {
  init();
# ifdef HAS_BLAH
    var x = blah();
# else
    function blah() {
#     ifdef BLEHOS
#       include <bleh.h>
        bleh();
#     else
        error("no bleh");
#     endif
    }
# endif
  more_stuff();
}
```

There are cases where each line should be prefixed with some string other than a plain indentation. The add-prefix function causes its contents to be printed using some given string prefix for every line. The prefix gets accumulated to an existing indentation, and indentation in the contents gets added to the prefix.

```
#lang scribble/text
@(define (comment . body)
   @add-prefix["// "]{@body})
@comment{add : int int -> string}
char *foo(int x, int y) {
  @comment{
    skeleton:
      allocate a string
      print the expression into it
      @comment{...more work...}
  }
  char *buf = malloc(@comment{FIXME!
                              This is bad}
                     100);
}
```

$\rightarrow$

```
// add : int int -> string
char *foo(int x, int y) {
  // skeleton:
  //   allocate a string
  //   print the expression into it
  //   // ...more work...
  char *buf = malloc(// FIXME!
                     // This is bad
                     100);
}
```

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When combining `add-prefix` and `disable-prefix` there is an additional value that can be useful: `flush`. This is a value that causes `output` to print the current indentation and prefix. This makes it possible to get the "ignored as a prefix" property of `disable-prefix` but only for a nested prefix.

```
#lang scribble/text
@(define (comment . text)
   (list flush
         @add-prefix[" *"]{
           @disable-prefix{/*} @text */}))
function foo(x) {
  @comment{blah
           more blah
           yet more blah}
  if (x < 0) {
    @comment{even more
             blah here
             @comment{even
                      nested}}
    do_stuff();
  }
}
```

$\rightarrow$

```
function foo(x) {
  /* blah
   * more blah
   * yet more blah */
  if (x < 0) {
    /* even more
     * blah here
     * /* even
     *  * nested */ */
    do_stuff();
  }
}
```

6.5   Using External Files

Using additional files that contain code for your preprocessing is trivial: the source text is still source code in a module, so you can `require` additional files with utility functions.

```
#lang scribble/text
@(require "itemize.rkt")
Todo:
@itemize[@list{Hack some}
         @list{Sleep some}
         @list{Hack some
               more}]
```

itemize.rkt:
```
#lang racket
(provide itemize)
(define (itemize . items)
  (add-between (map (lambda (item)
                      (list "* " item))
                    items)
               "\n"))
```

$\rightarrow$

```
Todo:
 * Hack some
 * Sleep some
 * Hack some
   more
```

Note that the `at-exp` language can often be useful here, since such files need to deal with texts. Using it, it is easy to include a lot of textual content.

```
            #lang scribble/text
            @(require "stuff.rkt")
            Todo:
            @itemize[@list{Hack some}
                     @list{Sleep some}
                     @list{Hack some
                              more}]                    Todo:
            @summary                                    * Hack some
stuff.rkt: #lang at-exp racket/base                     * Sleep some
            (require racket/list)                     → * Hack some
            (provide (all-defined-out))                    more
            (define (itemize . items)                  If that's not enough,
              (add-between (map (lambda (item)          I don't know what is.
                                  @list{* @item})
                                items)
                           "\n"))
            (define summary
              @list{If that's not enough,
                    I don't know what is.})
```

Of course, the extreme side of this will be to put all of your content in a plain Racket module,
using @-forms for convenience. However, there is no need to use the text language in this
case; instead, you can (require scribble/text), which will get all of the bindings that
are available in the scribble/text language. Using output, switching from a prepro-
cessed files to a Racket file is very easy —- choosing one or the other depends on whether it
is more convenient to write a text file with occasional Racket expressions or the other way.

```
#lang at-exp racket/base
(require scribble/text racket/list)
(define (itemize . items)
  (add-between (map (lambda (item)
                      @list{* @item})
                    items)
               "\n"))                          Todo:
(define summary                                * Hack some
  @list{If that's not enough,                  * Sleep some
        I don't know what is.})          →  * Hack some
(output                                           more
 @list{                                        If that's not enough,
   Todo:                                       I don't know what is.
   @itemize[@list{Hack some}
            @list{Sleep some}
            @list{Hack some
                  more}]
   @summary
 })
```

However, you might run into a case where it is desirable to include a mostly-text file from a scribble/text source file. It might be because you prefer to split the source text to several files, or because you need to use a template file that cannot have a #lang header (for example, an HTML template file that is the result of an external editor). In these cases, the scribble/text language provides an include form that includes a file in the preprocessor syntax (where the default parsing mode is text).

```
#lang scribble/text
@(require racket/list)
@(define (itemize . items)
    (list
     "<ul>"
     (add-between
      (map (lambda (item)
             @list{<li>@|item|</li>})
           items)                          <html>
      "\n")                                <head><title>Todo</title></head>
     "</ul>"))                             <body>
@(define title "Todo")                       <h1>Todo</h1>
@(define summary                             <ul><li>Hack some</li>
    @list{If that's not enough,                 <li>Sleep some</li>
          I don't know what is.})    →        <li>Hack some
                                                   more</li></ul>
@include["template.html"]                    <p><i>If that's not enough,
```
`template.html:`
```
<html>                                            I don't know what is.</i></p>
<head><title>@|title|</title></head>   </body>
<body>                                 </html>
  <h1>@|title|</h1>
  @itemize[@list{Hack some}
           @list{Sleep some}
           @list{Hack some
                 more}]
  <p><i>@|summary|</i></p>
</body>
</html>
```

(Using `require` with a text file in the `scribble/text` language will not work as intended: the language will display the text is when the module is invoked, so the required file's contents will be printed before any of the requiring module's text does. If you find yourself in such a situation, it is better to switch to a Racket-with-@-expressions file as shown above.)

7 Low-Level Scribble API

7.1 Scribble Layers

Scribble is made of independently usable parts. For example, the Scribble reader can be used in any situation that requires lots of free-form text. You can also skip Scribble's special reader support, and instead use the document-generation structure directly.

7.1.1 Typical Composition

A Scribble document normally starts

```
#lang scribble/manual
```

but it could also start

```
#lang scribble/base
```

or

```
#lang scribble/doc
```

The last one introduces the smallest number of typesetting bindings in the document body. Using scribble/base after #lang is the same as using scribble/doc plus (require scribble/base), and using scribble/manual after #lang is the same as using scribble/doc plus (require scribble/manual).

Besides making the file a module, each of the #lang declarations selects the Scribble reader (instead of the usual Racket reader), and it starts the body of the file in "text" mode. The reader layer mostly leaves text alone, but @-forms escape to S-expression mode.

A module written as

```
#lang scribble/doc
@(require scribble/manual)

@(define to-be "To Be")

@title{@|to-be| or Not @|to-be|}

@bold{That} is the question.
Whether 'tis nobler...
```

reads as

```
(module ⟨name⟩ scribble/doc
  (require scribble/manual)
  "\n"
  (define to-be "To Be") "\n"
  "\n"
  (title to-be " or Not " to-be) "\n"
  "\n"
  (bold "That") " is the question." "\n"
  "Whether 'tis nobler..." "\n")
```

As shown in this example, the read result is a module whose content mingles text and definitions. The `scribble/doc` language lifts definitions, `requires`, and `provides` to the beginning of the module, while everything else is collected into a document bound to the provided identifier `doc`. That is, the module is transformed to something like this:

```
(module ⟨name⟩ racket/base
  (require scribble/decode
           scribble/manual)
  (define to-be "To Be")
  (define doc
    (decode
      "\n" "\n" "\n"
      (title to-be " or Not " to-be) "\n"
      "\n"
      (bold "That") " is the question." "\n"
      "Whether 'tis nobler..." "\n"))
  (provide doc))
```

The `decode` function produces a `part` structure instance that represents the document. To build the `part` instance, it inspects its arguments to find a `title-decl` value created by `title` to name the part, `part-start` values created by `section` to designate sub-parts, etc.

A `part` is the input to a rendering back-end, such as the HTML renderer. All renderers recognize a fixed structure hierarchy: the content of a part is a *flow*, which is a sequence of *flow elements*, such as paragraphs and tables; a table, in turn, consists of a list of list of flows; a paragraph is a list of *elements*, which can be instances of the `element` structure type, plain strings, or certain special symbols.

The value bound to `doc` in the example above is something like

```
(make-part ....
           (list "To Be" " or Not " "To Be") ; title
           ....
```

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```
(make-flow
  (list
   (make-paragraph
    (list (make-element 'bold (list "That"))
          " is the question." "\n"
          "Whether " 'rsquo "tis nobler..."))))
....)
```

Notice that the `'` in the input's `'tis` has turned into `'rsquo` (rendered as a curly apostrophe). The conversion to use `'rsquo` was performed by `decode` via `decode-flow` via `decode-paragraph` via `decode-content` via `decode-string`.

In contrast, `(make-element 'bold (list "That"))` was produced by the `bold` function. The `decode` operation is a function, not a syntactic form, and so `bold` has control over its argument before `decode` sees the result. Also, decoding traverses only immediate string arguments.

As it turns out, `bold` also decodes its argument, because the `bold` function is implemented as

```
(define (bold . strs)
  (make-element 'bold (decode-content strs)))
```

The `verbatim` function, however, does not decode its content, and instead typesets its text arguments directly.

A document module can construct elements directly using `make-element`, but normally functions like `bold` and `verbatim` are used to construct them. In particular, the `scribble/manual` library provides many functions and forms to typeset elements and flow elements.

The `part` structure hierarchy includes built-in element types for setting hyperlink targets and references. Again, this machinery is normally packaged into higher-level functions and forms, such as `secref`, defproc, and racket.

7.1.2 Layer Roadmap

Working roughly from the bottom up, the Scribble layers are:

- `scribble/reader`: A reader that extends the syntax of Racket with @-forms for conveniently embedding a mixin of text and escapes. See §2 "@ Syntax".

- `scribble/core`: A set of document datatypes and utilities that define the basic layout and processing of a document. For example, the `part` datatype is defined in this layer. See §7.3 "Structures And Processing".

- `scribble/base-render` with `scribble/html-render`, `scribble/latex-render`, or `scribble/text-render`: A base renderer and mixins that generate documents in various formats from instances of the `scribble/struct` datatypes. See §7.4 "Renderers".

- `scribble/decode`: Processes a stream of text, section-start markers, etc. to produce instances of the `scribble/core` datatypes. See §7.5 "Decoding Text".

- `scribble/doclang`: A language to be used for the initial import of a module; processes the module top level through `scribble/decode`, and otherwise provides all of `racket/base`. See §7.6 "Document Language".

- `scribble/doc`: A language that combines `scribble/reader` with `scribble/doclang`. See §7.7 "Document Reader".

- `scribble/base`: A library of basic document operators—such as `title`, `section`, and `secref`—for use with `scribble/decode` and a renderer. This library name also can be used as a language, where it combines `scribble/doc` with the exports of `scribble/base`. See §3.1 "Base Document Format".

- `scribble/racket`: A library of functions for typesetting Racket code. See §4.4 "Racket". These functions are not normally used directly, but instead used through `scribble/manual`.

- `scribble/manual`: A library of functions for writing Racket documentation; re-exports `scribble/base`. Also, the `scribble/manual-struct` library provides types for index-entry descriptions created by functions in `scribble/manual`. See §4.3 "Manual Forms".

- `scribble/eval`: A library of functions for evaluating code at document-build time, especially for showing examples. See §4.5 "Evaluation and Examples".

- `scribble/bnf`: A library of support functions for writing grammars. See §4.7 "BNF Grammars".

- `scribble/xref`: A library of support functions for using cross-reference information, typically after a document is rendered (e.g., to search). See §7.8 "Cross-Reference Utilities".

- `scribble/text`: A language that uses `scribble/reader` preprocessing text files.

The `scribble` command-line utility generates output with a specified renderer. More specifically, the executable installs a renderer, loads the modules specified on the command line, extracts the `doc` export of each module (which must be an instance of `part`), and renders each—potentially with links that span documents.

7.2 @ Reader Internals

7.2.1 Using the @ Reader

You can use the reader via Racket's `#reader` form:

```
#reader scribble/reader @foo{This is free-form text!}
```

or use the `at-exp` meta-language as described in §7.2.3 "Adding @-expressions to a Language".

Note that the Scribble reader reads @-forms as S-expressions. This means that it is up to you to give meanings for these expressions in the usual way: use Racket functions, define your functions, or require functions. For example, typing the above into `racket` is likely going to produce a "reference to undefined identifier" error, unless `foo` is defined. You can use `string-append` instead, or you can define `foo` as a function (with variable arity).

A common use of the Scribble @-reader is when using Scribble as a documentation system for producing manuals. In this case, the manual text is likely to start with

```
#lang scribble/doc
```

which installs the @ reader starting in "text mode," wraps the file content afterward into a Racket module where many useful Racket and documentation related functions are available, and parses the body into a document using `scribble/decode`. See §7.7 "Document Reader" for more information.

Another way to use the reader is to use the `use-at-readtable` function to switch the current readtable to a readtable that parses @-forms. You can do this in a single command line:

```
racket -ile scribble/reader "(use-at-readtable)"
```

7.2.2 Syntax Properties

The Scribble reader attaches properties to syntax objects. These properties might be useful in some rare situations.

