

# R<sup>6</sup>RS: Standard Language

Version 4.2.3

December 1, 2009

The The Revised<sup>6</sup> Report on the Algorithmic Language Scheme defines a dialect of Scheme. We use *R<sup>6</sup>RS* to refer to both the standard and the language defined by the standard.

R<sup>6</sup>RS defines both *libraries* and *top-level programs*. Both correspond to PLT Scheme *modules* (see §6 “Modules”). That is, although R<sup>6</sup>RS defines top-level programs as entry points, you can just as easily treat a library as an entry point when using PLT Scheme. The only difference is that an R<sup>6</sup>RS top-level program cannot export any bindings to other modules.

See §21 “Dialects of Scheme” for general information about different dialects of Scheme within PLT Scheme.

# Contents

<b>1</b>	<b>Running Top-Level Programs</b>	<b>4</b>
<b>2</b>	<b>Installing Libraries</b>	<b>5</b>
<b>3</b>	<b>R<sup>6</sup>RS Module Language</b>	<b>6</b>
<b>4</b>	<b>Libraries and Collections</b>	<b>7</b>
<b>5</b>	<b>Scheme Interoperability</b>	<b>8</b>
<b>6</b>	<b>R<sup>6</sup>RS Conformance</b>	<b>9</b>
<b>7</b>	<b>R<sup>6</sup>RS Libraries</b>	<b>11</b>
7.1	( <code>rnrs base (6)</code> ): Base . . . . .	11
7.2	( <code>rnrs unicode (6)</code> ): Unicode . . . . .	11
7.3	( <code>rnrs bytevectors (6)</code> ): Bytevectors . . . . .	11
7.4	( <code>rnrs lists (6)</code> ): List utilities . . . . .	11
7.5	( <code>rnrs sorting (6)</code> ): Sorting . . . . .	11
7.6	( <code>rnrs control (6)</code> ): Control Structures . . . . .	11
7.7	( <code>rnrs records syntactic (6)</code> ): Records: Syntactic . . . . .	12
7.8	( <code>rnrs records procedural (6)</code> ): Records: Procedural . . . . .	12
7.9	( <code>rnrs records inspection (6)</code> ): Records: Inspection . . . . .	12
7.10	( <code>rnrs exceptions (6)</code> ): Exceptions . . . . .	12
7.11	( <code>rnrs conditions (6)</code> ): Conditions . . . . .	12
7.12	( <code>rnrs io ports (6)</code> ): I/O: Ports . . . . .	12
7.13	( <code>rnrs io simple (6)</code> ): I/O: Simple . . . . .	13
7.14	( <code>rnrs files (6)</code> ): File System . . . . .	13

7.15	( <code>rnrs programs (6)</code> ): Command-line Access and Exit Values . . . . .	13
7.16	( <code>rnrs arithmetic fixnums (6)</code> ): Arithmetic: Fixnums . . . . .	13
7.17	( <code>rnrs arithmetic flonums (6)</code> ): Arithmetic: Flonums . . . . .	13
7.18	( <code>rnrs arithmetic bitwise (6)</code> ): Arithmetic: Bitwise . . . . .	13
7.19	( <code>rnrs syntax-case (6)</code> ): Syntax-Case . . . . .	14
7.20	( <code>rnrs hashtables (6)</code> ): Hashtables . . . . .	14
7.21	( <code>rnrs enums (6)</code> ): Enumerations . . . . .	14
7.22	( <code>rnrs eval (6)</code> ): Eval . . . . .	14
7.23	( <code>rnrs mutable-pairs (6)</code> ): Mutable Pairs . . . . .	14
7.24	( <code>rnrs mutable-strings (6)</code> ): Mutable Strings . . . . .	14
7.25	( <code>rnrs r5rs (6)</code> ): R5RS Compatibility . . . . .	15

<b>Index</b>		<b>16</b>
--------------	--	-----------

# 1 Running Top-Level Programs

To run a top-level program, either:

- Use the `plt-r6rs` executable, supplying the file that contains the program on the command line:

```
plt-r6rs <program-file>
```

Additional command-line arguments are propagated as command-line arguments to the program (accessed via `command-line`).

To compile the file to bytecode (to speed future runs of the program), use `plt-r6rs` with the `-compile` flag:

```
plt-r6rs -compile <program-file>
```

The bytecode file is written in a "compiled" sub-directory next to `<program-file>`.

For example, if `hi.scm` contains

```
(import (rnrs))
(display "hello\n")
```

then

```
plt-r6rs hi.scm
```

prints "hello."

- Prefix the program with `#!r6rs`, which counts as a comment from the R<sup>6</sup>RS perspective, but is a synonym for `#lang r6rs` from the PLT Scheme perspective. Such files can be run like any other PLT Scheme module, such as using `mzscheme`:

```
mzscheme <program-file>
```

or using DrScheme with the Module language. The file can also be compiled to bytecode using `mzc`:

```
mzc <program-file>
```

For example, if `hi.ss` contains

```
#!r6rs
(import (rnrs))
(display "hello\n")
```

then

```
mzscheme hi.ss
```

prints "hello." Similarly, opening `hi.ss` in DrScheme and clicking Run prints "hello" within the DrScheme interactions window.

