Lab 4 Walkthrough

Jack Reddan

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Simple calculations

```
5+3
```

```
## [1] 8
```
```
5-3
```

```
## [1] 2
```
```
5*3
```

```
## [1] 15
```
```
5/3
```

```
## [1] 1.666667
```

Saving your answers - object assignment

```
x <- 3*4
x
```

```
## [1] 12
```
```
this_is_a_really_long_name <- 2.5
this_is_a_really_long_name
```

```
## [1] 2.5
```
```
r_rocks <- 2^3
#rrocks
#Error: object 'rrocks' not found
#R_rocks
#Error: object 'R_rocks' not found
r_rocks
```

```
## [1] 8
```

Calling functions

```
seq(1, 10)
```

```
##  [1]  1  2  3  4  5  6  7  8  9 10
```

```r
seq(1, 10, by = 2)
```

```
## [1] 1 3 5 7 9
```

```r
example(seq)
```

```
## 
## seq> seq(0, 1, length.out = 11)
##  [1] 0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
## 
## seq> seq(stats::rnorm(20)) # effectively 'along'
##  [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
## 
## seq> seq(1, 9, by = 2)     # matches 'end'
## [1] 1 3 5 7 9
## 
## seq> seq(1, 9, by = pi)    # stays below 'end'
## [1] 1.000000 4.141593 7.283185
## 
## seq> seq(1, 6, by = 3)
## [1] 1 4
## 
## seq> seq(1.575, 5.125, by = 0.05)
##  [1] 1.575 1.625 1.675 1.725 1.775 1.825 1.875 1.925 1.975 2.025 2.075 2.125
## [13] 2.175 2.225 2.275 2.325 2.375 2.425 2.475 2.525 2.575 2.625 2.675 2.725
## [25] 2.775 2.825 2.875 2.925 2.975 3.025 3.075 3.125 3.175 3.225 3.275 3.325
## [37] 3.375 3.425 3.475 3.525 3.575 3.625 3.675 3.725 3.775 3.825 3.875 3.925
## [49] 3.975 4.025 4.075 4.125 4.175 4.225 4.275 4.325 4.375 4.425 4.475 4.525
## [61] 4.575 4.625 4.675 4.725 4.775 4.825 4.875 4.925 4.975 5.025 5.075 5.125
## 
## seq> seq(17) # same as 1:17, or even better seq_len(17)
##  [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17
```

```r
date()
```

```
## [1] "Sat Oct  9 19:08:50 2021"
```

Getting help in R

```r
help(log)
?log
help.search("cross tabulate")
??"cross tabulate"
example(log)
```

```
## 
## log> log(exp(3))
## [1] 3
## 
## log> log10(1e7) # = 7
## [1] 7
## 
## log> x <- 10^-(1+2*1:9)
## 
```

```
## log> cbind(x, log(1+x), log1p(x), exp(x)-1, expm1(x))
##         x
##  [1,] 1e-03 9.995003e-04 9.995003e-04 1.000500e-03 1.000500e-03
##  [2,] 1e-05 9.999950e-06 9.999950e-06 1.000005e-05 1.000005e-05
##  [3,] 1e-07 1.000000e-07 1.000000e-07 1.000000e-07 1.000000e-07
##  [4,] 1e-09 1.000000e-09 1.000000e-09 1.000000e-09 1.000000e-09
##  [5,] 1e-11 1.000000e-11 1.000000e-11 1.000000e-11 1.000000e-11
##  [6,] 1e-13 9.992007e-14 1.000000e-13 9.992007e-14 1.000000e-13
##  [7,] 1e-15 1.110223e-15 1.000000e-15 1.110223e-15 1.000000e-15
##  [8,] 1e-17 0.000000e+00 1.000000e-17 0.000000e+00 1.000000e-17
##  [9,] 1e-19 0.000000e+00 1.000000e-19 0.000000e+00 1.000000e-19
```

Vectors, vectorizations, and indexing

```r
length(3.1)
```

```
## [1] 1
```

```r
x <- c(56, 95.3, 0.4)
x
```

```
## [1] 56.0 95.3  0.4
```

```r
y <- c(3.2, 1.1, 0.2)
y
```

```
## [1] 3.2 1.1 0.2
```

Vectorization

```r
x+y
```

```
## [1] 59.2 96.4  0.6
```

```r
x-y
```

```
## [1] 52.8 94.2  0.2
```

```r
x/y
```

```
## [1] 17.50000 86.63636  2.00000
```

```r
sqrt(x)
```

```
## [1] 7.4833148 9.7621719 0.6324555
```

```r
round(sqrt(x), 3)
```

```
## [1] 7.483 9.762 0.632
```

```r
log(x)/2 + 1
```

```
## [1] 3.0126758 3.2785149 0.5418546
```