Forms that Scribble reads are marked with a `'scribble` property, and a value of a list of three elements: the first is `'form`, the second is the number of items that were read from the datum part, and the third is the number of items in the body part (strings, sub-forms, and escapes). In both cases, a `0` means an empty datum/body part, and `#f` means that the corresponding part was omitted. If the form has neither parts, the property is not attached

to the result. This property can be used to give different meanings to expressions from the datum and the body parts, for example, implicitly quoted keywords:

```
(define-syntax (foo stx)
  (let ([p (syntax-property stx 'scribble)])
    (printf ">>> ~s\n" (syntax->datum stx))
    (syntax-case stx ()
      [(_ x ...)
       (and (pair? p) (eq? (car p) 'form) (even? (cadr p)))
       (let loop ([n (/ (cadr p) 2)]
                  [as '()]
                  [xs (syntax->list #'(x ...))])
         (if (zero? n)
             (with-syntax ([attrs (reverse as)]
                           [(x ...) xs])
               #'(list 'foo `attrs x ...))
             (loop (sub1 n)
                   (cons (with-syntax ([key (car xs)]
                                       [val (cadr xs)])
                           #'(key ,val))
                         as)
                   (cddr xs))))])))

> @foo[x 1 y (* 2 3)]{blah}
>>> (foo x 1 y (* 2 3) "blah")
'(foo ((x 1) (y 6)) "blah")
```

In addition, the Scribble parser uses syntax properties to mark syntax items that are not physically in the original source — indentation spaces and newlines. Both of these will have a 'scribble property; an indentation string of spaces will have 'indentation as the value of the property, and a newline will have a '(newline S) value where S is the original newline string including spaces that precede and follow it (which includes the indentation for the following item). This can be used to implement a verbatim environment: drop indentation strings, and use the original source strings instead of the single-newline string. Here is an example of this.

```
(define-syntax (verb stx)
  (syntax-case stx ()
    [(_ cmd item ...)
     #'`(cmd
         #,@(let loop ([items (syntax->list #'(item ...))])
              (if (null? items)
                  '()
                  (let* ([fst  (car items)]
                         [prop (syntax-property fst 'scribble)]
                         [rst  (loop (cdr items))])
```

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```
                    (cond [(eq? prop 'indentation) rst]
                          [(not (and (pair? prop)
                                     (eq? (car prop) 'newline)))
                           (cons fst rst)]
                          [else (cons (datum->syntax-object
                                        fst (cadr prop) fst)
                                      rst)])))))))]))
```

```
> @verb[string-append]{
    foo
      bar
  }
"foo\n  bar"
```

7.2.3 Adding @-expressions to a Language

 #lang at-exp   package: at-exp-lib

The at-exp language installs @-reader support in the readtable, and then chains to the
reader of another language that is specified immediately after at-exp.

For example, #lang at-exp racket/base adds @-reader support to racket/base, so
that

```
  #lang at-exp racket/base

  (define (greet who) @string-append{Hello, @|who|.})
  (greet "friend")
```

reports "Hello, friend.".

7.2.4 Interface

 (require scribble/reader)   package: at-exp-lib

The scribble/reader module provides direct Scribble reader functionality for advanced
needs.

```
(read [in]) → any
  in : input-port? = (current-input-port)
```

```
(read-syntax [source-name in]) → (or/c syntax? eof-object?)
  source-name : any/c = (object-name in)
  in : input-port? = (current-input-port)
```

These procedures implement the Scribble reader. They do so by constructing a reader table based on the current one, and using that for reading.

```
(read-inside [in]) → any
  in : input-port? = (current-input-port)
```

```
(read-syntax-inside [source-name
                     in
                     #:command-char command-char])
 → (or/c syntax? eof-object?)
  source-name : any/c = (object-name in)
  in : input-port? = (current-input-port)
  command-char : char? = #\@
```

These `-inside` variants parse as if starting inside a `@{...}`, and they return a (syntactic) list. The `command-char` is used to customize the readtable. Useful for implementing languages that are textual by default (see `"docreader.rkt"` for example).

```
(make-at-readtable [#:readtable readtable
                    #:command-char command-char
                    #:datum-readtable datum-readtable
                    #:syntax-post-processor syntax-post-proc])
 → readtable?
  readtable : readtable? = (current-readtable)
  command-char : char? = #\@
  datum-readtable :    (or/c readtable? boolean?
                              (readtable? . -> . readtable?))
                   = #t
  syntax-post-proc : (syntax? . -> . syntax?) = values
```

Constructs an @-readtable. The keyword arguments can customize the resulting reader in several ways:

- *readtable* — a readtable to base the @-readtable on.

- *command-char* — the character used for @-forms.

- *datum-readtable* — determines the readtable used for reading the datum part. A `#t` values uses the @-readtable, otherwise it can be a readtable, or a readtable-to-readtable function that will construct one from the @-readtable. The idea is that you may want to have completely different uses for the datum part, for example, introducing a convenient `key=val` syntax for attributes.

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- *syntax-post-proc* — function that is applied on each resulting syntax value after it has been parsed (but before it is wrapped quoting punctuations). You can use this to further control uses of @-forms, for example, making the command be the head of a list:

```
(use-at-readtable
  #:syntax-post-processor
  (lambda (stx)
    (syntax-case stx ()
      [(cmd rest ...) #'(list 'cmd rest ...)]
      [else (error "@ forms must have a body")])))
```

```
(make-at-reader #:syntax? syntax?
                #:inside? inside? ...) → procedure?
  syntax? : #t
  inside? : #f
```

Constructs a variant of a @-readtable. The arguments are the same as in `make-at-readtable`, with two more that determine the kind of reader function that will be created: *syntax?* chooses between a `read-` or `read-syntax`-like function, and *inside?* chooses a plain reader or an `-inside` variant.

The resulting function has a different contract and action based on these inputs. The expected inputs are as in `read` or `read-syntax` depending on *syntax?*; the function will read a single expression or, if *inside?* is true, the whole input; it will return a syntactic list of expressions rather than a single one in this case.

Note that *syntax?* defaults to `#t`, as this is the more expected common case when you're dealing with concrete-syntax reading.

Note that if *syntax?* is true, the `read`-like function is constructed by simply converting a syntax result back into a datum.

```
(use-at-readtable ...) → void?
```

Passes all arguments to `make-at-readtable`, and installs the resulting readtable using `current-readtable`. It also enables line counting for the current input-port via `port-count-lines!`.

This is mostly useful for playing with the Scribble syntax on the REPL.

7.3 Structures And Processing

```
(require scribble/core)        package: scribble-lib
```

A document is represented as a part, as described in §7.3.1 "Parts, Flows, Blocks, and Paragraphs". This representation is intended to be independent of its eventual rendering, and it is intended to be immutable; rendering extensions and specific data in a document can collude arbitrarily, however.

A document is processed in four passes:

- The *traverse pass* traverses the document content in document order so that information from one part of a document can be communicated to other parts of the same document. The information is transmitted through a symbol-keyed mapping that can be inspected and extended by `traverse-element`s and `traverse-block`s in the document. The traverse pass iterates the traversal until it obtains a fixed point (i.e., the mapping from one iteration is unchanged from the previous iteration).

- The *collect pass* globally collects information in the document that can span documents that are built at separate times, such as targets for hyperlinking.

- The *resolve pass* matches hyperlink references with targets and expands delayed elements (where the expansion should not contribute new hyperlink targets).

- The *render pass* generates the result document.

None of the passes mutate the document representation. Instead, the traverse pass, collect pass, and resolve pass accumulate information in a side hash table, `collect-info` table, and `resolve-info` table. The collect pass and resolve pass are effectively specialized version of traverse pass that work across separately built documents.

7.3.1   Parts, Flows, Blocks, and Paragraphs

This diagram shows the large-scale structure of the type hierarchy for Scribble documents. A box represents a struct or a built-in Racket type; for example `part` is a struct. The bottom portion of a box shows the fields; for example `part` has three fields, `title`, `blocks`, and `subparts`. The substruct relationship is shown vertically with navy blue lines connected by a triangle; for example, a `compound-paragraph` is a `block`. The types of values on fields are shown via dark red lines in the diagram. Doubled lines represent lists and tripled lines represent lists of lists; for example, the `blocks` field of `compound-paragraph` is a list of `blocks`. Dotted lists represent functions that compute elements of a given field; for example, the `block` field of a `traverse-block` struct is a function that computes a `block`.

The diagram is not completely accurate: a `table` may have `'cont` in place of a block in its `cells` field, and the types of fields are only shown if they are other structs in the diagram. A prose description with more detail follows the diagram.
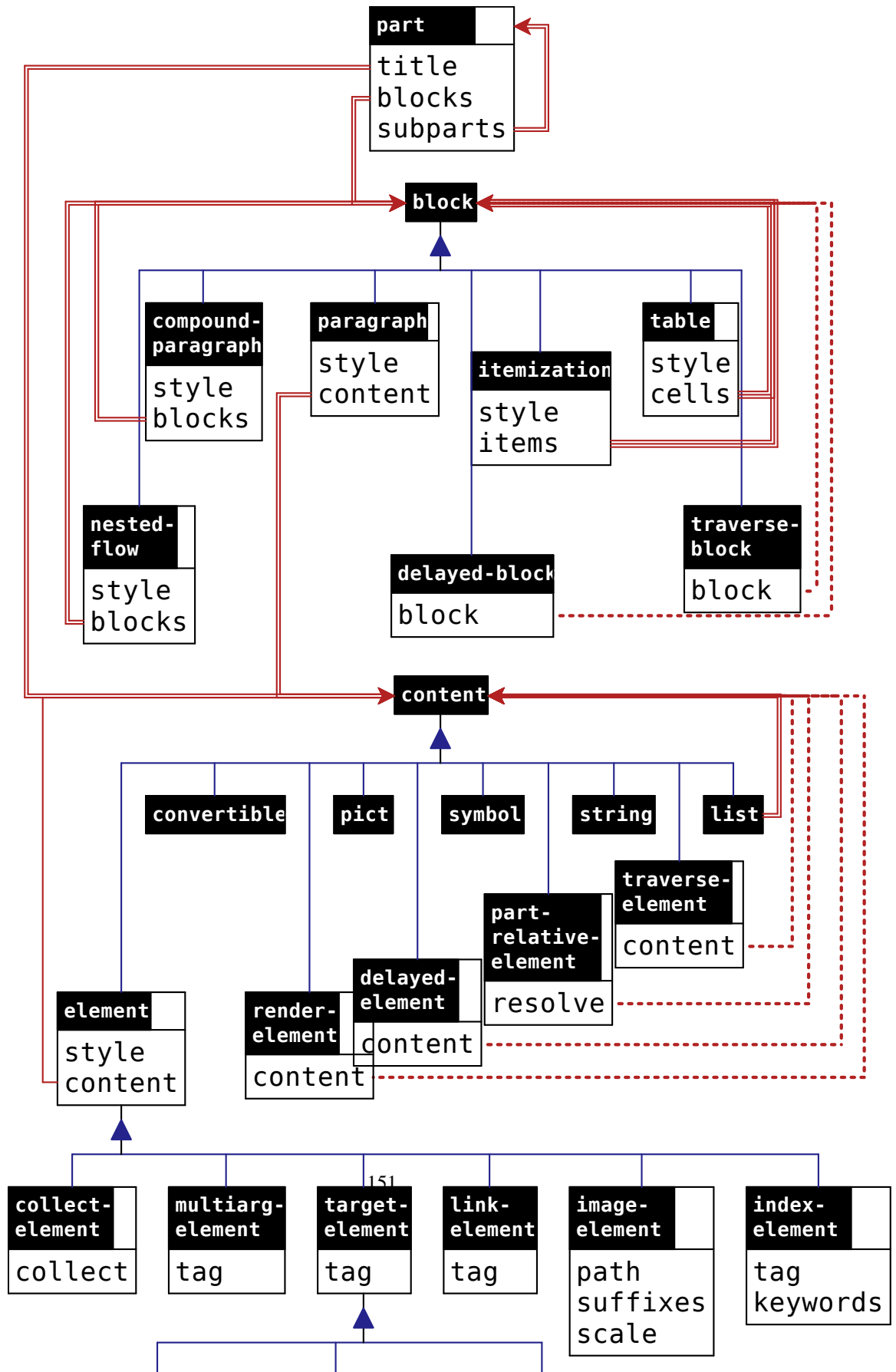
A *part* is an instance of `part`; among other things, it has a title content, an initial flow, and a list of subsection parts. There is no difference between a part and a full document; a particular source module just as easily defines a subsection (incorporated via `include-section`) as a document.

A *flow* is a list of blocks.

A *block* is either a table, an itemization, a nested flow, a paragraph, a compound paragraph, a traverse block, or a delayed block.

- A *table* is an instance of `table`; it has a list of list of blocks corresponding to table cells.

- A *itemization* is an instance of `itemization`; it has a list of flows.

- A *nested flow* is an instance of `nested-flow`; it has a flow that is typeset as sub-flow.

- A *paragraph* is an instance of `paragraph`; it has a content:

  - An *content* can be a string, one of a few symbols, an instance of `element` (possibly `link-element`, etc.), a `multiarg-element`, a a traverse element, part-relative element, a delayed element, or a list of content.

    * A string is included in the result document verbatim, except for space, and unless the content's enclosing style is `'hspace`. In a style other than `'hspace`, consecutive spaces in the output may be collapsed togther or replaced with a line break. In the style `'hspace`, all text is converted to uncollapsable spaces that cannot be broken across lines.

    * A symbol content is either `'mdash`, `'ndash`, `'ldquo`, `'lsquo`, `'rdquo`, `'rsquo`, `'larr`, `'rarr`, or `'prime`; it is rendered as the corresponding HTML entity (even for Latex output).

    * An instance of `element` has a content plus a style. The style's interpretation depends on the renderer, but it can be one of a few special symbols (such as `'bold`) that are recognized by all renderers.

    * An instance of `link-element` has a tag for the target of the link.

    * An instance of `target-element` has a tag to be referenced by `link-element`s. An instance of the subtype `toc-target-element` is treated like a kind of section label, to be shown in the "on this page" table for HTML output.

    * An instance of `index-element` has a tag (as a target), a list of strings for the keywords (for sorting and search), and a list of contents to appear in the end-of-document index.

    * An instance of `image-element` incorporates an image from a file into the rendered document.

    * An instance of `multiarg-element` combines a style with a list of content, where the style corresponds to a rendered command that takes multiple arguments.

* An instance of `collect-element` has a procedure that is called in the collect pass of document processing to record information used by later passes.
* A *traverse element* is an instance of `traverse-element`, which ultimately produces content, but can accumulate and inspect information in the traverse pass.
* A *part-relative element* is an instance of `part-relative-element`, which has a procedure that is called in the collect pass of document processing to obtain *content*. When the part-relative element's procedure is called, collected information is not yet available, but information about the enclosing parts is available.
* A *delayed element* is an instance of `delayed-element`, which has a procedure that is called in the resolve pass of document processing to obtain *content*.
* An instance of `render-element` has a procedure that is called in the render pass of document processing.

- A *compound paragraph* is an instance of `compound-paragraph`; like `blockquote`, it has list of blocks, but the blocks are typeset as a single paragraph (e.g., no indentation after the first block) instead of inset.

- A *traverse block* is an instance of `traverse-block`, which ultimately produces another block, but can accumulate and inspect information during the traverse pass.

- A *delayed block* is an instance of `delayed-block`, which has a procedure that is called in the resolve pass of document processing to obtain a *block*.

7.3.2 Tags

A *tag* is a list containing a symbol and either a string, a `generated-tag` instance, or an arbitrary list. The symbol effectively identifies the type of the tag, such as `'part` for a tag that links to a part, or `'def` for a Racket function definition. The symbol also effectively determines the interpretation of the second half of the tag.

A part can have a *tag prefix*, which is effectively added onto the second item within each tag whose first item is `'part` or `'tech`. The prefix is added to a string value by creating a list containing the prefix and string, and it is added to a list value using `cons`; a prefix is not added to a `generated-tag` instance. The prefix is used for reference outside the part, including the use of tags in the part's `tags` field. Typically, a document's main part has a tag prefix that applies to the whole document; references to sections and defined terms within the document from other documents must include the prefix, while references within the same document omit the prefix. Part prefixes can be used within a document as well, to help disambiguate references within the document.

Some procedures accept a "tag" that is just the string part of the full tag, where the symbol part is supplied automatically. For example, `section` and `secref` both accept a string "tag", where `'part` is implicit.

The `scribble/tag` library provides functions for constructing tags.

7.3.3 Styles

A *style* combines a style name with a list of style properties in a `style` structure. A *style name* is either a string, symbol, or `#f`. A *style property* can be anything, including a symbol or a structure such as `color-property`.

A style has a single style name, because the name typically corresponds to a configurable instruction to a renderer. For example, with Latex output, a string style name corresponds to a Latex command or environment. For more information on how string style names interact with configuration of a renderer, see §7.10 "Extending and Configuring Scribble Output". Symbolic style names, meanwhile, provide a simple layer of abstraction between the renderer and documents for widely supported style; for example, the `'italic` style name is supported by all renderers.

Style properties within a style compose with style names and other properties. Again, symbols are often used for properties that are directly supported by renderers. For example, `'unnumbered` style property for a part renders the part without a section number. Many properties are renderer-specific, such as a `hover-property` structure that associates text with an element to be shown in an HTML display when the mouse hovers over the text.

7.3.4 Collected and Resolved Information

The collect pass, resolve pass, and render pass processing steps all produce information that is specific to a rendering mode. Concretely, the operations are all represented as methods on a `render<%>` object.

The result of the `collect` method is a `collect-info` instance. This result is provided back as an argument to the `resolve` method, which produces a `resolve-info` value that encapsulates the results from both iterations. The `resolve-info` value is provided back to the `resolve` method for final rendering.

Optionally, before the `resolve` method is called, serialized information from other documents can be folded into the `collect-info` instance via the `deserialize-info` method. Other methods provide serialized information out of the collected and resolved records.

During the collect pass, the procedure associated with a `collect-element` instance can register information with `collect-put!`.

During the resolve pass, collected information for a part can be extracted with `part-collected-info`, which includes a part's number and its parent part (or `#f`). More generally, the `resolve-get` method looks up information previously collected. This resolve-time information is normally obtained by the procedure associated with a delayed block or

delayed element.

The `resolve-get` information accepts both a `part` and a `resolve-info` argument. The `part` argument enables searching for information in each enclosing part before sibling parts.

7.3.5 Structure Reference

