Homework-2

Madhu Peduri

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1.(a) Create a vector of length 10 and fill it with a sequence of integers

We use concatenat function to create a vector object,

```
v <- c(1:10)
length(v)
```

```
## [1] 10
```

⇒ Vector = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

1.(b) Coerce the vector into a matrix of 5 rows and 2 columns.

We use matrix and as.matrix() functions to coerce a vector in to matrix.

```
m <- as.matrix(matrix(v,nrow=5,ncol=2))
print(m)
```

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

```
print(class(m))
```

```
## [1] "matrix" "array"
```

1.(c) Name the columns of the matrix "A" and "B".

We use dimnames() function to add names to the columns of above matrix

```
dimnames(m)[2] <- list(c('A','B'))
print(m)
```

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

2.Assume that we have recorded the names and ages for four people: James is 27, Art is 42, Kate is 29, and Alex is 33.

(a) Create a vector of names and a vector of ages from the data, making sure that you keep the ordering of the elements consistent.

```
nameVec <- c('James', 'Art', 'Kate', 'Alex')
ageVec <- c(27,42,29,33)
```

⇒ Names = James, Art, Kate, Alex
⇒ Ages = 27, 42, 29, 33

(b) Use the class() function to print the class metadata R has stored for each vector.

```
cn <- class(nameVec)
ca <- class(ageVec)
```

⇒ Class of Names Vector = character
⇒ Class of Age vector = numeric

(c) Using data.frame(), combine the two vectors into a dataframe and name the columns something informative. Print out the dataframe.

```
df <- data.frame(names=nameVec, ages = ageVec)
print(df)
```

```
##   names ages
## 1 James   27
## 2   Art   42
## 3  Kate   29
## 4  Alex   33
```

3.A hypothetical data with heights (in cm) and weights (in kg) of 10 family members are given

(a) Create a vector called 'ht' corresponding to the heights of the 10 family members. Assign the names of the family members to the 'names' attribute of this vector.

```
ht <- c(120,172,163,158,153,148,160,170,155,167)
names(ht) <- c('Niece','Son','GrandPa','Daughter','Yai','GrandMa','Aunty','Uncle','Mom','Dad')
print(ht)
```

```
##    Niece      Son  GrandPa Daughter      Yai  GrandMa    Aunty    Uncle
##      120      172      163      158      153      148      160      170
##      Mom      Dad
##      155      167
```

(b) Create a vector called 'wt' corresponding to the family member's weights.

```
wt <- c(22,52,71,51,51,60,50,67,53,64)
print(wt)
```

```
##  [1] 22 52 71 51 51 60 50 67 53 64
```

(c) Compute the body mass index (BMI: units should be kg/m2) of each person where BMI = weight/height2.

```
bmi <- mapply(function(x,y){(y * 100 * 100)/(x * x)}, ht,wt)
print(bmi)
```

```
##    Niece      Son  GrandPa Daughter      Yai  GrandMa    Aunty    Uncle
## 15.27778 17.57707 26.72287 20.42942 21.78649 27.39226 19.53125 23.18339
##      Mom      Dad
## 22.06035 22.94812
```

(d) Identify the persons who have the lowest and highest BMI and calculate the standard deviation of the BMI.

```
minBmi <- names(bmi)[bmi == min(bmi)]
maxBmi <- names(bmi)[bmi == max(bmi)]
sdBmi  <- sd(bmi)
```

$\Rightarrow$ Minimum BMI = Niece
$\Rightarrow$ Maximum BMI = GrandMa
$\Rightarrow$ Standard Deviation in BMI = 3.7429511