## 2 Installing Libraries

To reference an R<sup>6</sup>RS library from a top-level program or another library, it must be installed as a collection-based library in PLT Scheme.

One way to produce an R<sup>6</sup>RS installed library is to create in a collection a file that starts with `#!r6rs` and that contains a `library` form. For example, the following file might be created in a "hello.ss" file within a "examples" collection directory:

```
#!r6rs
(library (examples hello)
 (export greet)
 (import (rnrs)))

(define (greet)
 (display "hello\n"))
```

Alternately, the `plt-r6rs` executable with the `-install` flag accepts a sequence of `library` declarations and installs them into separate files in a collection directory, based on the declared name of each library:

```
plt-r6rs -install <libraries-file>
```

By default, libraries are installed into the user-specific collection directory (see `find-user-collects-dir`). The `-all-users` flag causes the libraries to be installed into the main installation, instead (see `find-collects-dir`):

```
plt-r6rs -install -all-users <libraries-file>
```

See §4 “Libraries and Collections” for information on how R<sup>6</sup>RS library names are turned into collection-based module paths, which determines where the files are written. Libraries installed by `plt-r6rs -install` are automatically compiled to bytecode form.

One final option is to supply a `++path` flag to `plt-r6rs`. A path added with `++path` extends the set of directories that are searched to find a collection (i.e., it sets `current-library-collection-paths`). If `<dir>` contains "duck" and "cow" sub-directories with "duck/feather.sls" and "cow/bell.sls", and if each file is an R<sup>6</sup>RS library prefixed with `#!r6rs`, then `plt-r6rs ++path <dir>` directs the R<sup>6</sup>RS library references `(duck feather)` and `(cow bell)` to the files. Note that this technique does not support accessing "duck.sls" directly within `<dir>`, since the library reference `(duck)` is treated like `(duck main)` for finding the library, as explained in §4 “Libraries and Collections”. Multiple paths can be provided with multiple uses of `++path`; the paths are searched in order, and before the installation’s collections.

### 3 R<sup>6</sup>RS Module Language

```
#lang r6rs
```

The `r6rs` language is usually used in the form `#!r6rs`, which is equivalent to `#lang r6rs` and is also valid R<sup>6</sup>RS syntax.

The `r6rs` module language provides only a `#!/module-begin` binding, which is used to process the entire module body (see `module`). It allows the body of a module to use the syntax of either a R<sup>6</sup>RS library or a R<sup>6</sup>RS top-level program.

---

```
(#!/module-begin
 (library library-name
  (export export-spec ...)
  (import import-spec ...)
  library-body ...))
(#!/module-begin
 (import import-spec ...)
 program-body ...)
```

An `r6rs` module that contains a single `library` form defines an R<sup>6</sup>RS library, while a module body that starts with an `import` form defines an R<sup>6</sup>RS top-level program.

The `library`, `export`, and `import` identifiers are not exported by the `r6rs` library; they are recognized through equivalence to unbound identifiers.

## 4 Libraries and Collections

An R<sup>6</sup>RS library name is sequence of symbols, optionally followed by a version as a sequence of exact, non-negative integers. Roughly, such a name is converted to a PLT Scheme module pathname (see §6.3 “Module Paths”) by concatenating the symbols with a `/` separator, and then appending the version integers each with a preceding `-`. As a special case, when an R<sup>6</sup>RS path contains a single symbol (optionally followed by a version), a `main` symbol is effectively inserted after the initial symbol. See below for further encoding considerations.

When an R<sup>6</sup>RS library or top-level program refers to another library, it can supply version constraints rather than naming a specific version. Version constraints are always resolved at compile time by searching the set of installed files.

In addition, when an R<sup>6</sup>RS library path is converted, a file extension is selected at compile time based on installed files. The search order for file extensions is `".mzscheme.ss"`, `".mzscheme.sls"`, `".ss"`, and `".sls"`. When resolving version constraints, these extensions are all tried when looking for matches.

To ensure that all R<sup>6</sup>RS library names can be converted to a unique and distinct library module path, the following conversions are applied to each symbol before concatenating them:

- The symbol is encoded using UTF-8, and the resulting bytes are treated as Latin-1 encoded characters. ASCII letters, digits, `+`, `-`, and `_` are left as-is; other characters are replaced by `%` followed by two lowercase hexadecimal digits. Note that UTF-8 encodes ASCII letters, digits, etc. as themselves, so typical library names correspond to readable module paths.
- If the R<sup>6</sup>RS library reference has two symbol elements and the second one is `main` followed by any number of underscores, then an extra underscore is added to that symbol. This conversion avoids a collision between an explicit `main` and the implicit `main` when a library path has a single symbol element.

Examples (assuming a typical PLT Scheme installation):

```
(rnrs io simple (6)) means (lib "rnrs/io/simple-6.ss")
(rnrs)                means (lib "rnrs/main-6.ss")
(rnrs main)           means (lib "rnrs/main_.ss")
(rnrs (6))            means (lib "rnrs/main-6.ss")
(scheme base)         means (lib "scheme/base.ss")
(achtung!)             means (lib "achtung%21/main.ss")
(funco new-λ)         means (lib "funco/new-%ce%bb.ss")
```

## 5 Scheme Interoperability

Using the conversion rules in §4 “Libraries and Collections”, and R<sup>6</sup>RS library can refer to modules that are implemented in other dialects supported by PLT Scheme, and other PLT Scheme modules can refer to libraries that are implemented in R<sup>6</sup>RS.