```
(struct part (tag-prefix
              tags
              title-content
              style
              to-collect
              blocks
              parts)
        #:extra-constructor-name make-part)
  tag-prefix : (or/c #f string?)
  tags : (listof tag?)
  title-content : (or/c #f list?)
  style : style?
  to-collect : list?
  blocks : (listof block?)
  parts : (listof part?)
```

The `tag-prefix` field determines the optional tag prefix for the part.

The `tags` indicates a list of tags that each link to the section. Normally, `tags` should be a non-empty list, so that hyperlinks can target the section.

The `title-content` field holds the part's title, if any.

For the `style` field, the currently recognized symbolic style names are as follows:

- `'index` — The part represents an index.

The recognized style properties are as follows:

- `'unnumbered` — A section number is not computed or rendered for the section.

- `'hidden-number` — A section number is computed for the section, but it is not rendered as part of the section name.

- `'toc-hidden` — The part title is not shown in tables of contents, including in "on this page" boxes. For Latex rendering, the part title is omitted only if it is unnumbered or has a hidden number.

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- `'hidden` — The part title is not shown; for Latex output, the part title is not shown only if its is empty, and in that case, it is also excluded from tables of contents. The `'toc-hidden` style property usually should be included with `'hidden` (for consistency in non-Latex output).

- `'grouper` — The part is numbered with a Roman numeral, and its subsections continue numbering as if they appeared in the preceeding part. In other words, the part acts like a "part" in a book where chapter numbering is continuous across parts.

- `'toc` — Sub-parts of the part are rendered on separate pages for multi-page HTML mode.

- `'non-toc` — Initial sub-parts of the part are *not* rendered on separate pages for multi-page HTML mode; this style property applies only to the main part.

- `'reveal` — Shows sub-parts when this part is displayed in a table-of-contents panel in HTML output (which normally shows only the top-level sections).

- `'quiet` — In HTML output and most other output modes, hides entries for sub-parts of this part in a `table-of-contents` or `local-table-of-contents` listing except when those sub-parts are top-level entries in the listing.

- `'no-toc` — As a style property for the main part of a rendered page, causes the HTML output to not include a margin box for the main table of contents; the "on this page" box that contains `toc-element` and `toc-target-element` links (and that only includes an "on this page" label for multi-page documents) takes on the location and color of the main table of contents, instead.

- `'no-sidebar` — As a style property for the main part of a document, causes the HTML output to not include an "on this page" margin box.

- `document-version` structure — A version number for this part and its sub-parts (except as overridden). When it is not `""` may be used when rendering a document; at a minimum, a non-`""` version is rendered when it is attached to a part representing the whole document. The default version for a document is `(version)`. In rendered form, the version is normally prefixed with the word "Version," but this formatting can be controlled by overriding `.version:before` and/or `.versionNoNav:before` in CSS for HTML rendering or by redefining the `\SVersionBefore` macro for Latex rendering (see §7.10 "Extending and Configuring Scribble Output").

- `document-date` structure — A date for the part, normally used on a document's main part for for Latex output. The default date for a document is `#f`, which avoids explicitly specifying a date at the Latex level, so that the current date is used as the document date. Set the date to `""` to suppress a date in an output document.

- `body-id` structure — Generated HTML uses the given string `id` attribute of the `<body>` tag; this style property can be set separately for parts that start different HTML pages, otherwise it is effectively inherited by sub-parts; the default is `"scribble-racket-lang.org"`, but `setup-plt` installs `"doc-racket-lang.org"` as the `id` for any document that it builds.

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- `attributes` structure — Provides additional HTML attributes for the `<html>` tag when the part corresponds to its own HTML page.

- `head-extra` structure — Provides additional HTML content for the `<head>` tag when the part corresponds to its own HTML page.

- `color-property` structure — For HTML, applies a color to the part title.

- `background-color-property` structure — For HTML, Applies a color to the background of the part title.

- `hover-property` structure — For HTML, adds a text label to the title to be shown when the mouse hovers over it.

- `render-convertible-as` structure — For HTML, controls how objects that subscribe to the `file/convertible` protocol are rendered.

The `to-collect` field contains content that is inspected during the collect pass, but ignored in later passes (i.e., it doesn't directly contribute to the output).

The `blocks` field contains the part's initial flow (before sub-parts).

The `parts` field contains sub-parts.

```
(struct paragraph (style content)
        #:extra-constructor-name make-paragraph)
  style : style?
  content : content?
```

A paragraph has a style and a content.

For the `style` field, a string style name corresponds to a CSS class for HTML output or a macro for Latex output (see §7.10.1 "Implementing Styles"). The following symbolic style names are recognized:

- `'author` — Typeset as the author of a document. Such paragraphs normally should appear only in the initial flow of a `part` for a document, where they are treated specially by the Latex renderer by moving the author information to the title.

- `'pretitle` — Typeset before the title of the enclosing part.

- `'wraps` — Like a `#f` style name, but not boxable in the sense of `box-mode` for Latex output.

When a paragraph's style is `#f`, then it is boxable in the sense of `box-mode` for Latex output.

The currently recognized style properties are as follows:

- `'omitable` — When a table cell contains a single `paragraph` with the `'omitable` style property, then when rendering to HTML, no `<p>` tag wraps the cell content.

- `'div` — Generates `<div>` HTML output instead of `<p>` (unless a `alt-tag` property is provided).

- `alt-tag` structure — Generates the indicated HTML tag instead of `<p>` or `<div>`.

- `attributes` structure — Provides additional HTML attributes for the `<p>`, `<div>`, or alternate tag.

- `body-id` structure — For HTML, uses the given string as an `id` attribute of the `<p>`, `<div>`, or alternate tag.

- `'never-indents` — For Latex and compound paragraphs; see `compound-paragraph`.

- `box-mode` structure — For Latex output, uses an alternate rendering form for boxing contexts (such as a table cell); see `box-mode`.

```
(struct table (style blockss)
        #:extra-constructor-name make-table)
  style : style?
  blockss : (listof (listof (or/c block? 'cont)))
```

See also the `tabular` function.

A table has, roughly, a list of list of blocks. A cell in the table can span multiple columns by using `'cont` instead of a block in the following columns (i.e., for all but the first in a set of cells that contain a single block).

Within `style`, a string style name corresponds to a CSS class for HTML output or an environment for Latex output (see §7.10.1 "Implementing Styles"). The following symbolic style names are also recognized:

- `'boxed` — Renders as a definition.

- `'centered` — Centers HTML output horizontally.

- `'block` — Prevents pages breaks in Latex output.

The following style properties are currently recognized:

- `table-columns` structure — Provides column-specific styles, but only `column-attributes` properties (if any) are used if a `table-cells` structure is included as a style property.

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- `table-cells` structure — Provides cell-specific styles.

- `attributes` structure — Provides additional HTML attributes for the `<table>` tag.

- `body-id` structure — For HTML, uses the given string as an `id` attribute of the `<table>` tag.

- `'aux` — For HTML, include the table in the table-of-contents display for the enclosing part.

- `'never-indents` — For Latex and compound paragraphs; see `compound-paragraph`.

For Latex output, a paragraph as a cell value is not automatically line-wrapped, unless a vertical alignment is specified for the cell through a `table-cells` or `table-columns` style property. To get a line-wrapped paragraph, use a `compound-paragraph` or use an element with a string style and define a corresponding Latex macro in terms of `\parbox`. For Latex output of blocks in the flow that are `nested-flow`s, `itemization`s, `compound-paragraph`s, or `delayed-block`s, the block is wrapped with `minipage` using `\linewidth` divided by the column count as the width.

```
(struct itemization (style blockss)
        #:extra-constructor-name make-itemization)
  style : style?
  blockss : (listof (listof block?))
```

A itemization has a style and a list of flows.

In `style`, a string style name corresponds to a CSS class for HTML output or a macro for Latex output (see §7.10.1 "Implementing Styles"). In addition, the following symbolic style names are recognized:

- `'compact` — Reduces space between items.

- `'ordered` — Generates `<ol>` HTML output instead of `<ul>` or an Latex enumeration instead of an itemization.

The following style properties are currently recognized:

- `attributes` structure — Provides additional HTML attributes for the `<ul>` or `<ol>` tag.

- `body-id` structure — For HTML, uses the given string as an `id` attribute of the `<ul>` or `<ol>` tag.

- `'never-indents` — For Latex and compound paragraphs; see `compound-paragraph`.

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```
(struct nested-flow (style blocks)
        #:extra-constructor-name make-nested-flow)
  style : any/c
  blocks : (listof block?)
```

A nested flow has a style and a flow.

In `style`, the style name is normally a string that corresponds to a CSS class for HTML `<blockquote>` output or a Latex environment (see §7.10.1 "Implementing Styles"). The following symbolic style names are recognized:

- `'inset` — Insets the nested flow relative to surrounding text.

- `'code-inset` — Insets the nested flow relative to surrounding text in a way suitable for code. If the nested flow has a single block, then it is boxable in the sense of `box-mode` for Latex output.

- `'vertical-inset` — Insets the nested flow vertically relative to surrounding text, but not horizontally. If the nested flow has a single block, then it is boxable in the sense of `box-mode` for Latex output.

The following style properties are currently recognized:

- `'command` — For Latex output, a string style name is used as a command name instead of an environment name.

- `'multicommand` — For Latex output, a string style name is used as a command name with a separate argument for each block in `blocks`.

- `attributes` structure — Provides additional HTML attributes for the `<blockquote>` tag.

- `body-id` structure — For HTML, uses the given string as an `id` attribute of the `<blockquote>` tag.

- `'never-indents` — For Latex and compound paragraphs; see `compound-paragraph`.

- `box-mode` structure — For Latex output, uses an alternate rendering form for boxing contexts (such as a table cell); see `box-mode`.

- `'decorative` — The content of the nested flow is intended for decoration. Text output skips a decorative nested flow.

- `alt-tag` structure — Generates the indicated HTML tag instead of `<blockquote>`.

```
(struct compound-paragraph (style blocks)
        #:extra-constructor-name make-compound-paragraph)
  style : style?
  blocks : (listof block?)
```

A compound paragraph has a style and a list of blocks.

For HTML, a `paragraph` block in `blocks` is rendered without a `<p>` tag, unless the paragraph has a style with a non-`#f` style name. For Latex, each block in `blocks` is rendered with a preceding `\noindent`, unless the block has the `'never-indents` property (checking recursively in a `nested-flow` or `compound-paragraph` if the `nested-flow` or `compound-paragraph` itself has no `'never-indents` property).

The `style` field of a compound paragraph is normally a string that corresponds to a CSS class for HTML output or Latex environment for Latex output (see §7.10.1 "Implementing Styles"). The following style properties are currently recognized:

- `'command` — For Latex output, a string style name is used as a command name instead of an environment name.

- `alt-tag` structure — Generates the given HTML tag instead of `<p>`.

- `attributes` structure — Provides additional HTML attributes for the `<p>` or alternate tag.

- `body-id` structure — For HTML, uses the given string as an id attribute of the `<p>` or alternate tag.

- `'never-indents` — For Latex within another compound paragraph; see above.

```
(struct traverse-block (traverse)
        #:extra-constructor-name make-traverse-block)
  traverse : block-traverse-procedure/c
```

Produces another block during the traverse pass, eventually.

The `traverse` procedure is called with *get* and *set* procedures to get and set symbol-keyed information; the `traverse` procedure should return either a block (which effectively takes the `traverse-block`'s place) or a procedure like `traverse` to be called in the next iteration of the traverse pass.

All `traverse-element` and `traverse-block`s that have not been replaced are forced in document order relative to each other during an iteration of the traverse pass.

The *get* procedure passed to `traverse` takes a symbol and any value to act as a default; it returns information registered for the symbol or the given default if no value has been

registered. The `set` procedure passed to `traverse` takes a symbol and a value to registered for the symbol.

The symbol `'scribble:current-render-mode` is automatically registered to a list of symbols that describe the target of document rendering. The list contains `'html` when rendering to HTML, `'latex` when rendering via Latex, and `'text` when rendering to text. The registration of `'scribble:current-render-mode` cannot be changed via `set`.

```
(struct delayed-block (resolve)
        #:extra-constructor-name make-delayed-block)
  resolve : (any/c part? resolve-info? . -> . block?)
```

The `resolve` procedure is called during the resolve pass to obtain a normal block. The first argument to `resolve` is the renderer.

```
(struct element (style content)
        #:extra-constructor-name make-element)
  style : element-style?
  content : content?
```

Styled content within an enclosing paragraph or other content.

