Operator Syntax and Precedence

Description

Outlines R syntax and gives the precedence of operators.

Details

The following unary and binary operators are defined. They are listed in precedence groups, from highest to lowest.

`:: :::`	access variables in a namespace
`$ @`	component / slot extraction
`[ [[`	indexing
`^`	exponentiation (right to left)
`- +`	unary minus and plus
`:`	sequence operator
`%any% |>`	special operators (including `%%` and `%/%`)
`* /`	multiply, divide
`+ -`	(binary) add, subtract
`< > <= >= == !=`	ordering and comparison
`!`	negation
`& &&`	and
`| ||`	or
`~`	as in formulae
`-> ->>`	rightwards assignment
`<- <<-`	assignment (right to left)
`=`	assignment (right to left)
`?`	help (unary and binary)

Within an expression operators of equal precedence are evaluated from left to right except where indicated. (Note that `=` is not necessarily an operator.)

The binary operators `::`, `:::`, `$` and `@` require names or string constants on the right hand side, and the first two also require them on the left.

The links in the **See Also** section cover most other aspects of the basic syntax.

Note

There are substantial precedence differences between R and S. In particular, in S `?` has the same precedence as (binary) `+ -` and `& && | ||` have equal precedence.

References

Becker, R. A., Chambers, J. M. and Wilks, A. R. (1988) *The New S Language*. Wadsworth & Brooks/Cole.

See Also

`Arithmetic`, `Comparison`, `Control`, `Extract`, `Logic`, `NumericConstants`, `Paren`, `Quotes`, `Reserved`.

The ‘R Language Definition’ manual.

Examples

Run examples

```
## Logical AND ("&&") has higher precedence than OR ("||"):
TRUE || TRUE && FALSE   # is the same as
TRUE || (TRUE && FALSE) # and different from
(TRUE || TRUE) && FALSE

## Special operators have higher precedence than "!" (logical NOT).
## You can use this for %in% :
! 1:10 %in% c(2, 3, 5, 7) # same as !(1:10 %in% c(2, 3, 5, 7))
## but we strongly advise to use the "!( ... )" form in this case!


## '=' has lower precedence than '<-' ... so you should not mix them
##     (and '<-' is considered better style anyway):
## Not run: ## Consequently, this gives a ("non-catchable") error
 x <- y = 5  #->  Error in (x <- y) = 5 : ....

## End(Not run)
```