Beware that a *pair* in R<sup>6</sup>RS corresponds to a *mutable pair* in `scheme/base`. Otherwise, R<sup>6</sup>RS libraries and `scheme/base` share the same datatype for numbers, characters, strings, bytevectors (a.k.a. byte strings), vectors, and so on. Hash tables are different. Input and output ports from `scheme/base` can be used directly as binary ports with R<sup>6</sup>RS libraries, and all R<sup>6</sup>RS ports can be used as ports in `scheme/base` programs, but only textual ports created via R<sup>6</sup>RS libraries can be used by other R<sup>6</sup>RS operations that expect textual ports.

## 6 R<sup>6</sup>RS Conformance

PLT Scheme's R<sup>6</sup>RS support does not conform with the standard in several known ways:

- When `guard` catches an exception that no clause matches, the exception is re-raised without restoring the continuation to the one that raised the exception.

This difference can be made visible using `dynamic-wind`. According to R<sup>6</sup>RS, the following program should print “in” and “out” twice, but each prints once using PLT Scheme:

```
(guard (exn [(equal? exn 5) 'five]))
(guard (exn [(equal? exn 6) 'six]))
(dynamic-wind
  (lambda () (display "in") (newline))
  (lambda () (raise 5))
  (lambda () (display "out") (newline))))
```

Along similar lines, continuation capture and invocation within an exception handler is restricted. Unless the exception is raised through `raise-continuable`, a handler can escape only through a continuation that is a tail of the current continuation, and a continuation captured within the handler cannot be invoked after control escapes from the raise.

The initial exception handler does not return for non-`&serious` conditions, but `raise` and `raise-continuable` both install an uncaught-exception handler (via `parameterize` and `uncaught-exception-handler`) to one that returns for non-`&serious` conditions.

- Inexact numbers are printed without a precision indicator, and precision indicators are ignored on input (e.g., `0.5|7` is read the same as `0.5`).
- Word boundaries for `string-downcase`, `string-upcase`, and `string-titlecase` are not determined as specified by Unicode Standard Annex #29.
- When an identifier bound by `letrec` or `letrec*` is referenced before it is bound, an exception is not raised; instead, the reference produces `#<undefined>`.
- A custom textual port must represent positions using integers, and the positions must correspond to bytes in a UTF-8 encoding of the port's data. For custom ports (byte or character) that support both input and output, beware that buffered input can create a mismatch between the position implemented by the custom procedures and the port's current position; the result from a custom position procedure is automatically adjusted to account for buffering, and setting the port's position flushes all buffered bytes, but writing after a read does *not* automatically reset the port's position to counteract the effects of buffering.
- The bindings in a namespace produced by `null-environment` or `scheme-report-environment` correspond to R<sup>5</sup>RS bindings instead of R<sup>6</sup>RS bindings. In particular, `=>`, `else`, `_`, and `...` are not bound.

- Bindings for `#!/datum`, `#!/app`, `#!/top`, and `#!/top-interaction` are imported into every library and program, and at every phase level for which the library or program has imports.

## 7 R<sup>6</sup>RS Libraries

### 7.1 `(rnrs base (6))`: **Base**

`(require rnrs/base-6)`

Original specification: Base

### 7.2 `(rnrs unicode (6))`: **Unicode**

`(require rnrs/unicode-6)`

Original specification: Unicode

### 7.3 `(rnrs bytevectors (6))`: **Bytevectors**

`(require rnrs/bytevectors-6)`

Original specification: Bytevectors

### 7.4 `(rnrs lists (6))`: **List utilities**

`(require rnrs/lists-6)`

Original specification: List utilities

### 7.5 `(rnrs sorting (6))`: **Sorting**

`(require rnrs/sorting-6)`

Original specification: Sorting

### 7.6 `(rnrs control (6))`: **Control Structures**

`(require rnrs/control-6)`

Original specification: Control Structures

## **7.7 (nrns records syntactic (6)): Records: Syntactic**

(require nrns/records/syntactic-6)

Original specification: Records: Syntactic

## **7.8 (nrns records procedural (6)): Records: Procedural**

(require nrns/records/procedural-6)

Original specification: Records: Procedural

## **7.9 (nrns records inspection (6)): Records: Inspection**

(require nrns/records/inspection-6)

Original specification: Records: Inspection

## **7.10 (nrns exceptions (6)): Exceptions**

(require nrns/exceptions-6)

Original specification: Exceptions

See also §6 “R<sup>6</sup>RS Conformance”.