The `style` field can be a `style` structure, but it can also be just a style name.

In `style`, a string style name corresponds to a CSS class for HTML output and a macro name for Latex output (see §7.10.1 "Implementing Styles"). The following symbolic style names are recognized:

- `'tt`, `'italic`, `'bold`, `'roman`, `'sf`, `'url`, `'subscript`, `'superscript`, `'smaller`, `'larger` — Basic styles recognized by all renders.

- `'hspace` — Renders its `content` as monospace blanks.

- `'newline` — Renders a line break independent of the `content`.

- `'no-break` — Prevents line breaks when rendering `content`.

The following style properties are currently recognized:

- `target-url` structure — Generates a hyperlink.

- `url-anchor` structure — For HTML, inserts a hyperlink target before `content`.

- `color-property` structure — Applies a color to the text of `content`.

- `background-color-property` structure — Applies a color to the background of `content`.

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- `alt-tag` structure — Generates the given HTML tag instead of the default one (`<span>`, b, etc.).

- `attributes` structure — Provides additional HTML attributes for a tag.

- `hover-property` structure — For HTML, adds a text label to the content to be shown when the mouse hovers over it.

- `script-property` structure — For HTML, supplies a script alternative to `content`.

- `body-id` structure — For HTML uses the given string as an `id` attribute of the `<span>` tag.

- `'aux` — Intended for use in titles, where the auxiliary part of the title can be omitted in hyperlinks. See, for example, `secref`.

- `'tt-chars` — For Latex output, when the style name is a string, render the element's content with escapes suitable for Latex `tt` mode.

- `'exact-chars` — For Latex output, when the style name is a string, render the elements content exactly (without escapes).

- `command-extras` structure — For Latex output, adds strings as arguments to the Latex command.

```
(struct image-element element (path suffixes scale)
        #:extra-constructor-name make-image-element)
  path :  (or/c path-string?
               (cons/c 'collects (listof bytes?)))
  suffixes : (listof #rx"^[.]")
  scale : real?
```

Used as a style for an `element` to inline an image. The `path` field can be a result of `path->main-collects-relative`.

For each string in `suffixes`, if the rendered works with the corresponding suffix, the suffix is added to `path` and used if the resulting path refers to a file that exists. The order in `suffixes` determines the order in which suffixes are tried. The HTML renderer supports `".png"`, `".gif"`, and `".svg"`, while the Latex renderer supports `".png"`, `".pdf"`, and `".ps"` (but rendering Latex output to PDF will not work with `".ps"` files, while rendering to Latex DVI output works only with `".ps"` files). If `suffixes` is empty or if none of the suffixes lead to files that exist, `path` is used as-is.

The `scale` field scales the image in its rendered form.

```
(struct target-element element (tag)
        #:extra-constructor-name make-target-element)
  tag : tag?
```

Declares the content as a hyperlink target for `tag`.

```
(struct toc-target-element target-element ()
        #:extra-constructor-name make-toc-target-element)
```

Like `target-element`, the content is also a kind of section label to be shown in the "on this page" table for HTML output.

```
(struct toc-target2-element toc-target-element (toc-content)
        #:extra-constructor-name make-toc-target2-element)
  toc-content : content?
```

Extends `target-element` with a separate field for the content to be shown in the "on this page" table for HTML output.

```
(struct page-target-element target-element ()
        #:extra-constructor-name make-page-target-element)
```

Like `target-element`, but a link to the element goes to the top of the containing page.

```
(struct redirect-target-element target-element (alt-path
                                                alt-anchor)
          #:extra-constructor-name make-redirect-target-element)
  alt-path : path-string?
  alt-anchor : string?
```

Like `target-element`, but a link to the element is redirected to the given URL.

```
(struct toc-element element (toc-content)
        #:extra-constructor-name make-toc-element)
  toc-content : content?
```

Similar to `toc-target-element`, but with specific content for the "on this page" table specified in the `toc-content` field.

```
(struct link-element element (tag)
        #:extra-constructor-name make-link-element)
  tag : tag?
```

Hyperlinks the content to `tag`.

When `tag` is a part tag and the content of the element is `null`, then the hyperlink uses the target part's number and/or title as the content. In that case, if the section number is preceded by a word, the word starts in uppercase if the element's style includes a `'uppercase` property.

The following symbol is recognized as a style property:

- `'indirect-link` — For HTML output, treats the link as "external". When rendering to HTML and the `set-external-tag-path` method is called to provide an external-link URL, then the resolution of the hyperlink can be deferred until the link is clicked (or, in some cases, patched by JavaScript when the documentation is viewed in a browser).

```
(struct index-element element (tag plain-seq entry-seq desc)
        #:extra-constructor-name make-index-element)
  tag : tag?
  plain-seq : (and/c pair? (listof string?))
  entry-seq : (listof content?)
  desc : any/c
```

The `plain-seq` specifies the keys for sorting, where the first string is the main key, the second is a sub-key, etc. For example, an "night" portion of an index might have sub-entries for "night, things that go bump in" and "night, defender of the". The former would be represented by `plain-seq '("night" "things that go bump in")`, and the latter by `'("night" "defender of the")`. Naturally, single-string `plain-seq` lists are the common case, and at least one word is required, but there is no limit to the word-list length. The strings in `plain-seq` must not contain a newline character.

The `entry-seq` list must have the same length as `plain-seq`. It provides the form of each key to render in the final document.

The `desc` field provides additional information about the index entry as supplied by the entry creator. For example, a reference to a procedure binding can be recognized when `desc` is an instance of `procedure-index-desc`. See `scribble/manual-struct` for other typical types of `desc` values.

See also `index`.

```
(struct multiarg-element (style contents)
        #:extra-constructor-name make-multiarg-element)
  style : element-style?
  contents : (listof content?)
```

Like `element` with a list for content, except that for Latex output, if the style name in `style` is a string, then it corresponds to a Latex command that accepts as many arguments (each in curly braces) as elements of `contents`.

```
(struct traverse-element (traverse)
        #:extra-constructor-name make-traverse-element)
  traverse : element-traverse-procedure/c
```

Like `traverse-block`, but the `traverse` procedure must eventually produce content, rather than a block.

See also
`cond-element` in
`scriblib/render-cond`.

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```
(struct delayed-element (resolve sizer plain)
        #:extra-constructor-name make-delayed-element)
  resolve : (any/c part? resolve-info? . -> . content?)
  sizer : (-> any/c)
  plain : (-> any/c)
```

The render procedure's arguments are the same as for delayed-block, but the result is content. Unlike delayed-block, the result of the render procedure's argument is remembered on the first call for re-use for a particular resolve pass.

The sizer field is a procedure that produces a substitute content for the delayed element for the purposes of determining the delayed element's width (see element-width).

The plain field is a procedure that produces a substitute content when needed before the collect pass, such as when element->string is used before the collect pass.

```
(struct part-relative-element (resolve sizer plain)
        #:extra-constructor-name make-part-relative-element)
  resolve : (collect-info? . -> . content?)
  sizer : (-> any/c)
  plain : (-> any/c)
```

Similar to delayed-block, but the replacement content is obtained in the collect pass by calling the function in the resolve field.

The resolve function can call collect-info-parents to obtain a list of parts that enclose the element, starting with the nearest enclosing section. Functions like part-collected-info and collected-info-number can extract information like the part number.

```
(struct collect-element element (collect)
        #:extra-constructor-name make-collect-element)
  collect : (collect-info . -> . any)
```

Like element, but the collect procedure is called during the collect pass. The collect procedure normally calls collect-put!.

Unlike delayed-element or part-relative-element, the element remains intact (i.e., it is not replaced) by either the collect pass or resolve pass.

```
(struct render-element element (render)
        #:extra-constructor-name make-render-element)
  render : (any/c part? resolve-info? . -> . any)
```

Like delayed-element, but the render procedure is called during the render pass.

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If a `render-element` instance is serialized (such as when saving collected info), it is reduced to a `element` instance.

```
(struct collected-info (number parent info)
        #:extra-constructor-name make-collected-info)
  number : (listof (or/c #f exact-nonnegative-integer? string?))
  parent : (or/c #f part?)
  info : any/c
```

Computed for each part by the collect pass.

The length of the `number` list indicates the section's nesting depth. Numbers in `number` correspond to the section's number, it's parent's number, etc. A non-empty string is used for a `'grouper` section. For an unnumbered section, `#f` is used in place of all numbers and `""` in place of all non-empty strings.

```
(struct target-url (addr)
        #:extra-constructor-name make-target-url)
  addr : path-string?
```

Used as a style property for an `element`. A path is allowed for `addr`, but a string is interpreted as a URL rather than a file path.

```
(struct document-version (text)
        #:extra-constructor-name make-document-version)
  text : (or/c string? #f)
```

Used as a style property for a `part` to indicate a version number.

```
(struct document-date (text)
        #:extra-constructor-name make-document-date)
  text : (or/c string? #f)
```

Used as a style property for a `part` to indicate a date (which is typically used for Latex output).

```
(struct color-property (color)
        #:extra-constructor-name make-color-property)
  color : (or/c string? (list/c byte? byte? byte?))
```

Used as a style property for an `element` to set its color. Recognized string names for `color` depend on the renderer, but at the recognized set includes at least `"white"`, `"black"`, `"red"`, `"green"`, `"blue"`, `"cyan"`, `"magenta"`, and `"yellow"`. When `color` is a list of bytes, the values are used as RGB levels.

When rendering to HTML, a `color-property` is also recognized for a block or `part` (and used for the title in the latter case).

```
(struct background-color-property (color)
        #:extra-constructor-name make-background-color-property)
  color : (or/c string? (list/c byte? byte? byte?))
```

Like color-property, but sets the background color.

```
(struct table-cells (styless)
        #:extra-constructor-name make-table-cells)
  styless : (listof (listof style?))
```

Used as a style property for a table to set its cells' styles.

If a cell style has a string name, it is used as an HTML class for the <td> tag or as a Latex command name.

The following symbols are recognized as cell-style properties:

- 'left — Left-align the cell content.

- 'right — Right-align the cell content top baselines.

- 'center — Center the cell content horizontally.

- 'top — Top-align the cell content.

- 'baseline — Align the cell content top baselines.

- 'bottom — bottom-align the cell content.

- 'vcenter — Center the cell content vertically.

In addition, for HTML output, attributes structures as style properties can add arbitrary attributes to a cell's <td> tag.

```
(struct table-columns (styles)
        #:extra-constructor-name make-table-columns)
  styles : (listof style?)
```

Like table-cells, but with support for a column-attributes property in each style, and the styles list is otherwise duplicated for each row in the table. The non-column-attributes parts of a table-columns are used only when a table-cells property is not present along with the table-columns property.

For HTML table rendering, for each column that has a column-attributes property in the corresponding element of styles, the attributes are put into an HTML col tag within the table.

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```
(struct box-mode (top-name center-name bottom-name)
        #:extra-constructor-name make-box-mode)
  top-name : string?
  center-name : string?
  bottom-name : string?
(box-mode* name) → box-mode?
  name : string?
```

As a style property, indicates that a nested flow or paragraph is *boxable* when it is used in a *boxing context* for Latex output, but a nested flow is boxable only if its content is also boxable.

A boxing context starts with a table cell in a multi-column table, and the content of a block in a boxing context is also in a boxing context. If the cell's content is boxable, then the content determines the width of the cell, otherwise a width is imposed. A paragraph with a #f style name is boxable as a single line; the 'wraps style name makes the paragraph non-boxable so that its width is imposed and its content can use multiple lines. A table is boxable when that all of its cell content is boxable.

To generate output in box mode, the box-mode property supplies Latex macro names to apply to the nested flow or paragraph content. The top-name macro is used if the box's top line is to be aligned with other boxes, center-name if the box's center is to be aligned, and bottom-name if the box's bottom line is to be aligned. The box-mode* function creates a box-mode structure with the same name for all three fields.

A box-mode style property overrides any automatic boxed rendering (e.g., for a paragraph with style name #f). If a block has both a box-mode style property and a 'multicommand style property, then the Latex macro top-name, center-name, or bottom-name is applied with a separate argument for each of its content.

```
(block? v) → boolean?
  v : any/c
```

Returns #t if v is a paragraph, table, itemization, nested-flow, traverse-block, or delayed-block, #f otherwise.

```
(content? v) → boolean?
  v : any/c
```

Returns #t if v is a string, symbol, element, multiarg-element, traverse-element, delayed-element, part-relative-element, a convertible value in the sense of convertible?, or list of content. Otherwise, it returns #f.

```
(struct style (name properties)
        #:extra-constructor-name make-style)
```

```
  name : (or/c string? symbol? #f)
  properties : list?
```

Represents a style.

```
plain : style?
```

A style (make-style #f null).

```
(element-style? v) → boolean?
  v : any/c
```

Returns #t if v is a string, symbol, #f, or style structure.

```
(tag? v) → boolean?
  v : any/c
```

Returns #t if v is acceptable as a link tag, which is a list containing a symbol and either a string, a generated-tag instance, or a non-empty list of serializable? values.

```
(struct generated-tag ()
        #:extra-constructor-name make-generated-tag)
```

A placeholder for a tag to be generated during the collect pass. Use tag-key to convert a tag containing a generated-tag instance to one containing a string.

```
(content->string content) → string?
  content : content?
(content->string content renderer p info) → string?
  content : content?
  renderer : any/c
  p : part?
  info : resolve-info?
```

Converts content to a single string (essentially rendering the content as "plain text").

If p and info arguments are not supplied, then a pre-"collect" substitute is obtained for delayed elements. Otherwise, the two arguments are used to force the delayed element (if it has not been forced already).

```
(content-width c) → exact-nonnegative-integer?
  c : content?
```

Returns the width in characters of the given content.

```
(block-width e) → exact-nonnegative-integer?
  e : block?
```

Returns the width in characters of the given block.

```
(struct collect-info (ht
                      ext-ht
                      ext-demand
                      parts
                      tags
                      gen-prefix
                      relatives
                      parents)
        #:extra-constructor-name make-collect-info)
  ht : any/c
  ext-ht : any/c
  ext-demand : (tag? collect-info? . -> . any/c)
  parts : any/c
  tags : any/c
  gen-prefix : any/c
  relatives : any/c
  parents : (listof part?)
```

Encapsulates information accumulated (or being accumulated) from the collect pass. The fields are exposed, but not currently intended for external use, except that `collect-info-parents` is intended for external use.

```
(struct resolve-info (ci delays undef)
        #:extra-constructor-name make-resolve-info)
  ci : any/c
  delays : any/c
  undef : any/c
```

Encapsulates information accumulated (or being accumulated) from the resolve pass. The fields are exposed, but not currently intended for external use.

```
(info-key? v) → boolean?
  v : any/c
```

Returns `#t` if *v* is an *info key*: a list of at least two elements whose first element is a symbol. The result is `#f` otherwise.

