**ITA0448 – STATISTICS WITH R PROGRAMMING FOR VECTORIZED EXPRESSIONS**

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**ASSIGNMENT**

**1. Consider the data set occupationalStatus in the datasets package.**

1. **What is the probability of a son having the same occupational status as his father? [Hint: investigate what diag(x) does if x is a matrix.]**
2. **Renormalize the data so that each row sums to 1. In the new data set the ith row represents the conditional distribution of a son’s occupational status given that his father has occupational status i.**
3. **What is the probability that a son has occupational status between 1 and 3, given that his father has status 1?**

**What if the father has occupational status 8?**

a)

library(datasets) data("occupationalStatus")

prob <- sum(diag(occupationalStatus)) / sum(occupationalStatus) prob

> prob

[1] 0.2747

b)

occupationalStatus\_norm <- apply(occupationalStatus, 1, function(x) x/sum(x)) prob\_1to3\_given\_1 <- occupationalStatus\_norm[1,1:3] %\*% matrix(1, nrow=3)/3 prob\_1to3\_given\_1

[,1]

[1,] 0.6981159

c)

prob\_1to3\_given\_8 <- occupationalStatus\_norm[8,1:3] %\*% matrix(1, nrow=3)/3 prob\_1to3\_given\_8

> prob\_1to3\_given\_8

[,1]

[1,] 0.2243202

**2. Create the following data frame, subsequently invert Gender for all individuals.**

**a) Name Age Height Weight Gender**

**Alex 25 177 57 M**

**Lilly 31 163 69 M**

**Mark 23 190 83 F**

data <- data.frame(

Name = c("Alex", "Lilly", "Mark"),

Age = c(25, 31, 23),

Height = c(177, 163, 190),

Weight = c(57, 69, 83),

Gender = c("M", "M", "F")

)

data$Gender <- ifelse(data$Gender == "M", "F", "M")

print(data)

Name Age Height Weight Gender

1. Alex 25 177 57 F
2. Lilly 31 163 69 F
3. Mark 23 190 83 M

**b) Create the below data frame**

Name Working

Alex Yes

Lilly No

Mark No

data2 <- data.frame(

Name = c("Alex", "Lilly", "Mark"),

Working = c("Yes", "No", "No")

)

print(data2)

Name Working

1. Alex Yes
2. Lilly No
3. Mark No

**c) Add the data frame column-wise to the previous one.**

**How many rows and columns does the new data frame have?**

merged\_data <- cbind(data, data2$Working)

print(merged\_data)

Name Age Height Weight Gender data2$Working

1. Alex 25 177 57 F Yes
2. Lilly 31 163 69 F No
3. Mark 23 190 83 M No

**3. A student recorded his/her scores on weekly R programming quizzes that were marked out of a possible 10 points. His/Herscores were as follows:**

**8, 5, 8, 5, 7, 6, 7, 7, 5, 7, 5, 5, 6, 6, 9, 8, 9, 7, 9, 9, 6, 8, 6, 6, 7**

**What is the mode of his/her scores on the weekly R programming quizzes?**

scores <- c(8, 5, 8, 5, 7, 6, 7, 7, 5, 7, 5, 5, 6, 6, 9, 8, 9, 7, 9, 9, 6, 8, 6, 6, 7)

mode <- names(table(scores))[table(scores)==max(table(scores))]

print(mode)

[1] "7"

**4. Construct the following data frame.**

**Countries population\_in\_million gdp per\_capita**

1. 100 2000
2. 200 7000 C 120 15000

**a) Write appropriate R code and reshape the above data frame from wide data format to long data format.**

library(tidyr)

data <- data.frame( Countries = c("A", "B", "C"), population\_in\_million = c(100, 200, 120), gdp\_per\_capita = c(2000, 7000, 15000)

)

long\_data <- gather(data, key = "variable", value = "value", -Countries)

print(long\_data)

Countries variable value

1. A population\_in\_million 100
2. B population\_in\_million 200
3. C population\_in\_million 120
4. A gdp\_per\_capita 2000
5. B gdp\_per\_capita 7000
6. C gdp\_per\_capita 15000

**b) Write R code and reshape from long to wide data format.**

wide\_data <- spread(long\_data, key = "variable", value = "value")

print(wide\_data)

Countries gdp\_per\_capita population\_in\_million

1. A 2000 100
2. B 7000 200
3. C 15000 120

**5. Consider the following data present. Create this file using windows notepad . Save the file as input.csv using the save As All files(\*.\*) option in notepad.**

Name,Age,Country,Gender

fradeep,25,USA,Male

Saravanan,31,Canada,Female

Rishik,23,UK,Male

pooja,27,Australia,Female