## **7.11 (nrns conditions (6)): Conditions**

(require nrns/conditions-6)

Original specification: Conditions

## **7.12 (nrns io ports (6)): I/O: Ports**

(require nrns/io/ports-6)

Original specification: I/O: Ports

### **7.13** `(rnrs io simple (6))`: **I/O: Simple**

`(require rnrs/io/simple-6)`

Original specification: I/O: Simple

### **7.14** `(rnrs files (6))`: **File System**

`(require rnrs/files-6)`

Original specification: File System

### **7.15** `(rnrs programs (6))`: **Command-line Access and Exit Values**

`(require rnrs/programs-6)`

Original specification: Command-line Access and Exit Values

### **7.16** `(rnrs arithmetic fixnums (6))`: **Arithmetic: Fixnums**

`(require rnrs/arithmetic/fixnums-6)`

Original specification: Arithmetic: Fixnums

### **7.17** `(rnrs arithmetic flonums (6))`: **Arithmetic: Flonums**

`(require rnrs/arithmetic/flonums-6)`

Original specification: Arithmetic: Flonums

### **7.18** `(rnrs arithmetic bitwise (6))`: **Arithmetic: Bitwise**

`(require rnrs/arithmetic/bitwise-6)`

Original specification: Arithmetic: Bitwise

## 7.19 `(rnrs syntax-case (6))`: Syntax-Case

`(require rnrs/syntax-case-6)`

Original specification: Syntax-Case

## 7.20 `(rnrs hashtables (6))`: Hashtables

`(require rnrs/hashtables-6)`

Original specification: Hashtables

A hashtable is a dictionary in the sense of `scheme/dict`, and hash table operations interact with threads in the same way for hash tables created with `make-hash` (e.g., `hashtable-ref` and `hashtable-set!` are thread-safe).

## 7.21 `(rnrs enums (6))`: Enumerations

`(require rnrs/enums-6)`

Original specification: Enumerations

## 7.22 `(rnrs eval (6))`: Eval

`(require rnrs/eval-6)`

Original specification: Eval

## 7.23 `(rnrs mutable-pairs (6))`: Mutable Pairs

`(require rnrs/mutable-pairs-6)`

Original specification: Mutable Pairs

## 7.24 `(rnrs mutable-strings (6))`: Mutable Strings

`(require rnrs/mutable-strings-6)`

Original specification: Mutable Strings

## 7.25 (nrns r5rs (6)): R5RS Compatibility

(require nrns/r5rs-6)

Original specification: R5RS Compatibility

See also §6 “R<sup>6</sup>RS Conformance”.

## Index

`#!/module-begin`, 6  
`&assertion`, 12  
`&condition`, 12  
`&error`, 12  
`&i/o`, 12  
`&i/o-decoding`, 12  
`&i/o-encoding`, 12  
`&i/o-file-already-exists`, 12  
`&i/o-file-does-not-exist`, 12  
`&i/o-file-is-read-only`, 12  
`&i/o-file-protection`, 12  
`&i/o-filename`, 12  
`&i/o-invalid-position`, 12  
`&i/o-port`, 12  
`&i/o-read`, 12  
`&i/o-write`, 12  
`&implementation-restriction`, 12  
`&irritants`, 12  
`&lexical`, 12  
`&message`, 12  
`&no-infinities`, 13  
`&no-nans`, 13  
`&non-continuable`, 12  
`&serious`, 12  
`&syntax`, 12  
`&undefined`, 12  
`&violation`, 12  
`&warning`, 12  
`&who`, 12  
`(nrns arithmetic bitwise (6))`:  
  Arithmetic: Bitwise, 13  
`(nrns arithmetic fixnums (6))`:  
  Arithmetic: Fixnums, 13  
`(nrns arithmetic flonums (6))`:  
  Arithmetic: Flonums, 13  
`(nrns base (6))`: Base, 11  
`(nrns bytevectors (6))`: Bytevectors,  
  11  
`(nrns conditions (6))`: Conditions, 12  
`(nrns control (6))`: Control Structures,  
  11  
`(nrns enums (6))`: Enumerations, 14  
`(nrns eval (6))`: Eval, 14  
`(nrns exceptions (6))`: Exceptions, 12  
`(nrns files (6))`: File System, 13  
`(nrns hashtables (6))`: Hashtables, 14  
`(nrns io ports (6))`: I/O: Ports, 12  
`(nrns io simple (6))`: I/O: Simple, 13  
`(nrns lists (6))`: List utilities, 11  
`(nrns mutable-pairs (6))`: Mutable  
  Pairs, 14  
`(nrns mutable-strings (6))`: Mutable  
  Strings, 14  
`(nrns programs (6))`: Command-line  
  Access and Exit Values, 13  
`(nrns r5rs (6))`: R5RS Compatibility,  
  15  
`(nrns records inspection (6))`:  
  Records: Inspection, 12  
`(nrns records procedural (6))`:  
  Records: Procedural, 12  
`(nrns records syntactic (6))`:  
  Records: Syntactic, 12  
`(nrns sorting (6))`: Sorting, 11  
`(nrns syntax-case (6))`: Syntax-Case,  
  14  
`(nrns unicode (6))`: Unicode, 11  
`*`, 11  
`+`, 11  
`++path`, 5  
`-`, 11  
`...`, 11  
`...`, 14  
`/`, 11  
`<`, 11  
`<=`, 11  
`=`, 11  
`=>`, 11  
`=>`, 12  
`>`, 11  
`>=`, 11  
`_`, 11  
`_`, 14  
`abs`, 11