For a list that is an info tag, the interpretation of the second element of the list is effectively determined by the leading symbol, which classifies the key. However, a `#f` value as the

```

second element has an extra meaning: collected information mapped by such info keys is not propagated out of the part where it is collected; that is, the information is available within the part and its sub-parts, but not in ancestor or sibling parts.

Note that every tag is an info key.

```
(collect-put! ci key val) → void?
  ci : collect-info?
  key : info-key?
  val : any/c
```

Registers information in `ci`. This procedure should be called only during the collect pass.

```
(resolve-get p ri key) → any/c
  p : (or/c part? #f)
  ri : resolve-info?
  key : info-key?
```

Extract information during the resolve pass or render pass for `p` from `ri`, where the information was previously registered during the collect pass. See also §7.3.4 "Collected and Resolved Information".

The result is `#f` if the no value for the given key is found. Furthermore, the search failure is recorded for potential consistency reporting, such as when `racket setup` is used to build documentation.

```
(resolve-get/ext? p ri key) → any/c boolean?
  p : (or/c part? #f)
  ri : resolve-info?
  key : info-key?
```

Like `render-get`, but returns a second value to indicate whether the resulting information originated from an external source (i.e., a different document).

```
(resolve-search dep-key p ri key) → void?
  dep-key : any/c
  p : (or/c part? #f)
  ri : resolve-info?
  key : info-key?
```

Like `resolve-get`, but a shared `dep-key` groups multiple searches as a single request for the purposes of consistency reporting and dependency tracking. That is, a single success for the same `dep-key` means that all of the failed attempts for the same `dep-key` have been satisfied. However, for dependency checking, such as when using `racket setup` to re-build documentation, all attempts are recorded (in case external changes mean that an earlier attempt would succeed next time).

```
(resolve-get/tentative p ri key) → any/c
  p : (or/c part? #f)
  ri : resolve-info?
  key : info-key?
```

Like `resolve-search`, but without dependency tracking. For multi-document settings where dependencies are normally tracked, such as when using `racket setup` to build documentation, this function is suitable for use only for information within a single document.

```
(resolve-get-keys p ri pred) → list?
  p : (or/c part? #f)
  ri : resolve-info?
  pred : (info-key? . -> . any/c)
```

Applies *pred* to each key mapped for *p* in *ri*, returning a list of all keys for which *pred* returns a true value.

```
(part-collected-info p ri) → collected-info?
  p : part?
  ri : resolve-info?
```

Returns the information collected for *p* as recorded within *ri*.

```
(tag-key t ri) → tag?
  t : tag?
  ri : resolve-info?
```

Converts a `generated-tag` value with *t* to a string.

```
(traverse-block-block b i) → block?
  b : traverse-block?
  i : (or/c resolve-info? collect-info?)
```

Produces the block that replaces *b*.

```
(traverse-element-content e i) → content?
  e : traverse-element?
  i : (or/c resolve-info? collect-info?)
```

Produces the content that replaces *e*.

```
block-traverse-procedure/c : contract?
```

Defined as

```
(recursive-contract
 ((symbol? any/c . -> . any/c)
  (symbol? any/c . -> . any)
  . -> . (or/c block-traverse-procedure/c
               block?)))
```

element-traverse-procedure/c : contract?

Defined as

```
(recursive-contract
 ((symbol? any/c . -> . any/c)
  (symbol? any/c . -> . any)
  . -> . (or/c element-traverse-procedure/c
               content?)))
```

7.3.6 HTML Style Properties

```
(require scribble/html-properties)
                    package: scribble-lib
```

The scribble/html-properties library provides datatypes used as style properties for HTML rendering.

```
(struct attributes (assoc)
        #:extra-constructor-name make-attributes)
  assoc : (listof (cons/c symbol? string?))
```

Used as a style property to add arbitrary attributes to an HTML tag.

```
(struct alt-tag (name)
        #:extra-constructor-name make-alt-tag)
  name : (and/c string? #rx"^[a-zA-Z0-9]+$")
```

Use as a style property for an element, paragraph, or compound-paragraph to substitute an alternate HTML tag (instead of <span>, <p>, div, etc.).

```
(struct column-attributes (assoc)
        #:extra-constructor-name make-column-attributes)
  assoc : (listof (cons/c symbol? string?))
```

Used as a style property on a style with table-columns to add arbitrary attributes to an HTML col tag within the table.

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```
(struct url-anchor (name)
        #:extra-constructor-name make-url-anchor)
  name : string?
```

Used as a style property with `element` to insert an anchor before the element.

```
(struct hover-property (text)
        #:extra-constructor-name make-hover-property)
  text : string?
```

Used as a style property with `element` to add text that is shown when the mouse hovers over the element.

```
(struct script-property (type script)
        #:extra-constructor-name make-script-property)
  type : string?
  script : (or/c path-string? (listof string?))
```

Used as a style property with `element` to supply a script alternative to the element content.

```
(struct css-addition (path)
        #:extra-constructor-name make-css-addition)
         (or/c path-string?
                (cons/c 'collects (listof bytes?))
  path :
                url?
                bytes?)
```

Used as a style property to supply a CSS file (if `path` is a path, string, or list), URL (if `path` is a `url`) or content (if `path` is a byte string) to be referenced or included in the generated HTML. This property can be attached to any style, and all additions are collected to the top of the generated HTML page.

The `path` field can be a result of `path->main-collects-relative`.

```
(struct css-style-addition (path)
        #:extra-constructor-name make-css-style-addition)
         (or/c path-string?
                (cons/c 'collects (listof bytes?))
  path :
                url?
                bytes?)
```

Like `css-addition`, but added after any style files that are specified by a document and before any style files that are provided externally.

```
(struct js-addition (path)
        #:extra-constructor-name make-js-addition)
         (or/c path-string?
               (cons/c 'collects (listof bytes?))
  path :        url?
               bytes?)
```

Like `css-addition`, but for a JavaScript file instead of a CSS file.

```
(struct js-style-addition (path)
        #:extra-constructor-name make-js-style-addition)
         (or/c path-string?
               (cons/c 'collects (listof bytes?))
  path :        url?
               bytes?)
```

Like `css-style-addition`, but for a JavaScript file instead of a CSS file.

```
(struct body-id (value)
        #:extra-constructor-name make-body-id)
  value : string?
```

Used as a style property to associate an `id` attribute with an HTML tag.

```
(struct html-defaults (prefix style extra-files)
        #:extra-constructor-name make-html-defaults)
           (or/c bytes? path-string?
  prefix :        (cons/c 'collects (listof bytes?)))
           (or/c bytes? path-string?
  style :         (cons/c 'collects (listof bytes?)))
                (listof (or/c path-string?
  extra-files :            (cons/c 'collects (listof bytes?))))
```

Like `latex-defaults`, but use for the `scribble` command-line tool's `--html` and `--htmls` modes.

```
(struct head-extra (xexpr)
        #:extra-constructor-name make-head-extra)
  xexpr : xexpr/c
```

For a `part` that corresponds to an HTML page, adds content to the `<head>` tag.

```
(struct render-convertible-as (types)
        #:extra-constructor-name make-render-convertible-as)
  types : (listof (or/c 'png-bytes 'svg-bytes))
```

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For a `part` that corresponds to an HTML page, controls how objects that subscribe to the `file/convertible` protocol are rendered.

The alternatives in the `types` field are tried in order and the first one that succeeds is used in the html output.

```
(struct part-link-redirect (url)
        #:extra-constructor-name make-part-link-redirect)
  url : url?
```

As a style property on a part, causes hyperiinks to the part to be redirected to `url` instead of the rendered part.

```
(struct link-resource (path)
        #:extra-constructor-name make-link-resource)
  path : path-string?
```

As a style property on an `element`, causes the elements to be rendered as a hyperlink to (a copy of) `path`.

The file indicated by `path` is referenced in place when `render<%>` is instantiated with `refer-to-existing-files` as true. Otherwise, it is copied to the destination directory and potentially renamed to avoid conflicts.

```
(struct install-resource (path)
        #:extra-constructor-name make-install-resource)
  path : path-string?
```

Like `link-resource`, but makes `path` accessible in the destination without rendering a hyperlink.

This style property is useful only when `render<%>` is instantiated with `refer-to-existing-files` as `#f`, and only when `path` does not match then name of any other file that is copied by the renderer to the destination.

7.3.7 Latex Style Properties

```
(require scribble/latex-properties)
                     package: scribble-lib
```

The `scribble/latex-properties` library provides datatypes used as style properties for Latex rendering.

```
(struct tex-addition (path)
        #:extra-constructor-name make-tex-addition)
```

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```
          (or/c path-string?
  path :        (cons/c 'collects (listof bytes?))
                bytes?)
```

Used as a style property to supply a ".tex" file (if `path` is a path, string, or list) or content (if `path` is a byte string) to be included in the generated Latex. This property can be attached to any style, and all additions are collected to the top of the generated Latex file.

The `path` field can be a result of `path->main-collects-relative`.

```
(struct latex-defaults (prefix style extra-files)
        #:extra-constructor-name make-latex-defaults)
  prefix :  (or/c bytes? path-string?
                  (cons/c 'collects (listof bytes?)))
  style :  (or/c bytes? path-string?
                 (cons/c 'collects (listof bytes?)))
  extra-files :  (listof (or/c path-string?
                               (cons/c 'collects (listof bytes?))))
```

Used as a style property on the main `part` of a document to set a default prefix file, style file, and extra files (see §7.10.2 "Configuring Output"). The defaults are used by the `scribble` command-line tool for and `--latex` or `--pdf` mode if none are supplied via `--prefix` and `--style` (where `extra-files` are used only when `prefix` is used). A byte-string value is used directly like file content, and a path can be a result of `path->main-collects-relative`.

Languages (used with `#lang`) like `scribble/manual` and `scribble/sigplan` add this property to a document to specify appropriate files for Latex rendering.

See also `scribble/latex-prefix`.

```
(struct command-extras (arguments)
        #:extra-constructor-name make-command-extras)
  arguments : (listof string?)
```

Used as a style property on an `element` to add extra arguments to the element's command in Latex output.

7.4 Renderers

A renderer is an object that provides four main methods: `traverse`, `collect`, `resolve`, and `render`. Each method corresponds to a pass described in §7.3 "Structures And Processing", and they are chained together by the `render` function to render a document.

7.4.1 Rendering Driver

(require scribble/render)   package: scribble-lib

```
(render docs
        names
        [#:render-mixin render-mixin
         #:dest-dir dest-dir
         #:helper-file-prefix helper-file-prefix
         #:prefix-file prefix-file
         #:style-file style-file
         #:style-extra-files style-extra-files
         #:extra-files extra-files
         #:xrefs xrefs
         #:info-in-files info-in-files
         #:info-out-file info-out-file
         #:redirect redirect
         #:redirect-main redirect-main
         #:directory-depth directory-depth
         #:quiet? quiet?
         #:warn-undefined? warn-undefined?])       → void?
  docs : (listof part?)
  names : (listof path-string?)
  render-mixin : (class? . -> . class?) = render-mixin
  dest-dir : (or/c #f path-string?) = #f
  helper-file-prefix : (or/c #f string?) = #f
  prefix-file : (or/c #f path-string?) = #f
  style-file : (or/c #f path-string?) = #f
  style-extra-files : (listof path-string?) = #f
  extra-files : (listof path-string?) = #f
  xrefs : (listof xref?) = null
  info-in-files : (listof path-string?) = null
  info-out-file : (or/c #f path-string?) = #f
  redirect : (or/c #f string?) = #f
  redirect-main : (or/c #f string?) = #f
  directory-depth : exact-nonnegative-integer? = 0
  quiet? : any/c = #t
  warn-undefined? : any/c = (not quiet?)
```

Renders the given *docs*, each with an output name derived from the corresponding element of *names*. A directory path (if any) for a name in *names* is discarded, and the file suffix is replaced (if any) with a suitable suffix for the output format.

The *render-mixin* argument determines the output format. By default, it is render-mixin from scribble/html-render.

The `dest-dir` argument determines the output directory, which is created using `make-directory*` if it is non-`#f` and does not exist already.

The `helper-file-prefix`, `prefix-file`, `style-file`, `style-extra-files`, and `extra-files` arguments are passed on to the `render%` constructor.

The `xrefs` argument provides extra cross-reference information to be used during the documents' resolve pass. The `info-in-files` arguments supply additional cross-reference information in serialized form. When the `info-out-file` argument is not `#f`, cross-reference information for the rendered documents is written in serialized for to the specified file.

The `redirect` and `redirect-main` arguments correspond to the `set-external-tag-path` and `set-external-root-url` methods of `render-mixin` from `scribble/html-render`, so they should be non-`#f` only for HTML rendering.

The `directory-depth` arguments correspond to the `set-directory-depth` method of `render-multi-mixin`.

If `quiet?` is a false value, output-file information is written to the current output port.

If `warn-undefined?` is a true value, then references to missing cross-reference targets trigger a warning message on the current error port.

7.4.2 Base Renderer

```
(require scribble/base-render)        package: scribble-lib
```

The `scribble/base-render` module provides `render%`, which implements the core of a renderer. This rendering class must be refined with a mixin from `scribble/text-render`, `scribble/markdown-render`, or `scribble/html-render`, or `scribble/latex-render`.

The mixin structure is meant to support document-specific extensions to the renderers. For example, the `scribble` command-line tool might, in the future, extract rendering mixins from a document module (in addition to the document proper).

See the `"base-render.rkt"` source for more information about the methods of the renderer. Documents built with higher layers, such as `scribble/manual`, generally do not call the render object's methods directly.

```
render<%> : interface?
```

```
(send a-render traverse srcs dests) → (and/c hash? immutable?)
  srcs : (listof part?)
  dests : (listof path-string?)
```

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Performs the traverse pass, producing a hash table that contains the replacements for and `traverse-block`s and `traverse-elements`s. See `render` for information on the *dests* argument.

```
(send a-render collect srcs dests fp [demand]) → collect-
info?
  srcs : (listof part?)
  dests : (listof path-string?)
  fp : (and/c hash? immutable?)
  demand : (tag? collect-info? . -> . any/c)
         = (lambda (tag ci) #f)
```

Performs the collect pass. See `render` for information on the *dests* arguments. The *fp* argument is a result from the `traverse` method.

The *demand* argument supplies external tag mappings on demand. When the `collect-info` result is later used to find a mapping for a tag and no mapping is already available, *demand* is called with the tag and the `collect-info`. The *demand* function returns true to indicate when it adds information to the `collect-info` so that the lookup should be tried again; the *demand* function should return `#f` if it does not extend `collect-info`.

