S2S Lab 1

Further Exercises Solutions

Exercise 1

The code below creates the vectors `a` and `b`. `a` randomly takes the value 1 or 2 and `b` randomly takes the value 2 or 4 (this is done using the `sample()` function which you can learn more about using the `help()` function).

```
a <- sample(c(1, 2), 1)
b <- sample(c(2, 4), 1)
```

Create a new vector `c` which is:

- `TRUE` if both `a` and `b` are equal.
- `FALSE` if `a` and `b` are different.

Create another vector `d` which is:

- `FALSE` if `a` is 1 and `b` is 2.
- `TRUE` if `a` is 2 and `b` is 2.
- `FALSE` if `a` is 1 and `b` is 4.
- `FALSE` if `a` is 2 and `b` is 4.

Solution

```
c <- a == b

d <- a >= b
```

Exercise 2

$$\boldsymbol{P} = \begin{bmatrix} 3 \\ 54 \\ 1 \\ 6 \\ 0 \end{bmatrix}, \qquad \boldsymbol{Q} = \begin{bmatrix} 18 \\ -1 \end{bmatrix}$$

Create the vectors $\boldsymbol{P}$ and $\boldsymbol{Q}$ in R.

Write code to complete the calculation $\boldsymbol{P} + 2 \times \boldsymbol{Q}$ and save the result as a new vector called `R`.

Extract the 2^{nd} and 5^{th} elements of `R`. Can you predict what these values will be before running your code?

Solution

```
P <- c(3, 54,1, 6, 0)
Q <- c(18, -1)

R <- P + 2*Q
```

```
R[c(2, 5)]
```

```
[1] 52 36
```

Exercise 3

Create the sequence **TRUE, TRUE, FALSE, TRUE, TRUE, FALSE, TRUE, TRUE, FALSE** using the `rep()` function and save the result as a vector called `logical`. Change `logical` to a numeric vector called `numeric`.

Next, create the vector $\left[5.50, 5.25, 5.00, 4.75, 4.50, 4.25, 4.00, 3.75, 3.50\right]^{\intercal}$ using the `seq()` function and call it `sequence`.

Finally add together `numeric` and `sequence` and use the `subset()` function to keep only the elements which are greater than 5.50.

Solution

```
logical <- rep(x = c(TRUE, TRUE, FALSE), times = 3)
logical <- rep(rep(x = c(TRUE, FALSE), times = c(2, 1)), times = 3)

numeric <- as.numeric(logical)

sequence <- seq(from = 5.5, to = 3.5, by = -0.25)

subset(x = numeric + sequence, subset = (numeric + sequence > 5.5))
```

```
[1] 6.50 6.25 5.75
```