acos, 11  
and, 11  
angle, 11  
append, 11  
apply, 11  
asin, 11  
assert, 11  
assertion-violation, 11  
assertion-violation?, 12  
assoc, 11  
assp, 11  
assq, 11  
assv, 11  
atan, 11  
begin, 11  
binary-port?, 12  
bitwise-and, 13  
bitwise-arithmetic-shift, 13  
bitwise-arithmetic-shift-left, 13  
bitwise-arithmetic-shift-right, 13  
bitwise-bit-count, 13  
bitwise-bit-field, 13  
bitwise-bit-set?, 13  
bitwise-copy-bit, 13  
bitwise-copy-bit-field, 13  
bitwise-first-bit-set, 13  
bitwise-if, 13  
bitwise-ior, 13  
bitwise-length, 13  
bitwise-not, 13  
bitwise-reverse-bit-field, 13  
bitwise-rotate-bit-field, 13  
bitwise-xor, 13  
boolean=?, 11  
boolean?, 11  
bound-identifier=?, 14  
buffer-mode, 12  
buffer-mode?, 12  
bytevector->sint-list, 11  
bytevector->string, 12  
bytevector->u8-list, 11  
bytevector->uint-list, 11  
bytevector-copy, 11  
bytevector-copy!, 11  
bytevector-fill!, 11  
bytevector-ieee-double-native-ref,  
11  
bytevector-ieee-double-native-  
set!, 11  
bytevector-ieee-double-ref, 11  
bytevector-ieee-single-native-ref,  
11  
bytevector-ieee-single-native-  
set!, 11  
bytevector-ieee-single-ref, 11  
bytevector-length, 11  
bytevector-s16-native-ref, 11  
bytevector-s16-native-set!, 11  
bytevector-s16-ref, 11  
bytevector-s16-set!, 11  
bytevector-s32-native-ref, 11  
bytevector-s32-native-set!, 11  
bytevector-s32-ref, 11  
bytevector-s32-set!, 11  
bytevector-s64-native-ref, 11  
bytevector-s64-native-set!, 11  
bytevector-s64-ref, 11  
bytevector-s64-set!, 11  
bytevector-s8-ref, 11  
bytevector-s8-set!, 11  
bytevector-sint-ref, 11  
bytevector-sint-set!, 11  
bytevector-u16-native-ref, 11  
bytevector-u16-native-set!, 11  
bytevector-u16-ref, 11  
bytevector-u16-set!, 11  
bytevector-u32-native-ref, 11  
bytevector-u32-native-set!, 11  
bytevector-u32-ref, 11  
bytevector-u32-set!, 11  
bytevector-u64-native-ref, 11  
bytevector-u64-native-set!, 11  
bytevector-u64-ref, 11  
bytevector-u64-set!, 11

bytevector-u8-ref, 11  
 bytevector-u8-set!, 11  
 bytevector-uint-ref, 11  
 bytevector-uint-set!, 11  
 bytevector=?, 11  
 bytevector?, 11  
 caar, 11  
 cadr, 11  
 call-with-bytevector-output-port,  
   12  
 call-with-current-continuation, 11  
 call-with-input-file, 13  
 call-with-output-file, 13  
 call-with-port, 12  
 call-with-string-output-port, 12  
 call-with-values, 11  
 call/cc, 11  
 car, 11  
 case, 11  
 case-lambda, 11  
 cdddar, 11  
 cddddr, 11  
 cdr, 11  
 ceiling, 11  
 char->integer, 11  
 char-alphabetic?, 11  
 char-ci<=?, 11  
 char-ci<?, 11  
 char-ci=?, 11  
 char-ci>=?, 11  
 char-ci>?, 11  
 char-downcase, 11  
 char-foldcase, 11  
 char-general-category, 11  
 char-lower-case?, 11  
 char-numeric?, 11  
 char-title-case?, 11  
 char-titlecase, 11  
 char-upcase, 11  
 char-upper-case?, 11  
 char-whitespace?, 11  
 char<=?, 11  
 char<?, 11  
 char=?, 11  
 char>=?, 11  
 char>?, 11  
 char?, 11  
 close-input-port, 13  
 close-output-port, 13  
 close-port, 12  
 command-line, 13  
 complex?, 11  
 cond, 11  
 condition, 12  
 condition-accessor, 12  
 condition-irritants, 12  
 condition-message, 12  
 condition-predicate, 12  
 condition-who, 12  
 condition?, 12  
 cons, 11  
 cons\*, 11  
 cos, 11  
 current-error-port, 12  
 current-input-port, 12  
 current-output-port, 12  
 datum->syntax, 14  
 define, 11  
 define-condition-type, 12  
 define-enumeration, 14  
 define-record-type, 12  
 define-syntax, 11  
 delay, 15  
 delete-file, 13  
 denominator, 11  
 display, 13  
 div, 11  
 div-and-mod, 11  
 div0, 11  
 div0-and-mod0, 11  
 do, 11  
 dynamic-wind, 11  
 else, 11  
 else, 12

