Managing and Understanding Data (Class Exercise)

R data structures:

1. Generate 3 student name, gender, gpa and grade vectors. You could use names such as "Henry Grant", "Amy Becker", "Bessie Kim"; use gender such as "male", "female", "female"; use gpa such as 3.5, 3.7, 3.2; use grades such as "senior", "sophomore", "junior".

Ans1:

[1] "Henry Grant" "Amy Becker"  "Bessie Kim"

[1] "male"   "female" "female"

[1] 3.5 3.7 3.2

[1] "senior"    "sophomore" "junior"

Code1:

names <- c("Henry Grant", "Amy Becker", "Bessie Kim")

gender <- c("male", "female", "female")

gpa <- c(3.5, 3.7, 3.2)

grades <- c("senior", "sophomore", "junior")

2. Access the gender of second student and access the first two students’ grades.

Ans 2:

[1] "female"

[1] "senior"    "sophomore"

Code2:

gender[2]

grades[1:2]

3. Change vector gender into a factor vector with levels female and male; also change vector grade into a factor vector with levels freshman, sophomore, junior and senior.

Ans 3:

[1] male   female female

Levels: male female

[1] senior    sophomore junior

Levels: Freshman sophomore junior senior

Code 3:

gender <-factor(c("male", "female", "female"),

                levels = c("male", "female"))

gender

grades <- factor(c("senior", "sophomore", "junior"),

                 levels = c("Freshman", "sophomore", "junior","senior"))

grades

4. Create a data frame using student information you generated above with stringsAsFactors set to False; Display the data frame and see how many rows and how many columns does this data frame have?

Ans 4:This data frame created from above has 3 rows and 4 columns

        names gender gpa    grades

1 Henry Grant   male 3.5    senior

2  Amy Becker female 3.7 sophomore

3  Bessie Kim female 3.2    junior

Code 4:

data <- data.frame(names, gender, gpa, grades, stringsAsFactors = FALSE)

data

5. Access student gpa column; get student name and grade by specifying a vector of column names.

Ans 5:

  gpa  
1 3.5  
2 3.7  
3 3.2

          names    grades  
1 Henry Grant    senior  
2  Amy Becker sophomore  
3  Bessie Kim    junior

Code 5:

col = data[c("gpa")]  
col

col = data[c("names", "grades")]  
col

6. Access student information in row 1 and column 2. What is it?

Ans 6: The ans is male

“Male”

Code 6:

stuinfo = data[c(1),c(2)]

stuinfo

7. Access student information in row 2 & column 3 and in row 3 & column 4 together using vectors. What does the output look like?

Ans 7:

                  gpa    grades

             2   3.7 sophomore

             3   3.2    junior

Code 7:

stinf = data[c(2,3),c(3,4)]

stinf

8. Output student information in column 2 (all rows), then in row 3 (all columns) and then all rows & all columns.

Ans 8:

output1 :  “male” “female” “female”

output2 :    names gender gpa grades

                 3 Bessie Kim female 3.2 junior

output3:     names            gender  gpa    grades

                  1 Henry Grant   male     3.5    senior

                  2  Amy Becker female   3.7 sophomore

                  3  Bessie Kim   female    3.2    junior

Code 8:

1. data[,c(2)]
2. data[c(3),]
3. data[,]

 9. Create a 4\*2 matrix M using characters from ‘a’ to ‘h’; Create a 3\*3 matrix N using character from ‘a’ to ‘i’.

Ans 9:

Output1:

        [,1] [,2]  
[1,] "a"  "e"   
[2,] "b"  "f"   
[3,] "c"  "g"   
[4,] "d"  "h"

Output2:

     [,1] [,2] [,3]

[1,] "a"  "d"  "g"

[2,] "b"  "e"  "h"

[3,] "c"  "f"  "i"

Code 9:

alpha1 <- c("a","b","c","d","e","f","g","h")  
M <- matrix(alpha1,nrow=4,ncol=2)  
M

alpha2 <- c("a","b","c","d","e","f","g","h","i")

N <- matrix(alpha2, nrow=3,ncol=3)

N

 10. Extract values from matrix. What character in M do you have in row 2 and column 1? What character in N do you have in row 3 and column 2?

Ans 10:

[1] "b"

[1] "f"

Code 10:

M[c(2),c(1)]

N[c(3),c(2)]

Ans 11:

[1] "b" "d" "f" "h"

[1] "g" "h" "i"

11. Extract the second row (all columns) of matrix M; extract the third column (all rows) of matrix N.

Code 11:

M[c(2),]

N[,c(3)]