# Lists and Vectors

## 1. Creating

### Lists

# Question: Create a list using the list() function  
# ---  
#  
alist <- list ("Red", "Blue", c(42,36,01), FALSE, 73.91, 128.6)  
  
# printing alist  
# ---   
alist

## [[1]]  
## [1] "Red"  
##   
## [[2]]  
## [1] "Blue"  
##   
## [[3]]  
## [1] 42 36 1  
##   
## [[4]]  
## [1] FALSE  
##   
## [[5]]  
## [1] 73.91  
##   
## [[6]]  
## [1] 128.6

### Vectors

# Question: Create vectors a, b and c   
# ---  
#   
a <- c(1,2,5.3,6,-2,4) # numeric vector   
b <- c("one","two","three") # character vector   
c <- c(TRUE,TRUE,TRUE,FALSE,TRUE,FALSE) # logical vector  
  
# Print out these vectors a, b and c  
a

## [1] 1.0 2.0 5.3 6.0 -2.0 4.0

b

## [1] "one" "two" "three"

c

## [1] TRUE TRUE TRUE FALSE TRUE FALSE

## 2. Naming

### Lists

# Question: Create a list containing a vector, a matrix and a list  
# ---  
#   
list\_data <- list(c("Jan","Feb","Mar"), matrix(c(3,9,5,1,-2,8), nrow = 2), list("green",12.3))   
  
# Giving names to the elements in the list  
names(list\_data) <- c("1st Quarter", "A\_Matrix", "A Inner list")   
  
# Print the list  
  
list\_data

## $`1st Quarter`  
## [1] "Jan" "Feb" "Mar"  
##   
## $A\_Matrix  
## [,1] [,2] [,3]  
## [1,] 3 5 -2  
## [2,] 9 1 8  
##   
## $`A Inner list`  
## $`A Inner list`[[1]]  
## [1] "green"  
##   
## $`A Inner list`[[2]]  
## [1] 12.3

### Vectors

#### 2.2 Naming Vectors

# You can give a name to the elements of a vector with the names() function   
# ---  
#   
a <- c("Serena Williams", "Tennis Player")   
names(a) <- c("Name", "Profession")  
  
# Then print out these vectors  
# ---  
   
a

## Name Profession   
## "Serena Williams" "Tennis Player"

## 3. Selection

### Lists

#### 3.1 List Selection

# Question: Let's now create a list ls  
# ---  
#   
ls <- list( first = 2, second = 4, third = list( fourth = 3.2, fifth = 6.4 ) )  
  
# ---  
#  
ls [1:2]#output the first and second

## $first  
## [1] 2  
##   
## $second  
## [1] 4

ls[-3]#output first and second

## $first  
## [1] 2  
##   
## $second  
## [1] 4

ls [c ("first", "second")]#output first and second

## $first  
## [1] 2  
##   
## $second  
## [1] 4

### Vectors

#### 3.1 Vector Selection

# Create a numeric vector a   
# ---  
#   
a <- c(1,2,5.3,6,-2,4)   
  
# And select the 2nd and 3rd elements in the vector  
a[c(2,3)]

## [1] 2.0 5.3

#another way  
a[2:3]

## [1] 2.0 5.3

## 4. Adding

### Lists

#### 4.1 Adding Lists

# Question: Create a list containing a vector and a matrix   
# ---  
#   
list\_data <- list(c("Jan","Feb","Mar"), matrix(c(3,9,5,1,-2,8), nrow = 2))  
  
list\_data

## [[1]]  
## [1] "Jan" "Feb" "Mar"  
##   
## [[2]]  
## [,1] [,2] [,3]  
## [1,] 3 5 -2  
## [2,] 9 1 8

# And add an element at the end of the list then print it out  
# ---  
#   
list\_data[4] <- "New element"   
  
list\_data[3] <- "Vincent"  
list\_data

## [[1]]  
## [1] "Jan" "Feb" "Mar"  
##   
## [[2]]  
## [,1] [,2] [,3]  
## [1,] 3 5 -2  
## [2,] 9 1 8  
##   
## [[3]]  
## [1] "Vincent"  
##   
## [[4]]  
## [1] "New element"

## Challenge  
# ---  
# Question: Create an empty list named months\_of\_the\_years,   
# then add all 12 months of the year  
# ---  
#   
months<-list(c())  
months[1] <- "Jan"  
months[2] <- "Feb"  
months[3] <- "March"  
months[4] <- "April"  
months[5] <- "May"  
months[6] <- "June"  
months[7] <- "July"  
months[8] <- "Aug"  
months[9] <- "Sep"  
months[10] <- "Oct"  
months[11] <- "Nov"  
months[12] <- "Dec"  
  
months

## [[1]]  
## [1] "Jan"  
##   
## [[2]]  
## [1] "Feb"  
##   
## [[3]]  
## [1] "March"  
##   
## [[4]]  
## [1] "April"  
##   
## [[5]]  
## [1] "May"  
##   
## [[6]]  
## [1] "June"  
##   
## [[7]]  
## [1] "July"  
##   
## [[8]]  
## [1] "Aug"  
##   
## [[9]]  
## [1] "Sep"  
##   
## [[10]]  
## [1] "Oct"  
##   
## [[11]]  
## [1] "Nov"  
##   
## [[12]]  
## [1] "Dec"

### Vectors

#### 4.2 Adding Vectors

# Question: Vectors can be combined via the function c as shown  
# ---  
#   
p = c(1, 2, 3)  
q = c("aa", "bb", "cc")  
  
# Then print out the combined vector  
# ---  
#   
c(p, q)

## [1] "1" "2" "3" "aa" "bb" "cc"

## Challenge   
# ---  
# Question: Combine the following vectors and print out the result below  
# ---  
#   
a <- c("Serena Williams", "Tennis Player")   
names(a) <- c("Name","Profession")  
b <- c("Nakuru")  
names(b)<- c("Residence")  
c(a,b)

## Name Profession Residence   
## "Serena Williams" "Tennis Player" "Nakuru"