```
(send a-render resolve srcs dests ci) → resolve-info?
  srcs : (listof part?)
  dests : (listof path-string?)
  ci : collect-info?
```

Performs the resolve pass. See `render` for information on the *dests* argument. The *ci* argument is a result from the `collect` method.

```
(send a-render render srcs dests ri) → void?
  srcs : (listof part?)
  dests : (listof path-string?)
  ri : resolve-info?
```

Produces the final output. The *ri* argument is a result from the `render` method.

The *dests* provide names of files for Latex or single-file HTML output, or names of sub-directories for multi-file HTML output. If the *dests* are relative, they're relative to the current directory; normally, they should indicates a path within the *dest-dir* supplied on initialization of the `render%` object.

```
(send a-render serialize-info ri) → any/c
  ri : resolve-info?
```

Serializes the collected info in *ri*.

```
(send a-render serialize-infos ri count doc) → list?
  ri : resolve-info?
  count : exact-positive-integer?
  doc : part?
```

Like `serialize-info`, but produces *count* results that together have the same information as produced by `serialize-info`. The structure of *doc* is used to drive the partitioning (on the assumption that *ri* is derived from *doc*).

```
(send a-render deserialize-info  v
                                 ci
                                 [#:root root-path]) → void?
  v : any/c
  ci : collect-info?
  root-path : (or/c path-string? false/c) = #f
```

Adds the deserialized form of *v* to *ci*.

If *root-path* is not `#f`, then file paths that are recorded in *ci* as relative to an instantiation-supplied *root-path* are deserialized as relative instead to the given *root-path*.

```
(send a-render get-defined ci) → (listof tag?)
  ci : collect-info?
```

Returns a list of tags that were defined within the documents represented by *ci*.

```
(send a-render get-defineds ci count doc)
 → (listof (listof tag?))
  ci : collect-info?
  count : exact-positive-integer?
  doc : part?
```

Analogous to `serialize-infos`: returns a list of tags for each of *count* partitions of the result of `get-defined`, using the structure of *doc* to drive the partitioning.

```
(send a-render get-external ri) → (listof tag?)
  ri : resolve-info?
```

Returns a list of tags that were referenced but not defined within the documents represented by *ri* (though possibly found in cross-reference information transferred to *ri* via `xref-transfer-info`).

```
(send a-render get-undefined ri) → (listof tag?)
  ri : resolve-info?
```

Returns a list of tags that were referenced by the resolved documents with no target found either in the resolved documents represented by *ri* or cross-reference information transferred to *ri* via `xref-transfer-info`.

If multiple tags were referenced via `resolve-search` and a target was found for any of the tags using the same dependency key, then no tag in the set is included in the list of undefined tags.

```
render% : class?
  superclass: object%
  extends: render<%>
```

Represents a renderer.

```
(new render%
    [dest-dir dest-dir]
   [[refer-to-existing-files refer-to-existing-files]
    [root-path root-path]
    [prefix-file prefix-file]
    [style-file style-file]
    [style-extra-files style-extra-files]
    [extra-files extra-files]])
→ (is-a?/c render%)
 dest-dir : path-string?
 refer-to-existing-files : any/c = #f
 root-path : (or/c path-string? #f) = #f
 prefix-file : (or/c path-string? #f) = #f
 style-file : (or/c path-string? #f) = #f
 style-extra-files : (listof path-string?) = null
 extra-files : (listof path-string?) = null
```

Creates a renderer whose output will go to *dest-dir*. For example, *dest-dir* could name the directory containing the output Latex file, the HTML file for a single-file output, or the output sub-directory for multi-file HTML output.

If *refer-to-existing-files* is true, then when a document refers to external files, such as an image or a style file, then the file is referenced from its source location instead of copied to the document destination.

If *root-path* is not #f, it is normally the same as *dest-dir* or a parent of *dest-dir*. It causes cross-reference information to record destination files relative to *root-path*; when cross-reference information is serialized, it can be deserialized via deserialize-info with a different root path (indicating that the destination files have moved).

The *prefix-file*, *style-file*, and *style-extra-files* arguments set files that control output styles in a formal-specific way; see §7.10.2 "Configuring Output" for more information.

The *extra-files* argument names files to be copied to the output location, such as image files or extra configuration files.

7.4.3 Text Renderer

```
(require scribble/text-render)        package: scribble-lib
```

```
render-mixin : (class? . -> . class?)
  argument extends/implements: render<%>
```

Specializes a render<%> class for generating plain text.

7.4.4 Markdown Renderer

```
(require scribble/markdown-render)
                        package: scribble-lib
```

```
render-mixin : (class? . -> . class?)
  argument extends/implements: render<%>
```

Specializes a render<%> class for generating Markdown text.

Code blocks are marked using the Github convention

```
```racket
```

so that they are lexed and formatted as Racket code.

7.4.5 HTML Renderer

```
(require scribble/html-render)      package: scribble-lib
```

```
render-mixin : (class? . -> . class?)
  argument extends/implements: render<%>
```

Specializes a render<%> class for generating HTML output.

```
(send a-render set-external-tag-path url) → void?
  url : string?
```

> Configures the renderer to redirect links to external via url, adding a tag query
> element to the end of the URL that contains the Base64-encoded, printed,
> serialized original tag (in the sense of link-element) for the link.

```
(send a-render set-external-root-url url) → void?
  url : string?
```

Configures the renderer to redirect links to documents installed in the distribution's documentation directory to the given URL, using the URL as a replacement to the path of the distribution's document directory.

```
render-multi-mixin : (class? . -> . class?)
  argument extends/implements: render<%>
```

Further specializes a rendering class produced by `render-mixin` for generating multiple HTML files.

```
(send a-render-multi set-directory-depth depth) → void?
  depth : exact-nonnegative-integer?
```

Sets the depth of directory structure used when rendering parts that are own their own pages. A value of `0` is treated the same as `1`.

7.4.6   Latex Renderer

```
(require scribble/latex-render)       package: scribble-lib
```

```
render-mixin : (class? . -> . class?)
  argument extends/implements: render<%>
```

Specializes a `render<%>` class for generating Latex input.

7.4.7   PDF Renderer

```
(require scribble/pdf-render)       package: scribble-lib
```

```
render-mixin : (class? . -> . class?)
  argument extends/implements: render<%>
```

Specializes a `render<%>` class for generating PDF output via Latex, building on `render-mixin` from `scribble/latex-render`.

7.4.8   Contract (Blue boxes) Renderer

```
(require scribble/contract-render)
```

`override-render-mixin-multi` : `(class? . -> . class?)`
    argument extends/implements: `render<%>`

Overrides the `render` method of given renderer to record the content of the blue boxes (generated by `defproc`, `defform`, etc) that appear in the document.

```
(send an-override-render-mixin-multi render srcs
                                             dests
                                             ri)   → void?
  srcs : (listof part?)
  dests : (listof path?)
  ri : render-info?
```

> Overrides `render` in `render<%>`.
>
> In addition to doing whatever the `super` method does, also save the content of the blue boxes (rendered via a `scribble/text-render` renderer).
>
> It saves this information in three pieces in a file inside the *dests* directories called `"blueboxes.rktd"`. The first piece is a single line containing a (decimal, ASCII) number. That number is the number of bytes that the second piece of information occupies in the file. The second piece of information is a `hash` that maps `tag?` values to a list of offsets and line numbers that follow the hash table. For example, if the `hash` maps `'(def ((lib "x/main.rkt") abcdef))` to `'((10 . 3))`, then that means that the documentation for the `abcdef` export from the `x` collection starts 10 bytes after the end of the hash table and continues for `3` lines. Multiple elements in the list mean that that `tag?` has multiple blue boxes and each shows where one of the boxes appears in the file.

`override-render-mixin-single` : `(class? . -> . class?)`
    argument extends/implements: `render<%>`

Just like `override-render-mixin-multi`, except it saves the resulting files in a different place.

```
(send an-override-render-mixin-single render srcs
                                              dests
                                              ri)   → void?
  srcs : (listof part?)
  dests : (listof path?)
  ri : render-info?
```

> Overrides `render` in `render<%>`.

Just like `render`, except that it saves the file `"blueboxes.rktd"` in the same directory where each *dests* element resides.

7.5 Decoding Text

```
(require scribble/decode)        package: scribble-lib
```

The `scribble/decode` library helps you write document content in a natural way—more like plain text, except for `@` escapes. Roughly, it processes a stream of strings to produces instances of the `scribble/struct` datatypes (see §4.8.1 "Compatibility Structures And Processing").

At the flow level, decoding recognizes a blank line as a paragraph separator. Blocks and paragraphs without blank lines in between are collected into a compound paragraph.

At the content level, decoding makes just a few special text conversions:

- `---`: converted to `'mdash`

- `--`: converted to `'ndash`

- `` `` ``: converted to `'ldquo`, which is fancy open quotes: "

- `''`: converted to `'rdquo`, which is fancy closing quotes: "

- `'`: converted to `'rsquo`, which is a fancy apostrophe: '

- `` ` ``: converted to `'lsquo`, which is a fancy quote: '

Some functions *decode* a sequence of *pre-flow* or *pre-content* arguments using `decode-flow` or `decode-content`, respectively. For example, the `bold` function accepts any number of *pre-content* arguments, so that in

```
@bold{``apple''}
```

the `` ``apple'' `` argument is decoded to use fancy quotes, and then it is bolded.

```
(pre-content? v) → boolean?
  v : any/c
```

Returns `#t` if *v* is a *pre-content* value: a string or other non-list content, a list of pre-content values, or a `splice` containing a list of pre-content values; otherwise returns `#f`.

Pre-content is decoded into content by functions like `decode-content` and `decode-paragraph`.

```
(pre-flow? v) → boolean?
  v : any/c
```

Returns #t if *v* is a *pre-flow* value: a string or other non-list content, a block, #<void>, a list of pre-flow values, or a splice containing a list of pre-flow values; otherwise returns #f.

Pre-flow is decoded into a flow (i.e., a list of blocks) by functions like decode-flow.

```
(pre-part? v) → boolean?
  v : any/c
```

Returns #t if *v* is a *pre-part* value: a string or other non-list content, a block, a part, a title-decl, a part-start, a part-index-decl, a part-collect-decl, a part-tag-decl, #<void>, a list of pre-part values, or a splice containing a list of pre-part values; otherwise returns #f.

A pre-part sequence is decoded into a part by functions like decode and decode-part.

```
(decode lst) → part?
  lst : (listof pre-part?)
```

Decodes a document, producing a part. In *lst*, lists and instances of splice are inlined into the list, and #<void>s are dropped. An instance of title-decl supplies the title for the part, plus tag, style and version information. Instances of part-index-decl (that precede any sub-part) add index entries that point to the section. Instances of part-collect-decl add elements to the part that are used only during the collect pass. Instances of part-tag-decl add hyperlink tags to the section title. Instances of part-start at level 0 trigger sub-part parsing. Instances of section trigger are used as-is as subsections, and instances of paragraph and other flow-element datatypes are used as-is in the enclosing flow.

Portions of *lst* are within a part are decoded using decode-flow.

```
(decode-part lst tags title depth) → part?
  lst : (listof pre-part?)
  tags : (listof string?)
  title : (or/c #f list?)
  depth : exact-nonnegative-integer?
```

Like decode, but given a list of tag string for the part, a title (if #f, then a title-decl instance is used if found), and a depth for part-starts to trigger sub-part parsing.

```
(decode-flow lst) → (listof block?)
  lst : (listof pre-flow?)
```

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Decodes a flow. In `lst`, lists and instances of `splice` are inlined into the list. A sequence of two or more newlines separated only by whitespace is parsed as a compound-paragraph separator.

Portions of `lst` are within a compound paragraph are decoded using `decode-compound-paragraph`.

```
(decode-compound-paragraph lst) → block?
  lst : (listof pre-flow?)
```

Decodes a compound paragraph. In `lst`, lists and instances of `splice` are inlined into the list. Instances of `paragraph` and other block datatypes are used as-is in the result. If the compound paragraph contains a single block, the block is returned without a `compound-paragraph` wrapper.

Portions of `lst` that are separated by blocks are decoded using `decode-content`.

```
(decode-paragraph lst) → paragraph?
  lst : (listof pre-content?)
```

Decodes a paragraph using `decode-content` to decode `lst` as the paragraph's content.

```
(decode-content lst) → list?
  lst : (listof pre-content?)
```

Decodes content. Lists and splices in `lst` are flattened into the list. Plain strings are decoded; non-string, non-list content is included in the result as-is.

```
(decode-elements lst) → list?
  lst : (listof pre-content?)
```

An alias for `decode-content`.

```
(decode-string s) → (listof content?)
  s : string?
```

Decodes a single string to produce content.

```
(whitespace? s) → boolean?
  s : string?
```

Returns `#t` if `s` contains only whitespace, `#f` otherwise.

```
(struct title-decl (tag-prefix tags version style content)
        #:extra-constructor-name make-title-decl)
```

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```
  tag-prefix : (or/c #f string?)
  tags : (listof string?)
  version : (or/c string? #f)
  style : style?
  content : content?
```

See `decode` and `decode-part`. The `tag-prefix` and `style` fields are propagated to the resulting `part`. If the `version` field is not `#f`, it is propagated as a `document-version` style property on the `part`.

```
(struct part-start (depth tag-prefix tags style title)
          #:extra-constructor-name make-part-start)
  depth : integer?
  tag-prefix : (or/c #f string?)
  tags : (listof string?)
  style : style?
  title : content?
```

Like `title-decl`, but for a sub-part. See `decode` and `decode-part`.

```
(struct part-index-decl (plain-seq entry-seq)
          #:extra-constructor-name make-part-index-decl)
  plain-seq : (listof string?)
  entry-seq : list?
```

See `decode`. The two fields are as for `index-element`.

```
(struct part-collect-decl (element)
          #:extra-constructor-name make-part-collect-decl)
  element : (or/c element? part-relative-element?)
```

See `decode`.

```
(struct part-tag-decl (tag)
          #:extra-constructor-name make-part-tag-decl)
  tag : tag?
```

See `decode`.

```
(struct splice (run)
          #:extra-constructor-name make-splice)
  run : list?
```

See `decode`, `decode-part`, and `decode-flow`.

```
(spliceof ctc) → flat-contract?
  ctc : flat-contract?
```

Produces a contract for a `splice` instance whose `run` elements satisfy `ctc`.