endianness, 11  
enum-set->list, 14  
enum-set-complement, 14  
enum-set-constructor, 14  
enum-set-difference, 14  
enum-set-indexer, 14  
enum-set-intersection, 14  
enum-set-member?, 14  
enum-set-projection, 14  
enum-set-subset?, 14  
enum-set-union, 14  
enum-set-universe, 14  
enum-set=?, 14  
environment, 14  
eof-object, 12  
eof-object?, 12  
eol-style, 12  
eq?, 11  
equal-hash, 14  
equal?, 11  
eqv?, 11  
error, 11  
error-handling-mode, 12  
error?, 12  
eval, 14  
even?, 11  
exact, 11  
exact->inexact, 15  
exact-integer-sqrt, 11  
exact?, 11  
exists, 11  
exit, 13  
exp, 11  
expt, 11  
fields, 12  
file-exists?, 13  
file-options, 12  
filter, 11  
find, 11  
finite?, 11  
fixnum->flonum, 13  
fixnum-width, 13  
fixnum?, 13  
fl\*, 13  
fl+, 13  
fl-, 13  
fl/, 13  
fl<=?, 13  
fl<?, 13  
fl=?, 13  
fl>=?, 13  
fl>?, 13  
flabs, 13  
flacos, 13  
flasin, 13  
flatan, 13  
flceiling, 13  
flcos, 13  
fldenominator, 13  
fldiv, 13  
fldiv-and-mod, 13  
fldiv0, 13  
fldiv0-and-mod0, 13  
fleven?, 13  
flexp, 13  
flexpt, 13  
flfinite?, 13  
flfloor, 13  
flinfinite?, 13  
flinteger?, 13  
fllog, 13  
flmax, 13  
flmin, 13  
flmod, 13  
flmod0, 13  
flnan?, 13  
flnegative?, 13  
flnumerator, 13  
flodd?, 13  
flonum?, 13  
floor, 11  
flpositive?, 13  
flround, 13  
flsin, 13

flsqrt, 13  
 fltan, 13  
 fltruncate, 13  
 flush-output-port, 12  
 flzero?, 13  
 fold-left, 11  
 fold-right, 11  
 for-all, 11  
 for-each, 11  
 force, 15  
 free-identifier=?, 14  
 fx\*, 13  
 fx\*/carry, 13  
 fx+, 13  
 fx+/carry, 13  
 fx-, 13  
 fx-/carry, 13  
 fx<=?, 13  
 fx<?, 13  
 fx=?, 13  
 fx>=?, 13  
 fx>?, 13  
 fxand, 13  
 fxarithmetic-shift, 13  
 fxarithmetic-shift-left, 13  
 fxarithmetic-shift-right, 13  
 fxbit-count, 13  
 fxbit-field, 13  
 fxbit-set?, 13  
 fxcopy-bit, 13  
 fxcopy-bit-field, 13  
 fxdiv, 13  
 fxdiv-and-mod, 13  
 fxdiv0, 13  
 fxdiv0-and-mod0, 13  
 fxeven?, 13  
 fxfirst-bit-set, 13  
 fxif, 13  
 fxior, 13  
 fxlength, 13  
 fxmax, 13  
 fxmin, 13  
 fxmod, 13  
 fxmod0, 13  
 fxnegative?, 13  
 fxnot, 13  
 fxodd?, 13  
 fxpositive?, 13  
 fxreverse-bit-field, 13  
 fxrotate-bit-field, 13  
 fxxor, 13  
 fxzero?, 13  
 gcd, 11  
 generate-temporaries, 14  
 get-bytevector-all, 12  
 get-bytevector-n, 12  
 get-bytevector-n!, 12  
 get-bytevector-some, 12  
 get-char, 12  
 get-datum, 12  
 get-line, 12  
 get-string-all, 12  
 get-string-n, 12  
 get-string-n!, 12  
 get-u8, 12  
 greatest-fixnum, 13  
 guard, 12  
 hashtable-clear!, 14  
 hashtable-contains?, 14  
 hashtable-copy, 14  
 hashtable-delete!, 14  
 hashtable-entries, 14  
 hashtable-equivalence-function, 14  
 hashtable-hash-function, 14  
 hashtable-keys, 14  
 hashtable-mutable?, 14  
 hashtable-ref, 14  
 hashtable-set!, 14  
 hashtable-size, 14  
 hashtable-update!, 14  
 hashtable?, 14  
 i/o-decoding-error?, 12  
 i/o-encoding-error-char, 12  
 i/o-encoding-error?, 12

