ITA0448-R PROGRAMMING

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Day 3 assignment

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

(a) 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.]

(b) 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.

(c) 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?

CODE:

```
a)data(occupationalStatus)

trans_mat <- table(occupationalStatus$fath, occupationalStatus$son)


prob_same <- sum(diag(trans_mat))/sum(trans_mat)

prob_same
```

Output

```
[1] 0.2862006
```

```
b)trans_mat_norm <- trans_mat / rowSums(trans_mat)


prob_son_1_3_given_fath_1 <- sum(trans_mat_norm[1, 1:3])

prob_son_1_3_given_fath_1
```

output

```
[1] 0.5454545
```

```
c)prob_son_1_3_given_fath_8 <- sum(trans_mat_norm[8, 1:3])
prob_son_1_3_given_fath_8
```

output

```
[1] 0
```

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

b) Create the below data frame

Name Working

Alex Yes

Lilly No

Mark No

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

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

CODE:

```
a)df <- 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"))
df$Gender <- ifelse(df$Gender == "M", "F", "M")

b)working <- data.frame(Name = c("Alex", "Lilly", "Mark"),
             Working = c("Yes", "No", "No"))
```

```
c)new_df <- cbind(df, working$Working)
```

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?

CODE:

We can see that the score of 7 appears most frequently, with a total of 4 times. Therefore, the mode of the scores is 7.

4. Construct the following data frame.

Countries population_in_million gdp_per_capita

A 100 2000

B 200 7000

C 120 15000

a) Write appropriate R code and reshape the above data frame from wide data format

to long data format.

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

CODE:

```
a)library(tidyr)


# Create data frame

df <- data.frame(Countries = c("A", "B", "C"),

          population_in_million = c(100, 200, 120),

          gdp_per_capita = c(2000, 7000, 15000))


# Reshape to long format

df_long <- pivot_longer(df, cols = c("population_in_million", "gdp_per_capita"),

              names_to = "Variable", values_to = "Value")
```

b)# Reshape to wide format

```
df_wide <- pivot_wider(df_long, names_from = Variable, values_from = Value)
```

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.

i. Use appropriate R commands to read input.csv file.

ii. Analyze the CSV File and compute the following.

a. Get the maximum salary

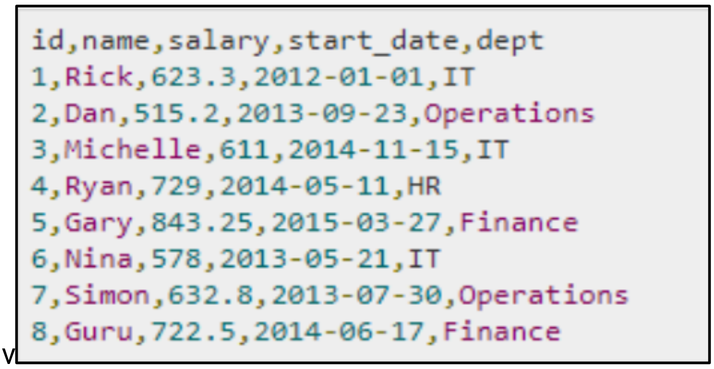
b. Get the details of the person with max salary

c. Get all the people working in IT department

d. Get the persons in IT department whose salary is greater than 600

e. Get the people who joined on or after 2014

iii. Get the people who joined on or after 2014 and write the output onto a file called output.csv



```
id,name,salary,start_date,dept
1,Rick,623.3,2012-01-01,IT
2,Dan,515.2,2013-09-23,Operations
3,Michelle,611,2014-11-15,IT
4,Ryan,729,2014-05-11,HR
5,Gary,843.25,2015-03-27,Finance
6,Nina,578,2013-05-21,IT
7,Simon,632.8,2013-07-30,Operations
8,Guru,722.5,2014-06-17,Finance
```

CODE:

```
i)data <- read.csv("input.csv")

print(data)
```

Output:

```
   id,  name,   salary,  start_date,   dept
1    1   Rick     623.30    2012-01-01      IT
2    2   Dan      515.20    2013-09-23      Operations
3    3   Michelle 611.00    2014-11-15      IT
4    4   Ryan     729.00    2014-05-11      HR
```

```
5    NA   Gary     843.25   2015-03-27      Finance
6     6   Nina     578.00   2013-05-21      IT
7     7   Simon    632.80   2013-07-30      Operations
8     8   Guru     722.50   2014-06-17      Finance
```

```
ii)data <- read.csv("input.csv")

print(is.data.frame(data))
print(ncol(data))
print(nrow(data))
```

Output:

```
[1] TRUE
[1] 5
[1] 8
```

```
a)# Create a data frame.
data <- read.csv("input.csv")

# Get the max salary from data frame.
sal <- max(data$salary)
print(sal)
```

Output:

```
[1] 843.25
```

```
b)# Create a data frame.
data <- read.csv("input.csv")

# Get the max salary from data frame.
sal <- max(data$salary)

# Get the person detail having max salary.
retval <- subset(data, salary == max(salary))
print(retval)
```

Output:

```
    id  name  salary  start_date   dept
5    NA   Gary  843.25  2015-03-27   Finance
```

c)# Create a data frame.

```
data <- read.csv("input.csv")

retval <- subset( data, dept == "IT")
print(retval)
```

Output:

```
    id  name      salary   start_date   dept
1     1    Rick       623.3    2012-01-01    IT
3     3    Michelle  611.0    2014-11-15    IT
6     6    Nina        578.0    2013-05-21    IT
```

d)# Create a data frame.

```
data <- read.csv("input.csv")

info <- subset(data, salary > 600 & dept == "IT")
print(info)
```

Output:

```
    id  name      salary   start_date   dept
1     1    Rick       623.3    2012-01-01    IT
3     3    Michelle  611.0    2014-11-15    IT
```

e)# Create a data frame.

```
data <- read.csv("input.csv")

retval <- subset(data, as.Date(start_date) > as.Date("2014-01-01"))
print(retval)
```

Output:

```
    id  name     salary   start_date    dept
3     3    Michelle 611.00   2014-11-15     IT
4     4    Ryan      729.00   2014-05-11     HR
5    NA    Gary      843.25   2015-03-27    Finance
```

```
8      8    Guru     722.50   2014-06-17    Finance
```

iii)

Code:

```
# Create a data frame.
data <- read.csv("input.csv")
retval <- subset(data, as.Date(start_date) > as.Date("2014-01-01"))

# Write filtered data into a new file.
write.csv(retval,"output.csv")
newdata <- read.csv("output.csv")
print(newdata)
```

Output:

```
  X      id   name      salary   start_date    dept
1 3       3    Michelle  611.00   2014-11-15    IT
2 4       4    Ryan      729.00   2014-05-11    HR
3 5      NA    Gary      843.25   2015-03-27    Finance
4 8       8    Guru      722.50   2014-06-17    Finance
```