```
(clean-up-index-string str) → string?
  str : string?
```

Trims leading and trailing whitespace, and converts non-empty sequences of whitespace to a single space character.

7.6   Document Language

```
 #lang scribble/doclang2        package: scribble-lib
```

The `scribble/doclang2` language provides everything from `racket/base`, except that it replaces the `#%module-begin` form.

The `scribble/doclang2` `#%module-begin` essentially packages the body of the module into a call to `decode`, binds the result to `doc`, and exports `doc`.

Any module-level form other than an expression (e.g., a `require` or `define`) remains at the top level, and the `doc` binding is put at the end of the module. As usual, a module-top-level `begin` slices into the module top level.

For example:

```
#lang racket
(module example scribble/doclang2
  "hello world, this is"
  " an example document")
(require 'example)
doc
```

The behavior of `scribble/doclang2` can be customized by providing `#:id`, `#:post-process`, and `#:exprs` arguments at the very beginning of the module.

- `#:id` names the top-level documentation binding. By default, this is `doc`.

- `#:post-process` processes the body of the module after `decode`. By default, this is `values`.

- `#:exprs` prepends an additional sequence of expressions to the beginning of the module's body. By default, this is the empty sequence `()`.

This example explicitly uses the defaults for all three keywords:

```
#lang racket
(module example scribble/doclang2
  #:id doc
  #:post-process values
  #:exprs ()
  "hello world, this is an example document")
(require 'example)
doc
```

The next toy example uses a different name for the documentation binding, and also adds an additional binding with a count of the parts in the document:

```
#lang racket
(module example scribble/doclang2
  #:id documentation
  #:post-process (lambda (decoded-doc)
                    (set! number-of-parts (length (part-
parts decoded-doc)))
                    decoded-doc)
  #:exprs ((title "My first expression!"))

  (require scribble/core
           scribble/base)

  (define number-of-parts #f)
  (provide number-of-parts)
  (section "part 1")
  "hello world"
  (section "part 2")
  "this is another document")

(require 'example)
number-of-parts
documentation
```

7.6.1 scribble/doclang

```
#lang scribble/doclang        package: scribble-lib
```

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The `scribble/doclang` language provides the same functionality as `scribble/doclang2`, where the configuration options are positional and mandatory. The first three elements in the `#%module-begin`'s body must be the `id`, `post-process`, and `exprs` arguments.

Example:

```
#lang racket
(module* example scribble/doclang
  doc
  values
  ()
  (require scribble/base)
  (provide (all-defined-out))
  (define foo (para "hello again"))
  "hello world, this is an example document"
  (para "note the " (bold "structure")))

(module+ main
  (require (submod ".." example))
  (printf "I see doc is: ~s\n\n" doc)
  (printf "I see foo is: ~s" foo))
```

7.7   Document Reader

`#lang scribble/doc`   package: `at-exp-lib`

The `scribble/doc` language is the same as `scribble/doclang`, except that `read-syntax-inside` is used to read the body of the module. In other words, the module body starts in Scribble "text" mode instead of S-expression mode.

7.8   Cross-Reference Utilities

`(require scribble/xref)`   package: `scribble-lib`

The `scribble/xref` library provides utilities for querying cross-reference information that was collected from a document build.

```
(xref? v) → boolean?
  v : any/c
```

Returns `#t` if *v* is a cross-reference record created by `load-xref`, `#f` otherwise.

```
(load-xref  sources
            [#:demand-source demand-source
             #:render% using-render%
             #:root root-path])                    → xref?
  sources : (listof (-> (or/c any/c (-> list?))))
  demand-source : (tag? -> (or/c (-> any/c) #f))
                = (lambda (tag) #f)
  using-render% : (implementation?/c render<%>)
                = (render-mixin render%)
  root-path : (or/c path-string? false/c) = #f
```

Creates a cross-reference record given a list of functions, *sources*.

Let *source* be a function in *sources*. The *source* function normally returns serialized information, *info*, which was formerly obtained from `serialize-info` in `render<%>`. The result of *source* can optionally be another function, which is in turn responsible for returning a list of *info*s. Finally, each *info* can be either serialized information, a `#f` to be ignored, or a value produced by `make-data+root` from which *data* part is used as serialized information and the *root* part overrides *root-path* for deserialization.

The *demand-source* function can effectively add a new source to *sources* in response to a search for information on the given tag. The *demand-source* function returns `#f` to indicate that no new sources satisfy the given tag.

Since the format of serialized information is specific to a rendering class, the optional *using-render%* argument accepts the relevant class. It defaults to HTML rendering, partly because HTML-format information is usable by other formats (including Latex/PDF and text).

If *root-path* is not `#f`, then file paths that are serialized as relative to an instantiation-supplied *root-path* are deserialized as relative instead to the given *root-path*, but a `make-data+root` result for any *info* supplies an alternate path for deserialization of the *info*'s *data*.

Use `load-collections-xref` from `setup/xref` to get all cross-reference information for installed documentation.

```
(xref-binding->definition-tag xref
                              binding
                              mode)    → (or/c tag? false/c)
  xref : xref?
```

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```
              (or/c identifier?
                    (list/c (or/c module-path?
                                  module-path-index?)
                            symbol?)
                    (listof module-path-index?
  binding :                 symbol?
                            module-path-index?
                            symbol?
                            (one-of/c 0 1)
                            (or/c exact-integer? false/c)
                            (or/c exact-integer? false/c)))
  mode : (or/c exact-integer? false/c)
```

Locates a tag in *xref* that documents a module export. The binding is specified in one of several ways, as described below; all possibilities encode an exporting module and a symbolic name. The name must be exported from the specified module. Documentation is found either for the specified module or, if the exported name is re-exported from other other module, for the other module (transitively).

The `mode` argument specifies the relevant phase level for the binding. The `binding` is specified in one of four ways:

- If `binding` is an identifier, then `identifier-binding` is used with `mode` to determine the binding.

- If `binding` is a two-element list, then the first element provides the exporting module and the second the exported name. The `mode` argument is effectively ignored.

- If `binding` is a seven-element list, then it corresponds to a result from `identifier-binding` using `mode`.

- If `binding` is a five-element list, then the first element is as for the two-element-list case, and the remain elements are as in the last four elements of the seven-element case.

If a documentation point exists in *xref*, a tag is returned, which might be used with `xref-tag->path+anchor` or embedded in a document rendered via `xref-render`. If no definition point is found in *xref*, the result is `#f`.

```
(xref-tag->path+anchor  xref
                        tag
                        [#:external-root-url root-url
                         #:render% using-render%])
 →  (or/c false/c path?)
    (or/c false/c string?)
  xref : xref?
```

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```
  tag : tag?
  root-url : (or/c string? #f) = #f
  using-render% : (implementation?/c render<%>)
              = (render-mixin render%)
```

Returns a path and anchor string designated by the key *tag* according the cross-reference *xref*. The first result is #f if no mapping is found for the given tag. The second result is #f if the first result is #f, and it can also be #f if the tag refers to a page rather than a specific point in a page.

If *root-url* is provided, then references to documentation in the main installation are redirected to the given URL.

The optional *using-render%* argument is as for `load-xref`.

```
(xref-tag->index-entry xref tag) → (or/c false/c entry?)
  xref : xref?
  tag : tag?
```

Extract an `entry` structure that provides addition information about the definition (of any) referenced by *tag*. This function can be composed with `xref-binding->definition-tag` to obtain information about a binding, such as the library that exports the binding and its original name.

```
(xref-render  xref
              doc
              dest
            [#:render% using-render%
             #:refer-to-existing-files? use-existing?])
 → (or/c void? any/c)
  xref : xref?
  doc : part?
  dest : (or/c path-string? false/c)
  using-render% : (implemenation?/c render<%>)
              = (render-mixin render%)
  use-existing? : any/c = (not dest)
```

Renders *doc* using the cross-reference info in *xref* to the destination *dest*. For example, *doc* might be a generated document of search results using link tags described in *xref*.

If *dest* is #f, no file is written, and the result is an X-expression for the rendered page. Otherwise, the file *dest* is written and the result is #<void>.

The optional *using-render%* argument is as for `load-xref`. It determines the kind of output that is generated.

If *use-existing?* is true, then files referenced during rendering (such as image files) are referenced from their existing locations, instead of copying to the directory of *dest*.

```
(xref-transfer-info renderer ci xref) → void?
  renderer : (is-a?/c render<%>)
  ci : collect-info?
  xref : xref?
```

Transfers cross-reference information to *ci*, which is the initially collected information from *renderer*.

```
(xref-index xref) → (listof entry?)
  xref : xref?
```

Converts indexing information *xref* into a list of entry structures.

```
(struct entry (words content tag desc)
        #:extra-constructor-name make-entry)
  words : (and/c (listof string?) cons?)
  content : list?
  tag : tag?
  desc : any/c
```

Represents a single entry in a Scribble document index.

The words list corresponds to index-element-plain-seq. The content list corresponds to index-element-entry-seq. The desc value corresponds to index-element-desc. The tag is the destination for the index link into the main document.

```
(data+root? v) → boolean?
  v : any/c
(make-data+root data root) → data+root?
  data : any/c
  root : (or/c #f path-string?)
```

A value constructed by make-data+root can be returned by a source procedure for load-xref to specify a path used for deserialization.

7.9 Tag Utilities

```
(require scribble/tag)          package: scribble-lib
```

The scribble/tag library provides utilities for constructing cross-reference tags. The library is re-exported by scribble/base.

```
(make-section-tag  name
                   [#:doc doc-mod-path
                    #:tag-prefixes tag-prefixes]) → tag?
  name : string?
  doc-mod-path : (or/c module-path? #f) = #f
  tag-prefixes : (or/c #f (listof string?)) = #f
```

Forms a tag that refers to a section whose "tag" (as provided by the `#:tag` argument to `section`, for example) is `name`. If `doc-mod-path` is provided, the tag references a section in the document implemented by `doc-mod-path` from outside the document. Additional tag prefixes (for intermediate sections, typically) can be provided as `tag-prefixes`.

```
(make-module-language-tag lang) → tag?
  lang : symbol?
```

Forms a tag that refers to a section that contains `defmodulelang` for the language `lang`.

```
(taglet? v) → boolean?
  v : any/c
```

Returns `#t` if `v` is a taglet, `#f` otherwise.

A *taglet* is a value that can be combined with a symbol via `list` to form a tag, but that is not a `generated-tag`. A taglet is therefore useful as a piece of a tag, and specifically as a piece of a tag that can gain a prefix (e.g., to refer to a section of a document from outside the document).

```
(doc-prefix mod-path taglet) → taglet?
  mod-path : (or/c #f module-path?)
  taglet : taglet?
(doc-prefix mod-path extra-prefixes taglet) → taglet?
  mod-path : (or/c #f module-path?)
  extra-prefixes : (or/c #f (listof taglet?))
  taglet : taglet?
```

Converts part of a cross-reference tag that would work within a document implemented by `mod-path` to one that works from outside the document, assuming that `mod-path` is not `#f`. That is, `mod-path` is converted to a taglet and added as prefix to an existing `taglet`.

If `extra-prefixes` is provided, then its content is added as a extra prefix elements before the prefix for `mod-path` is added. A `#f` value for `extra-prefixes` is equivalent to `'()`.

If `mod-path` is `#f`, then `taglet` is returned without a prefix (except adding `extra-prefixes`, if provided).

```
(module-path-prefix->string mod-path) → string?
  mod-path : module-path?
```

Converts a module path to a string by resolving it to a path, and using `path->main-collects-relative`.

```
(module-path-index->taglet mpi) → taglet?
  mpi : module-path-index?
```

Converts a module path index to a taglet—a normalized encoding of the path as an S-expression—that is interned via `intern-taglet`.

The string form of the taglet is used as prefix in a tag to form cross-references into the document that is implemented by the module referenced by *mpi*.

```
(intern-taglet v) → any/c
  v : any/c
```

Returns a value that is `equal?` to *v*, where multiple calls to `intern-taglet` for `equal?` *v*s produce the same (i.e., `eq?`) value.

7.10 Extending and Configuring Scribble Output

Sometimes, Scribble's primitives and built-in styles are insufficient to produce the output that you need. The cases in which you need to extend or configure Scribble fall into two groups:

- You may need to drop into the back-end "language" of CSS or Latex to create a specific output effect. For this kind of extension, you will mostly likely attach a `css-addition` or `tex-addition` style property to style, where the addition implements the style name. This kind of extension is described in §7.10.1 "Implementing Styles".

- You may need to produce a document whose page layout is different from the Racket documentation style. For that kind of configuration, you can run the `scribble` command-line tool and supply flags like `--prefix` or `++style`, or you can associate a `html-defaults` or `latex-defaults` style property to the main document's style. This kind of configuration is described in §7.10.2 "Configuring Output".

7.10.1 Implementing Styles

When a string is used as a style in an `element`, a `multiarg-element`, `paragraph`, `table`, `itemization`, `nested-flow`, or `compound-paragraph`, it corresponds to a CSS class for

```

HTML output or a Latex macro/environment for Latex output. In Latex output, the string is used as a command name for a `paragraph` and an environment name for a `table`, `item-ization`, `nested-flow`, or `compound-paragraph`; if the style has a `'command` style property for a `nested-flow` or `compound-paragraph`, then the style name is used as a command instead of an environment; and if the style has a `'multicommand` style property for a `nested-flow`, then the style name is used as a command with multiple arguments. In addition, for an itemization, the style string is suffixed with `"Item"` and used as a CSS class or Latex macro name to use for the itemization's items (in place of `\item` in the case of Latex).

To add a mapping from your own style name to a CSS configuration, add a `css-addition` structure instance to a style's style property list. To map a style name to a Latex macro or environment, add a `tex-addition` structure instance. A `css-addition` or `tex-addition` is normally associated with the style whose name is implemented by the adition, but it can also be added to the style for an enclosing part.

Scribble includes a number of predefined styles that are used by the exports of `scribble/base`. You can use them or redefine them. The styles are specified by `"scribble.css"` and `"scribble.tex"` in the `"scribble"` collection.

The styles used by `scribble/manual` are implemented by `"racket.css"` and `"racket.tex"` in the `"scribble"` collection. Other libraries, such as `scrib-lib/autobib`, similarly implement styles through files that are associated by `css-addition` and `tex-addition` style properties.

To avoid collisions with future additions to Scribble, start your style name with an uppercase letter that is not `S`. An uppercase letter helps to avoid collisions with macros defined by Latex packages, and future styles needed by `scribble/base` and `scribble/manual` will start with `S`.