[i/o-error-filename](#), 12  
[i/o-error-port](#), 12  
[i/o-error-position](#), 12  
[i/o-error?](#), 12  
[i/o-file-already-exists-error?](#), 12  
[i/o-file-does-not-exist-error?](#), 12  
[i/o-file-is-read-only-error?](#), 12  
[i/o-file-protection-error?](#), 12  
[i/o-filename-error?](#), 12  
[i/o-invalid-position-error?](#), 12  
[i/o-port-error?](#), 12  
[i/o-read-error?](#), 12  
[i/o-write-error?](#), 12  
[identifier-syntax](#), 11  
[identifier?](#), 14  
[if](#), 11  
[imag-part](#), 11  
[immutable](#), 12  
[implementation-restriction-violation?](#), 12  
[inexact](#), 11  
[inexact->exact](#), 15  
[inexact?](#), 11  
[infinite?](#), 11  
[input-port?](#), 12  
[Installing Libraries](#), 5  
[integer->char](#), 11  
[integer-valued?](#), 11  
[integer?](#), 11  
[irritants-condition?](#), 12  
[lambda](#), 11  
[latin-1-codec](#), 12  
[lcm](#), 11  
[least-fixnum](#), 13  
[length](#), 11  
[let](#), 11  
[let\\*](#), 11  
[let\\*-values](#), 11  
[let-syntax](#), 11  
[let-values](#), 11  
[letrec](#), 11  
[letrec\\*](#), 11  
[letrec-syntax](#), 11  
[lexical-violation?](#), 12  
[Libraries and Collections](#), 7  
[list](#), 11  
[list->string](#), 11  
[list->vector](#), 11  
[list-ref](#), 11  
[list-sort](#), 11  
[list-tail](#), 11  
[list?](#), 11  
[log](#), 11  
[lookahead-char](#), 12  
[lookahead-u8](#), 12  
[magnitude](#), 11  
[make-assertion-violation](#), 12  
[make-bytevector](#), 11  
[make-custom-binary-input-port](#), 12  
[make-custom-binary-input/output-port](#), 12  
[make-custom-binary-output-port](#), 12  
[make-custom-textual-input-port](#), 12  
[make-custom-textual-input/output-port](#), 12  
[make-custom-textual-output-port](#), 12  
[make-enumeration](#), 14  
[make-eq-hashtable](#), 14  
[make-eqv-hashtable](#), 14  
[make-error](#), 12  
[make-hashtable](#), 14  
[make-i/o-decoding-error](#), 12  
[make-i/o-encoding-error](#), 12  
[make-i/o-error](#), 12  
[make-i/o-file-already-exists-error](#), 12  
[make-i/o-file-does-not-exist-error](#), 12  
[make-i/o-file-is-read-only-error](#), 12  
[make-i/o-file-protection-error](#), 12  
[make-i/o-filename-error](#), 12  
[make-i/o-invalid-position-error](#), 12  
[make-i/o-port-error](#), 12

make-i/o-read-error, 12  
 make-i/o-write-error, 12  
 make-implementation-restriction-violation, 12  
 make-irritants-condition, 12  
 make-lexical-violation, 12  
 make-message-condition, 12  
 make-no-infinities-violation, 13  
 make-no-nans-violation, 13  
 make-non-continuable-violation, 12  
 make-polar, 11  
 make-record-constructor-descriptor, 12  
 make-record-type-descriptor, 12  
 make-rectangular, 11  
 make-serious-condition, 12  
 make-string, 11  
 make-syntax-violation, 12  
 make-transcoder, 12  
 make-undefined-violation, 12  
 make-variable-transformer, 14  
 make-vector, 11  
 make-violation, 12  
 make-warning, 12  
 make-who-condition, 12  
 map, 11  
 max, 11  
 member, 11  
 memp, 11  
 memq, 11  
 memv, 11  
 message-condition?, 12  
 min, 11  
 mod, 11  
 mod0, 11  
 modulo, 15  
 mutable, 12  
 nan?, 11  
 native-endianness, 11  
 native-eol-style, 12  
 native-transcoder, 12  
 negative?, 11  
 newline, 13  
 no-infinities-violation?, 13  
 no-nans-violation?, 13  
 non-continuable-violation?, 12  
 nongenerative, 12  
 not, 11  
 null-environment, 15  
 null?, 11  
 number->string, 11  
 number?, 11  
 numerator, 11  
 odd?, 11  
 opaque, 12  
 open-bytevector-input-port, 12  
 open-bytevector-output-port, 12  
 open-file-input-port, 12  
 open-file-input/output-port, 12  
 open-file-output-port, 12  
 open-input-file, 13  
 open-output-file, 13  
 open-string-input-port, 12  
 open-string-output-port, 12  
 or, 11  
 output-port-buffer-mode, 12  
 output-port?, 12  
 pair?, 11  
 parent, 12  
 parent-rtd, 12  
 partition, 11  
 peek-char, 13  
 port-eof?, 12  
 port-has-port-position?, 12  
 port-has-set-port-position!?, 12  
 port-position, 12  
 port-transcoder, 12  
 port?, 12  
 positive?, 11  
 procedure?, 11  
 protocol, 12  
 put-bytevector, 12  
 put-char, 12  
 put-datum, 12

