Basic Syntax

Comments are written after `#` sign.

```
# Comment
```

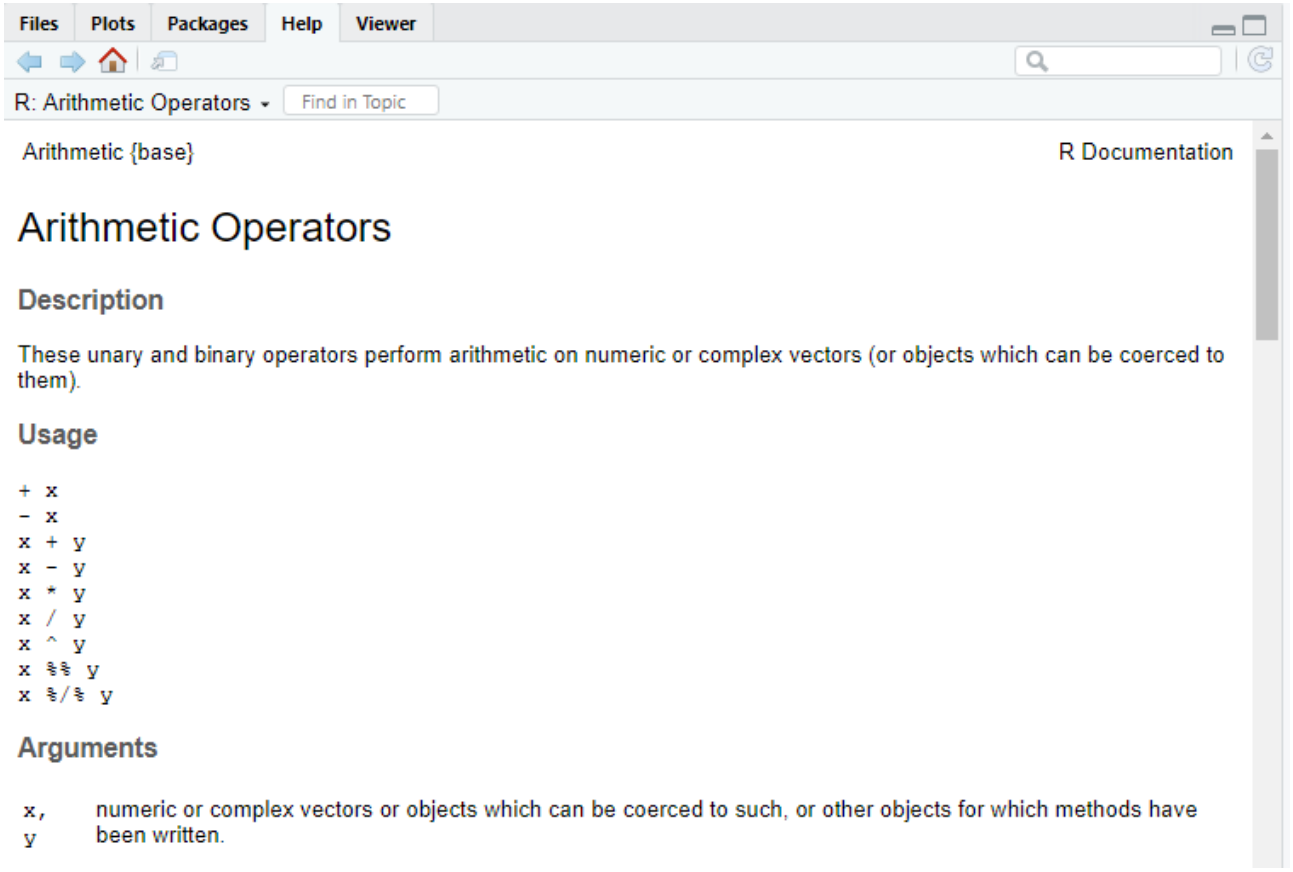
Arithmetic operators

```
> 2 + 3 # Addition
[1] 5
> 2 + 3 + 5
[1] 10
> 2 - 4 # Subtraction
[1] -2
> 2 * 3 # Multiplication
[1] 6
> (2 + 3) * 4
[1] 20
> 2 * 3 # Multiplication
[1] 6
> 11 / 3 # Division
[1] 3.666667
> 11 %/% 3 # Integer division
[1] 3
> 11 %/% 3 # Modulus - remainder after the division
[1] 3
> 11 %% 3 # Modulus - remainder after the division
[1] 2
> 2 ^ 3 # Raise to a power
[1] 8
> 2 ** 3 # Raise to a power
[1] 8
```

