

SET 1

K. J. SOMAIYA INSTITUTE OF MANAGEMENT STUDIES AND RESEARCH,
Vidyavihar, Mumbai- 400077

Program: MMS and PGDM - Finance

Course: Data Analytics using ‘R’

Maximum Marks: 50

Duration: 3 hours

Date: Sept 21, 2019

Important Instructions

- Use of Calculators, Mobile Phones and Internet is strictly prohibited
- Students can refer to their class notes and ‘R’ help
- All the relevant commands should be written in the answer sheet
- DO save the file – Instructions will be given during the examination

Question 1 (Marks 5):

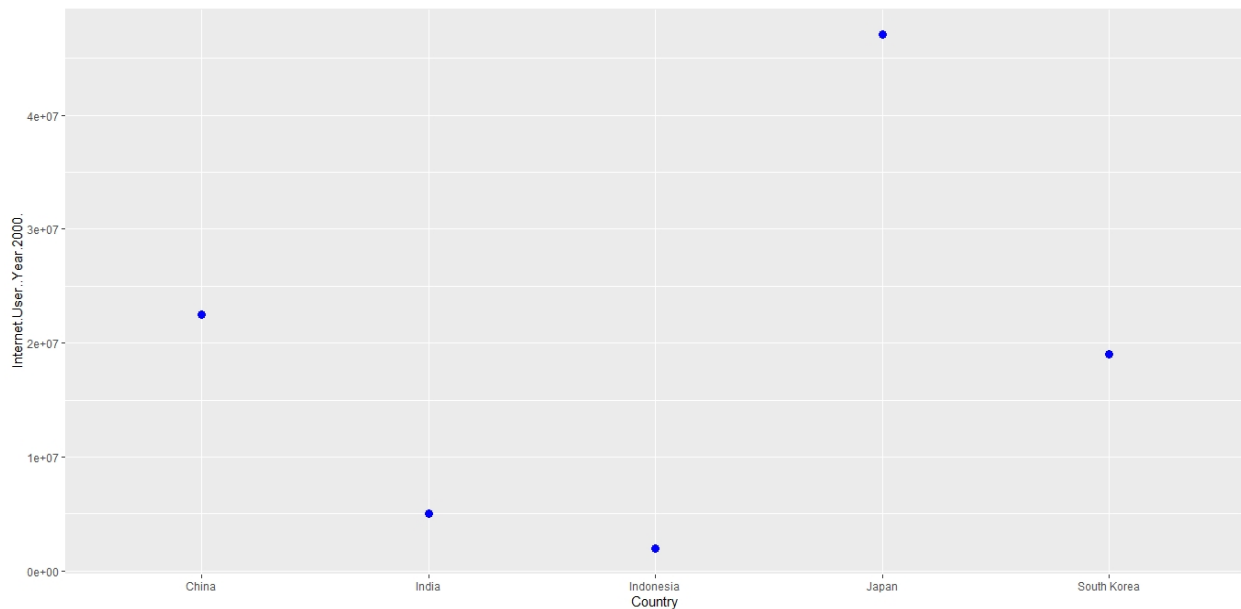
Use the Dataset: *Data_Usage_Asian_Countries*

Country	Internet User (Year 2000)
China	22500000
Japan	47080000
India	5000000
South Korea	19040000
Indonesia	2000000

Create a bar chart of Country v/s Internet User (Year 2000) using barplot ()

Question 2 (Marks 5):

Using ggplot () create the following (Use the Dataset: *Data_Usage_Asian_Countries*):



Question 3 (Marks = 20)

Use the Dataset: *Ricedata*

Year	Milled production (000 t)
2000	85019.08
2001	93313.30
2002	71856.11
2003	88570.26
2004	83172.97
2005	91839.29
2006	92804.37
2007	96428.19
2008	98740.01
2009	90493.88
2010	96023.33
2011	105319.30
2012	105252.60
2013	106186.40

a) Read the data as vector r_dt
 b) Make visual representation of the data
 c) Create a linear model rm1
 d) Compare the given dataset with the predicted value
 e) Make visual representation of the comparison
 f) Predict the values for the year : 2014 to 2018

Question 4 (Marks 20)

Analysis: Examine a situation at a bill payment counter

Expected: Average time of collection of one bill = 3 minutes

Therefore, on an average, 20 customers can be served per hour.