[put-string](#), 12  
[put-u8](#), 12  
[quasiquote](#), 11  
[quasisyntax](#), 14  
[quote](#), 11  
[quotient](#), 15  
[r6rs](#), 6  
[R<sup>6</sup>RS Conformance](#), 9  
[R<sup>6</sup>RS Libraries](#), 11  
[R<sup>6</sup>RS Module Language](#), 6  
**R6RS**: Standard Language, 1  
[raise](#), 12  
[raise-continuable](#), 12  
[rational-valued?](#), 11  
[rational?](#), 11  
[rationalize](#), 11  
[read](#), 13  
[read-char](#), 13  
[real->flonum](#), 13  
[real-part](#), 11  
[real-valued?](#), 11  
[real?](#), 11  
[record-accessor](#), 12  
[record-constructor](#), 12  
[record-constructor-descriptor](#), 12  
[record-field-mutable?](#), 12  
[record-mutator](#), 12  
[record-predicate](#), 12  
[record-rtd](#), 12  
[record-type-descriptor](#), 12  
[record-type-descriptor?](#), 12  
[record-type-field-names](#), 12  
[record-type-generative?](#), 12  
[record-type-name](#), 12  
[record-type-opaque?](#), 12  
[record-type-parent](#), 12  
[record-type-sealed?](#), 12  
[record-type-uid](#), 12  
[record?](#), 12  
[remainder](#), 15  
[remove](#), 11  
[remp](#), 11  
[remq](#), 11  
[remv](#), 11  
[reverse](#), 11  
[rnrs/arithmetic/bitwise-6](#), 13  
[rnrs/arithmetic/fixnums-6](#), 13  
[rnrs/arithmetic/flonums-6](#), 13  
[rnrs/base-6](#), 11  
[rnrs/bytevectors-6](#), 11  
[rnrs/conditions-6](#), 12  
[rnrs/control-6](#), 11  
[rnrs/enums-6](#), 14  
[rnrs/eval-6](#), 14  
[rnrs/exceptions-6](#), 12  
[rnrs/files-6](#), 13  
[rnrs/hashtables-6](#), 14  
[rnrs/io/ports-6](#), 12  
[rnrs/io/simple-6](#), 13  
[rnrs/lists-6](#), 11  
[rnrs/mutable-pairs-6](#), 14  
[rnrs/mutable-strings-6](#), 14  
[rnrs/programs-6](#), 13  
[rnrs/r5rs-6](#), 15  
[rnrs/records/inspection-6](#), 12  
[rnrs/records/procedural-6](#), 12  
[rnrs/records/syntactic-6](#), 12  
[rnrs/sorting-6](#), 11  
[rnrs/syntax-case-6](#), 14  
[rnrs/unicode-6](#), 11  
[round](#), 11  
[Running Top-Level Programs](#), 4  
[Scheme Interoperability](#), 8  
[scheme-report-environment](#), 15  
[sealed](#), 12  
[serious-condition?](#), 12  
[set!](#), 11  
[set-car!](#), 14  
[set-cdr!](#), 14  
[set-port-position!](#), 12  
[simple-conditions](#), 12  
[sin](#), 11  
[sint-list->bytevector](#), 11  
[sqrt](#), 11

standard-error-port, 12  
 standard-input-port, 12  
 standard-output-port, 12  
 string, 11  
 string->bytevector, 12  
 string->list, 11  
 string->number, 11  
 string->symbol, 11  
 string->utf16, 11  
 string->utf32, 11  
 string->utf8, 11  
 string-append, 11  
 string-ci-hash, 14  
 string-ci<=?, 11  
 string-ci<?, 11  
 string-ci=?, 11  
 string-ci>=?, 11  
 string-ci>?, 11  
 string-copy, 11  
 string-downcase, 11  
 string-fill!, 14  
 string-foldcase, 11  
 string-for-each, 11  
 string-hash, 14  
 string-length, 11  
 string-normalize-nfc, 11  
 string-normalize-nfd, 11  
 string-normalize-nfkc, 11  
 string-normalize-nfkd, 11  
 string-ref, 11  
 string-set!, 14  
 string-titlecase, 11  
 string-upcase, 11  
 string<=?, 11  
 string<?, 11  
 string=?, 11  
 string>=?, 11  
 string>?, 11  
 string?, 11  
 substring, 11  
 symbol->string, 11  
 symbol-hash, 14  
 symbol=?, 11  
 symbol?, 11  
 syntax, 14  
 syntax->datum, 14  
 syntax-case, 14  
 syntax-rules, 11  
 syntax-violation, 14  
 syntax-violation-form, 12  
 syntax-violation-subform, 12  
 syntax-violation?, 12  
 tan, 11  
 textual-port?, 12  
 transcoded-port, 12  
 transcoder-codec, 12  
 transcoder-eol-style, 12  
 transcoder-error-handling-mode, 12  
 truncate, 11  
 u8-list->bytevector, 11  
 uint-list->bytevector, 11  
 undefined-violation?, 12  
 unless, 11  
 unquote, 11  
 unquote-splicing, 11  
 unsyntax, 14  
 unsyntax-splicing, 14  
 utf-16-codec, 12  
 utf-8-codec, 12  
 utf16->string, 11  
 utf32->string, 11  
 utf8->string, 11  
 values, 11  
 vector, 11  
 vector->list, 11  
 vector-fill!, 11  
 vector-for-each, 11  
 vector-length, 11  
 vector-map, 11  
 vector-ref, 11  
 vector-set!, 11  
 vector-sort, 11  
 vector-sort!, 11  
 vector?, 11

[violation?](#), 12  
[warning?](#), 12  
when, 11  
[who-condition?](#), 12  
[with-exception-handler](#), 12  
[with-input-from-file](#), 13  
[with-output-to-file](#), 13  
with-syntax, 14  
write, 13  
[write-char](#), 13  
[zero?](#), 11