For example, a Scribble document

```
#lang scribble/manual
@(require scribble/core
          scribble/html-properties
          scribble/latex-properties)

@(define inbox-style
   (make-style "InBox"
               (list (make-css-addition "inbox.css")
                     (make-tex-addition "inbox.tex"))))

@title{Quantum Pet}

Do not open: @elem[#:style inbox-style]{Cat}
```

combined with an `"inbox.css"` that contains

```
.InBox {
  padding: 0.2em;
  border: 1px solid #000000;
}
```

and an `"inbox.tex"` that contains

```
\newcommand{\InBox}[1]{\fbox{#1}}
```

generates

Quantum Pet

Do not open: Cat

Scribble documents can also embed specific html tags and attributes. For example, this Scribble document:

```
#lang scribble/base

@(require scribble/core
          scribble/html-properties)

@(define external-image
   (elem
    #:style
    (style #f
           (list (alt-tag "img")
                 (attributes
                  '((src . "http://racket-
lang.org/icon.png")))))))

@external-image
```

renders as the the Racket logo at the url `http://racket-lang.org/logo.png` when producing html.

7.10.2 Configuring Output

The implementation of styles used by libraries depends to some degree on separately configurable parameters, and configuration is also possible by replacing style implementations. Latex output is more configurable in the former way, since a document class determines a set of page-layout and font properties that are used by other commands. The style-replacement

kind of configuration corresponds to re-defining Latex macros or overriding CSS class attributes. When `setup-plt` builds PDF documentation, it uses both kinds of configuration to produce a standard layout for Racket manuals; that is, it selects a particular page layout, and it replaces some `racket/base` styles.

Two kinds of files implement the two kinds of configuration:

- A *prefix file* determines the `DOCTYPE` line for HTML output or the `\documentclass` configuration (and perhaps some addition package uses or other configurations) for Latex output.

  The default prefix files are `"scribble-prefix.html"` and `"scribble-prefix.tex"` in the `"scribble"` collection.

- A *style file* refines the implementation of styles used in the document—typically just the "built-in" styles used by `scribble/base`.

  The default style files, `"scribble-style.css"` and `"scribble-style.tex"` in the `"scribble"` collection, change no style implementations.

For a given configuration of output, typically a particular prefix file works with a particular style file. Some prefix or style files may be more reusable. For now, reading the default files is the best way to understand how they interact. A prefix and/or style file may also require extra accomanying files; for example, a prefix file for Latex mode may require a corresponding Latex class file. The default prefix and style files require no extra files.

When rendering a document through the `scribble` command-line tool, use flags to select a prefix file, style file, and additional accompanying files:

- Select the prefix file using the `--prefix` flag. (Selecting the prefix file also cancels the default list of accompanying files, if any.)

- Replace the style file using the `--style` flag. Add additional style definitions and re-definitions using the `++style` flag.

- Add additional accompanying files with `++extra`.

When using the `scribble` command-line utility, a document can declare its default style, prefix, and extra files through a `html-defaults` and/or `latex-defaults` style property. In particular, when using the `scribble` command-line tool to generate Latex or PDF a document whose main part is implemented with `#lang` `scribble/manual`, the result has the standard Racket manual configuration, because `scribble/manual` associates a `latex-defaults` style property with the exported document. The `scribble/sigplan` language similarly associates a default configuration with an exported document. As libraries imported with `require`, however, `scribble/manual` and `scribble/sigplan` simply implement new styles in a composable way.

Whether or not a document has a default prefix- and style-file configuration through a style property, the defaults can be overridden using `scribble` command-line flags. Furthermore, languages like `scribble/manual` and `scribble/sigplan` add a `html-defaults` and/or `latex-defaults` style property to a main-document part only if it does not already have such a property added through the `#:style` argument of `title`.

7.10.3   Predefined Latex Macros

The `"scribble.tex"` Latex configuration includes several macros and environments that you can redefine to adjust the output style:

- `\preDoc` — called before the document content; the default does nothing, while the `scribble/manual` configuration enabled `\sloppy`.

- `\postDoc` — called after the document content; the default does nothing.

- `\sectionNewpage` — called before each top-level section starts; the default does nothing, while the `scribble/manual` configuration uses `\newpage` to start each chapter on a new page.

- `\SecRefLocal{}{}{}` — the first argument is a Latex label, the second argument is a section number, and the third argument is a section title. This macro is used by `secref` to reference a section (other than a document or top-level section within a document) that has a number and that is local to the current document. The default expands to `\SecRef`, passing along just the second and third arguments (so that the label is ignored).

- `\SecRef{}{}` — like `\SecRefLocal`, but used when the referenced section is in a different document, so that no label is available. The default shows "section" followed by the section number (ignoring the title). The `scribble/manual` redefinition of this macro shows "§", the section number, and the title in quotes.

- `\ChapRefLocal{}{}{}` and `\ChapRef{}{}` — like `\SecRefLocal` and `\SecRef`, but for a top-level section within a document. The default implementation defers to `\SecRefLocal` or `\SecRef`.

- `\PartRefLocal{}{}{}` and `\PartRef{}{}` — like `\SecRefLocal` and `\SecRef`, but for a top-level section within a document whose part has the `'grouper` style property. The default `\PartRef` shows "part" followed by the section number (ignoring the title).

- `\BookRefLocal{}{}{}` and `\BookRef{}{}` — like `\SecRefLocal` and `\SecRef`, but for a document (as opposed to a section within the document). The default `\BookRef` implementation shows the title in italic.

- `\SecRefLocalUC{}{}{}` and `\SecRefUC{}{}` — like `\SecRefLocal` and `\SecRef`, but for `Secref`. The default `\SecRefUC` shows "Section" followed by the section number.

- `\ChapRefLocalUC{}{}{}` and `\ChapRefUC{}{}` — like `\ChapRefLocal` and `\ChapRef`, but for Secref. The default `\ChapRefUC`implementation defers to `\SecRefUC`.

- `\PartRefLocalUC{}{}{}` and `\PartRefUC{}{}` — like `\PartRefLocal` and `\PartRef`, but for Secref. The default `\PartRefUC` shows "Part" followed by the section number.

- `\BookRefLocalUC{}{}{}` and `\BookRefUC{}{}` — like `\BookRefLocal` and `\BookRef`, but for Secref. The default `\BookRefUC` defers to `\BookRef`.

- `\SecRefLocalUN{}{}`, `\SecRefUCUN{}`, `\SecRefLocalUCUN{}{}`, `\SecRefUN{}`, `\PartRefLocalUN{}{}`, `\PartRefUN{}`, `\PartRefLocalUCUN{}{}`, `\PartRefUCUN{}`, `\BookRefLocalUN{}{}`, `\BookRefUN{}`, `\BookRefLocalUCUN{}{}`, `\BookRefUCUN{}`, `\ChapRefLocalUN{}{}`, `\ChapRefUN{}`, `\ChapRefLocalUCUN{}{}`, and `\ChapRefUCUN{}` — like `\SecRefLocal`, etc., but in the case that a section/part/chapter number is unavailable. The default implementation of `\BookRefUN` uses `\BookRef` with an empty first argument. The default `\SecRefLocalUN` expands to its second argument in quotes followed by "on page" as a `\pageref` using the first argument, while the default `\SecRefUN` expands to its only argument in quotes. The default `\PartRef` and `\ChapRef` variants expand to the corresponding `\SecRef` variant.

- `\Ssection{}{}`, `\Ssubsection{}{}`, `\Ssubsubsection{}{}`, `\Ssubsubsubsection{}{}`, `\Ssubsubsubsubsection{}{}` — for a top-level section, a second-level section, etc., where the last variant is used for all sections that are deeper than four levels. The first argument corresponds to the optional argument to `\section`, which is used for the table of contents.

- `\Ssectionstar{}`, `\Ssubsectionstar{}`, `\Ssubsubsectionstar{}`, `\Ssubsubsubsectionstar{}`, `\Ssubsubsubsubsectionstar{}` — like `\Ssection`, etc., but for unnumbered sections that are omitted from the table of contents.

- `\Ssectionstarx{}{}`, `\Ssubsectionstarx{}`, `\Ssubsubsectionstarx{}{}`, `\Ssubsubsubsectionstarx{}{}`, `\Ssubsubsubsubsectionstarx{}{}` — like `\Ssection`, etc., but for unnumbered sections (that nevertheless appear in the table of contents).

- `\Sincsection`, `\Sincsubsection`, `\Sincsubsubsection`, `\Sincsubsubsubsection`, `\Sincsubsubsubsubsection` — increments the section counter.

- `\Spart{}{}`, `\Spartstar{}`, `\Spartstarx{}{}`, `\Sincpart` — like the section commands, but used for in place of `\Ssection{}{}`, `\Ssectionstar{}`, etc. for a part with the `'grouper` style property.

7.10.4 Latex Prefix Support

`(require scribble/latex-prefix)`   package: `scribble-lib`

Provides a string that is useful for constructing a Latex document prefix.

> `unicode-encoding-packages : string?`

A string containing Latex code that is useful after a `\documentclass` declaration to make Latex work with Unicode characters.

8 Running `scribble`

The `scribble` command-line tool (also available as `raco scribble`) runs a Scribble document and renders it to a specific format. Select a format with one of the following flags, where the output name *fn* is by default the document source name without its file suffix:

- `--html` — a single HTML page "*fn*.html", plus CSS sources and needed image files; this mode is the default if no format is specified

- `--htmls` — multiple HTML pages (and associated files) in a "*fn*" directory, starting with "*fn*/index.html"

- `--html-tree` $\langle n \rangle$ — HTML pages in a directory tree up to $\langle n \rangle$ layers deep; a tree of depth 0 is equivalent to using `--html`, and a tree of depth 1 is equivalent to using `--htmls`

- `--latex` — LaTeX source "*fn*.tex", plus any needed additional files (such as non-standard class files) needed to run `latex` or `pdflatex`

- `--pdf` — PDF "*fn*.pdf" that is generated via `pdflatex`

- `--latex-section` $\langle n \rangle$ — LaTeX source "*fn*.tex" plus additional ".tex" files to be included in the enclosing document's preamble, where the enclosing document must use the UTF-8 input encoding and T1 font encoding; use 1 for $\langle n \rangle$ to make the rendered document a section, 2 for a subsection, etc.

- `--text` — plain text in a single file "*fn*.txt", with non-ASCII content encoded as UTF-8

- `--markdown` — Markdown text in a single file "*fn*.md", with non-ASCII content encoded as UTF-8

Use `--dest-name` to specify a *fn* other than the default name, but only when a single source file is provided. Use the `--dest` flag to specify a destination directory (for any number of source files). Use `--dest-base` to add a prefix to the name of each support file that is generated or copied to the destination.

After all flags, provide one or more document sources, where each source declares a module. The module should either have a `doc` submodule that exports `doc` as a `part`, or it should directly export `doc` as a `part`. (The submodule is tried first, and the main module is not directly loaded or evaluated if the submodule can be loaded on its own.)

When multiple documents are rendered at the same time, cross-reference information in one document is visible to the other documents. See §8.2 "Handling Cross-References" for information on references that cross documents that are built separately.

8.1 Extra and Format-Specific Files

Use the `--style` flag to specify a format-specific file to adjust the output style file for certain formats. For HTML (single-page or multi-page) output, the style file should be a CSS file that is applied after all other CSS files, and that may therefore override some style properties. For Latex (or PDF) output, the style file should be a `".tex"` file that can redefine Latex commands. When a particular Scribble function needs particular CSS or Latex support, however, a better option is to use a `css-addition` or `tex-addition` style property so that the support is included automatically; see §7.10 "Extending and Configuring Scribble Output" for more information.

In rare cases, use the `--style` flag to specify a format-specific base style file. For HTML (single-page or multi-page) output, the style file should be a CSS file to substitute for `"scribble.css"` in the `"scribble"` collection. For Latex (or PDF) output, the style file should be a `".tex"` file to substitute for `"scribble.tex"` in the `"scribble"` collection. The `--style` flag is rarely useful, because the content of `"scribble.css"` or `"scribble.tex"` is weakly specified; replacements must define all of the same styles, and the set of styles can change across versions of Racket.

Use `--prefix` to specify an alternate format-specific start of the output file. For HTML output, the starting file specifies the `DOCTYPE` declaration of each output HTML file as a substitute for `"scribble-prefix.html"` in the `"scribble"` collection. For Latex (or PDF) output (but not Latex-section output), the starting file specifies the `\documentclass` declaration and initial `\usepackage` declarations as a substitute for `"scribble-prefix.tex"` in the `"scribble"` collection. See also `html-defaults`, `latex-defaults`, and §7.10 "Extending and Configuring Scribble Output".

For any output form, use the `++extra` flag to add a needed file to the build destination, such as an image file that is referenced in the generated output but not included via `image` (which copies the file automatically).

8.2 Handling Cross-References

Cross references within a document or documents rendered together are always resolved. When cross references span documents that are rendered separately, cross-reference information needs to be saved and loaded explicitly. Cross-reference information is format-specific, but HTML-format information is usable for Latex (or PDF) or text rendering.

A Racket installation includes HTML-format cross-reference information for all installed documentation. Each document's information is in a separate file, so that loading all relevant files would be tedious. The `+m` or `++main-xref-in` flag loads cross-reference information for all installed documentation, so

```
scribble +m mine.scrbl
```

renders `"mine.scrbl"` to `"mine.html"` with cross-reference links to the Racket installation's documentation. (The `"racket-index"` package must be installed to use `+m`/`++main-xref-in`.)

The `++xref-in` flag loads cross-reference information by calling a specified module's function. The `setup/xref` module provides `load-collections-xref` to load cross-reference information for all installed documentation, and `+m` or `++main-xref-in` is just a shorthand for `++xref-in setup/xref load-collections-xref`.

The `--redirect-main` flag for HTML output redirects links to the local installation's documentation to a given URL, such as `http://docs.racket-lang.org/`. Beware that documentation links sometimes change (although Scribble generates HTML paths and anchors in a relatively stable way), so `http://download.racket-lang.org/docs/`*version*`/html/` may be more reliable when building with an installation for *version*. The `--redirect-main` flag is ignored for non-HTML output.

The `--redirect` flag is like `--redirect-main`, except that it builds on the given URL to indicate a cross-reference tag that is more stable than an HTML path and anchor (in case the documentation for a function changes sections, for example). No server currently exists to serve such tag requests, however.

For cross-references among documentation that is not part of the Racket installation, use `--info-out` to save information from a document build and use `++info-in` to load previously saved information. For example, if `"c.scrbl"` refers to information in `"a.scrbl"` and `"b.scrbl"`, then

```
scribble --info-out a.sxref a.scrbl

scribble --info-out b.sxref b.scrbl

scribble ++info-in a.sxref ++info-in b.sxref c.scrbl
```

builds `"c.html"` with cross-reference links into `"a.html"` and `"b.html"`.

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