Computations:

Utilization Factor =

$$\text{Number of customers arriving per hour} / \text{Number of customers that can be served per hour}$$

Average Number of persons waiting in the queue =

$$\text{Square of Utilization Factor} / (1 - \text{Utilization Factor})$$

Average waiting time for a customer in queue =

$$\text{Total Time} / (\text{Number of customers that can be served per hour} - \text{Number of customers arriving per hour})$$

[Total Time = 60 minutes]

Determine the Average Number of persons waiting in the queue and Average waiting time for a customer in queue for the following:

1. When 10 customers are arriving in the system
2. When 15 customers are arriving in the system
3. When 18 customers are arriving in the system

Based on the above findings, create a model to determine the average waiting time for a customer. Check the model to determine the average waiting time for a customer when 16 customers arrive in a system.

[Graphical representations wherever possible is recommended]

SET 2

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Question 1 (Marks 5):

Use the Dataset: *Age_Population*

	2 0 0 7	2011
Age Group		
0-14	3 0	20
15-59	5 5	65
60+	1 5	15

Create a bar chart comparing the population in different age groups using barplot ()

Question 2 (Marks 15)

Use the dataset: *LoansByIndia*

Yr	Loans and Grants to Foreign countries (Rs Cr)
2011	3508
2012	5530
2013	6910
2014	7183
2015	8727
2016	6407
2017	5890
2018	7267
2019	9069

- Read the above as vector `ln_dt`
- Make visual representation of the data

- c) Create a linear model lgm1
- d) Compare the given dataset with the predicted value
- e) Make visual representation of the comparison
- f) Predict the loan or grant amount by India to the foreign countries for the year 2020

Question 3 (Marks 15)

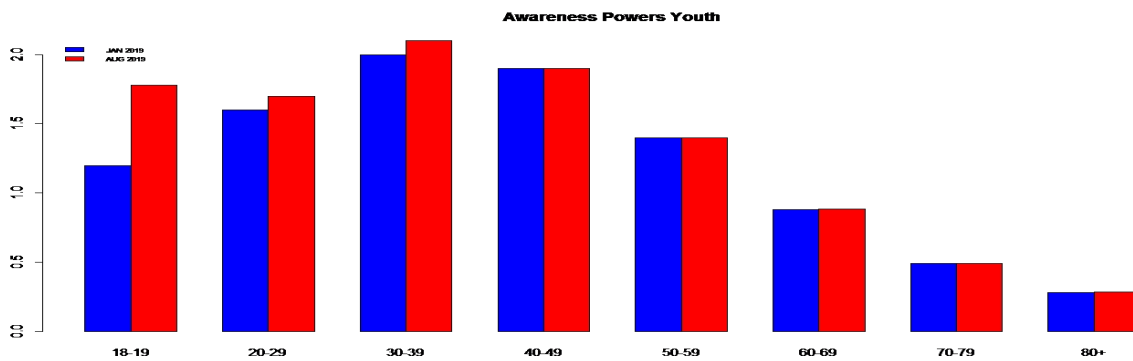
The data about new voters registered in Maharashtra from Feb 2019 (with respect to various age groups) is provided as per the following:

```
> agroup <- c("18-19", "20-29", "30-39", "40-49", "50-59", "60-69", "70-79", "80+")
> j19 <- c(1.2,1.6,2, 1.9,1.4,0.882, 0.49,2.8)
> ag19 <- c(1.78,1.7,2.1,1.9,1.4,0.883,0.493,2.84)
[agroup: Age Group; j19: Data in JAN 2019; ag19: Data in AUG 2019 ---- in Crore]
```

Create a matrix as shown below

	18-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
JAN 2019	1.20	1.6	2.0	1.9	1.4	8.82	4.90	2.80
AUG 2019	1.78	1.7	2.1	1.9	1.4	8.83	4.93	2.84

Generate the following visual



What do the data/visuals depict? Can you suggest any other visual form?

Question 4 (Marks 15)

Computing Customer Life Cycle Value (CLV)

CLV = Net present value of all cash flows from the customer
= Sum of Discounted Cash Flow – Acquisition Cost

Case A:

The cost of acquisition of customer is INR 2500 and it costs INR 500 per year to retain the customer. The revenue from the customer is INR 1000 in the first year, INR 1500 in the second year and thereafter INR 2000 every year. If the discount rate is 15 percent, compute life time value of a customer considering the life of customer to be five years.

Case B:

For the Cable Service Provider the cost of provisioning the service to the customer is INR 5000 and it costs INR 1000, 1200, 1300 and 1400 during the four years to retain the customer. The revenue from the

customer is INR 8000 in the first year, INR 4500 in the second year, INR 5000 in the third year and INR 5200 in the fourth year. If the discount rate is 20 percent, compute life time value of a customer. What will be the expected DCF and hence the benefit if the probability of retention of the customers during these four years is 0.9, 0.8, 0.6 and 0.4.

[Graphical representations wherever possible is recommended]