**STAT 40001/MA 59800 Statistical Computing Fall 2017**

**Lab-3**

1. Create the following matrix using R.



> a = matrix(c(3,-2,3,-1,0,3,20,6,8,9,2,12,-17,12,5,1,2,8,-9,10),nrow = 4,byrow=T)

> a

[,1] [,2] [,3] [,4] [,5]

[1,] 3 -2 3 -1 0

[2,] 3 20 6 8 9

[3,] 2 12 -17 12 5

[4,] 1 2 8 -9 10

1. Consider the following two data sets:

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Age | Major | Gender |
| Tony | 21 | Math | Male |
| Peter | 25 | Math | Male |
| Nancy | 27 | STAT | Female |

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Age | Major | Gender |
| Jay | 23 | CS | Male |
| Amanda | 28 | Math | Female |
| George | 27 | STAT | Male |

1. Create a single data frame.

> Name = c("Tony","Peter","Nancy")

> Age = c(21,25,27)

> Major = c("Math","Math","STAT")

> Gender = c("Male","Male","Female")

> data1 = data.frame(Name,Age,Major,Gender)

> Name = c("Jay","Amanda","George")

> Age = c(21,25,27)

> Major = c("CS","Math","STAT")

> Gender = c("Male","Female","Male")

> data2 = data.frame(Name,Age,Major,Gender)

> data = rbind(data1,data2)

> data

Name Age Major Gender

1 Tony 21 Math Male

2 Peter 25 Math Male

3 Nancy 27 STAT Female

4 Jay 21 CS Male

5 Amanda 25 Math Female

6 George 27 STAT Male

1. Remove the serial number (which appears by default) and row name “Name”.

> name = as.vector(data[,'Name'])

> age = as.vector(data[,'Age'])

> major = as.vector(data[,'Major'])

> gender = as.vector(data[,'Gender'])

> data = data.frame(row.names = name,age,major,gender)

> data

age major gender

Tony 21 Math Male

Peter 25 Math Male

Nancy 27 STAT Female

Jay 21 CS Male

Amanda 25 Math Female

George 27 STAT Male

1. Sort the data frame using Age.

> data=data[order(data[,"age"]),]

> data

age major gender

Tony 21 Math Male

Jay 21 CS Male

Peter 25 Math Male

Amanda 25 Math Female

Nancy 27 STAT Female

George 27 STAT Male

1. The data below contains missing values.

7,4,5,6,23,8,NA,34,23,56,NA,6,4,58,12,17,23, -10

1. Remove the missing values

> y = c(7,4,5,6,23,8,NA,34,23,56,NA,6,4,58,12,17,23,-10)

> y = y[!is.na(y)]

> y

[1] 7 4 5 6 23 8 34 23 56 6 4 58 12 17 23 -10

1. How many observations are less than 10?

> length(which(y<10))

[1] 8

1. If then calculate A+B and A-B.

> A = matrix(c(3,2,1,-3,2,-4,3,0,6,0,-1,5),nrow=3,byrow=T)

> B = matrix(c(2,-3,7,6,-4,-5,0,-2,2,4,-3,5),nrow=3,byrow=T)

> A + B

[,1] [,2] [,3] [,4]

[1,] 5 -1 8 3

[2,] -2 -9 3 -2

[3,] 8 4 -4 10

> A - B

[,1] [,2] [,3] [,4]

[1,] 1 5 -6 -9

[2,] 6 1 3 2

[3,] 4 -4 2 0

1. Using the matrix method, solve:

3*x* – *y* = 5

-4*x* + 2*y* = -9.

> A = matrix(c(3,-4,-1,2),2)

> B = matrix(c(5,-9),2)

> X = solve(A)%\*%B

> X

[,1]

[1,] 0.5

[2,] -3.5