Where can we find some documentation?
What is the difference between ^ and **?

Getting help

```
> ?Arithmetic
> help("Arithmetic")
```



Using example we can run the examples in the end of the documentation
```
> example("Arithmetic")
```

Using apropos we can look for similar function names
```
> apropos("sq")
[1] "chisq.test" "dchisq"     "pchisq"     "qchisq"     "rchisq"
[6] "sqrt"       "sQuote"
```

Using find we can find from which package is the function
```
> find("sqrt")
[1] "package:base"
```

Assignment operators
Where can we find some documentation?
```
> ?assignOps
```

There are 3 different assignment operators
```
> x = 5
> y <- 5 # Recommended
> 5 -> z
> x; y; z # Prints
[1] 5
[1] 5
[1] 5
```

What are the differences between them?

1. They have different operator precedence ?Syntax
2. = has two meanings
    - operator: assignment operator
    - syntax token: named argument passing in a function call

```
> x = 20
> mean(x = 3); x
[1] 3
[1] 20
> mean (x <- 3); x
[1] 3
[1] 3
```

Syntax

R is case sensitive

```
> A <- 5
> a
Error: object 'a' not found
```

R is not typified

```
> a <- 5
> a <- 5.4
> a <- "string"
```

Printing values

You can print an object just by typing its name, because R is wrapping that object name within the print command, so the following lines of code are identical:

```
> a
[1] "string"
> print(a)
[1] "string"
```

print function looks for the attribute class of the object and the class type shows print how to generate the output.
print gives some options for formatting the output

- removing the quotes from the output

```
> print(a)
[1] "string"
> print(a, quote = FALSE)
[1] string
```

- determine how many digits from the output to be shown

```
> a <- 3145.429357; a
[1] 3145.429
> print(a, digits = 10)
[1] 3145.429357
```

```
>  print(a, digits = 5)
[1] 3145.4
> print(a, digits = 2)
[1] 3145
```

Also we can redirect the output to a file using sink and then return it back to the console

```
> sink("~/Desktop/myOutput.R")
> a <- "string"; a
> print(a, quote = FALSE)
> a <- 3.14151; a
> print(a, digits = 3)
> print(a, digits = 1)
> print(a, digits = 0)
> closeAllConnections( )
```

myOutput.R:

```
[1] "string"
[1] string
[1] 3.14151
[1] 3.14
[1] 3
[1] 3
```

Workng directory

getwd returns the absolute path to the current working directory.

```
> getwd( )
[1] "/Users/andreystoev"
```

The working directory tells R where to look for files and where to create files. So the file that you have just created in the previous example myoutput.R will be created in this directory.

If you want to change the working directory you can use setwd function

```
> setwd("~/Desktop")
[1] "/Users/andreystoev/Desktop"
> getwd( )
[1] "/Users/andreystoev/Desktop"
```

Objects

Everything in R is an object.

ls prints all names of the objects in the global environment

```
> ls( )
[1] "a" "A" "x" "y" "z"
```

rm removes objects from the current environment

```
> ls( )
[1] "a" "A" "x" "y" "z"
> rm(x, y, z)
> ls( )
```

```
[1] "a" "A"
```

`rm(list = ls( ))` removes all objects from the current environment

Sources

[1] Monika Petkova's notes on R programming language @ FMI, Sofia University