R Basics

Matrices

Example 1

```
mymat <- matrix(1:12, 4, 2)
mymat
```

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

```
mymat <- matrix(1:12, ncol = 3, byrow = TRUE)
```

Example 2

```
kenya <- c(460.998, 314.4)
ethiopia <- c(290.475, 247.900)
chad <- c(309.306, 165.8)
geographical_matrix <- matrix(c(kenya, ethiopia, chad), nrow = 3, byrow =
TRUE)
geographical_matrix
```

```
##         [,1]  [,2]
## [1,] 460.998 314.4
## [2,] 290.475 247.9
## [3,] 309.306 165.8
```

```
location <- c("Lat", "Long")
countries <- c("Kenya", "Ethiopia", "Chad")
colnames(geographical_matrix) <- location
rownames(geographical_matrix) <- countries
geographical_matrix
```

```
##              Lat  Long
## Kenya    460.998 314.4
## Ethiopia 290.475 247.9
## Chad     309.306 165.8
```

Exercise ### Family matrix

```
jane <- c("Jane", 39, "Female", "Doctor")
pauline <- c("Pauline", 37, "Female", "Teacher")
daniel <- c("Daniel", 35, "Male", "Nurse")
mildred <- c("Mildred", 33, "Female", "Teacher")
cyprian <- c("Cyprian", 31, "Male", "Tutor")
names_matrix <- matrix(c(jane, pauline, daniel, mildred, cyprian), nrow = 5,
```

```
byrow = TRUE)
names_matrix
```

```
##      [,1]      [,2] [,3]     [,4]
## [1,] "Jane"    "39" "Female" "Doctor"
## [2,] "Pauline" "37" "Female" "Teacher"
## [3,] "Daniel"  "35" "Male"   "Nurse"
## [4,] "Mildred" "33" "Female" "Teacher"
## [5,] "Cyprian" "31" "Male"   "Tutor"
```

```
names <- c("Name", "Age", "Gender", "Occupation")
colnames(names_matrix) <-names
names_matrix
```

```
##      Name      Age  Gender   Occupation
## [1,] "Jane"    "39" "Female" "Doctor"
## [2,] "Pauline" "37" "Female" "Teacher"
## [3,] "Daniel"  "35" "Male"   "Nurse"
## [4,] "Mildred" "33" "Female" "Teacher"
## [5,] "Cyprian" "31" "Male"   "Tutor"
```

Adding columns

```
x <- matrix(1:9, nrow = 3)
x
```

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

```
cbind(x, c(1, 2, 3))
```

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

```
rbind(x,c(3,4,6))
```

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

Selecting Elements

```
x[2, 3]
```

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

```
x[1,]
```

```
## [1] 1 4 7
```

```
x[,2]
```

```
## [1] 4 5 6
```

```
names_matrix[2,4]
```

```
## Occupation
##  "Teacher"
```

```
names_matrix[5,2]
```

```
##  Age
## "31"
```

```
names_matrix[4,]
```

```
##       Name        Age     Gender Occupation
##  "Mildred"       "33"   "Female"  "Teacher"
```

```
names_matrix[,3]
```

```
## [1] "Female" "Female" "Male"   "Female" "Male"
```

Matrix Operations

```
x <- matrix(c(3, 9, -1, 4, 2, 6), nrow = 2)
y <- matrix(c(5, 2, 7, 9, 3, 4), nrow = 2)
# printing x
x
```

```
##      [,1] [,2] [,3]
## [1,]    3   -1    2
## [2,]    9    4    6
```

```
# printing y
y
```

```
##      [,1] [,2] [,3]
## [1,]    5    7    3
## [2,]    2    9    4
```

```
# addition
x&y
```

```
##      [,1] [,2] [,3]
## [1,] TRUE TRUE TRUE
## [2,] TRUE TRUE TRUE
```

```
x-y
```

```
##      [,1] [,2] [,3]
## [1,]   -2   -8   -1
## [2,]    7   -5    2
```

```
x*y
```

```
##      [,1] [,2] [,3]
## [1,]   15   -7    6
## [2,]   18   36   24
```

```
x|y
```

```
##      [,1] [,2] [,3]
## [1,] TRUE TRUE TRUE
## [2,] TRUE TRUE TRUE
```