Vector indexing

```r
x <- c(56, 95.3, 0.4)
x[2]
```

```
## [1] 95.3
x[1]
```

```
## [1] 56
x[4]
```

```
## [1] NA
x[3] <- 0.5
x
```

```
## [1] 56.0 95.3  0.5
```

Reproducibility and sessionInfo()

```
sessionInfo()
```

```
## R version 4.1.1 (2021-08-10)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Arch Linux
##
## Matrix products: default
## BLAS:   /usr/lib/libblas.so.3.10.0
## LAPACK: /usr/lib/liblapack.so.3.10.0
##
## locale:
##  [1] LC_CTYPE=en_US.UTF-8       LC_NUMERIC=C
##  [3] LC_TIME=en_US.UTF-8        LC_COLLATE=en_US.UTF-8
##  [5] LC_MONETARY=en_US.UTF-8    LC_MESSAGES=en_US.UTF-8
##  [7] LC_PAPER=en_US.UTF-8       LC_NAME=C
##  [9] LC_ADDRESS=C               LC_TELEPHONE=C
## [11] LC_MEASUREMENT=en_US.UTF-8 LC_IDENTIFICATION=C
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## loaded via a namespace (and not attached):
##  [1] compiler_4.1.1   magrittr_2.0.1   tools_4.1.1      htmltools_0.5.1.1
##  [5] yaml_2.2.1       stringi_1.7.2    rmarkdown_2.11   knitr_1.33
##  [9] stringr_1.4.0    xfun_0.24        digest_0.6.27    rlang_0.4.11
## [13] evaluate_0.14
```

In lab

```
x <- 1:50
plot(x, sin(x))
```
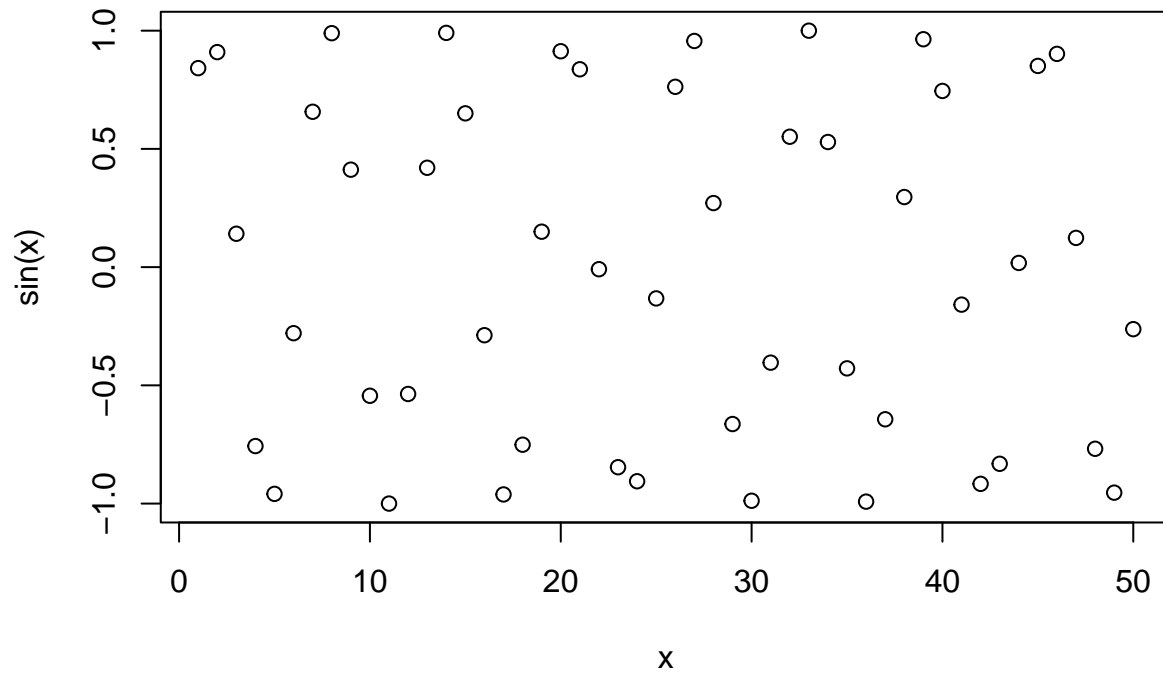
```
?plot
```

```
## Help on topic 'plot' was found in the following packages:
##
##   Package                Library
##   graphics               /usr/lib/R/library
##   base                   /usr/lib64/R/library
##
##
## Using the first match ...
```

```r
plot(x, sin(x),
     type = "l",
     col = "blue",
     lwd = 3,
     xlab = "A vector named x")
```

A vector named x