

ST. ANN'S COLLEGE OF ENGINEERING AND TECHNOLOGY, CHIRALA
DEPARTMENT OF CSE

ASSIGNMENTS

SUB: Statistics with R programming

YEAR-SEM-BRANCH: II-I-CSE

AY: 2019-20

UNIT-1

- 1) Explain about the matrix data structure along with all possible operations using examples.
- 2) Define a data.frame and distinguish it from a matrix object in R.
- 3) Explain about List data structure and give examples.
- 4) Explain about Functions, Classes in R and differentiate different types of class systems in R.
- 5) Write R code to tabulate a function $f(x) = 3x^2 + 2x + 1$ in the interval $(-1, 1)$ in steps of 0.2.
- 6) Explain about Variables, constants and Data Types in R Programming
- 7) How to create, name, access, merging and manipulate list elements? Explain with examples.
- 8) Write R code to create two vectors of three consecutive elements each, combine them to form matrices of sizes 2×3 and 3×2 , assign the names to the rows and columns of the resultant matrices and print all the elements of 3rd column from 2×3 matrix and 2nd row from 3×2 matrix on to the R console.
- 9) What is a factor? Explain about the significance of factors in R using suitable examples.
- 10) What is a vector in R? Explain operations on vectors.

UNIT-2

- 1) Explain the functioning of `lapply()` and `tapply()` in a R program with one example each.
- 2) What is Recursion? Write an R program to implement Quick sort on the vector `Value <- c(9, 6, 2, -1, 0, 20, 8, 7, 1)` using recursive approach.
- 3) What is Binary search tree? Write an R program to create a binary search tree and insert a new element into the existing binary search tree.
- 4) Write about Arithmetic, Boolean and Logical operators in R programming?
- 5) Write R code to plot the function $f(x) = x$ if $x < \frac{1}{2}$ and $(1-x)$ if $\frac{1}{2} < x < 1$ and 0 elsewhere by using **if else** command.
- 6) How to create user defined function in R? How to define default values in R? Write syntax and examples? Write about nested functions in R.
- 7) Implement binary search tree with R.

- 8) Write R code to generate first n terms of a Fibonacci series
- 9) Write R function to check whether the given number is prime or not.
- 10) Write R code to find the factorial of a number(use recursion).

UNIT-3

- 1) Write R code to obtain the probability of occurrence of exactly one event from n independent events using prod() function.
- 2) Explain about sorting functions in R? Illustrate the usage of order() function to sort a data.frame according to different columns.
- 3) Explain about Linear algebra operations on vectors and matrices using suitable examples.
- 4) Write an R function to calculate the vector cross product of the given vectors.
- 5) Explain set operations in R with examples.
- 6) Explain in detail about math functions in R with an example each.
- 7) Write about sort, rank and order functions with examples. Write about functions for statistical distributions.
- 8) Explain about Finding Stationary Distributions of Markov Chains.
- 9) What is cumulative sum,product,min,max? Explain with example? Write R functions used for this purpose?
- 10) Write about all summary commands in R?

UNIT-4

- 1) Write an R program to create two graphs sin(x) and cos(x) and plot them in an array of two rows.
- 2) Write an R program to plot the function $f(x)=\sin(x)$ in the interval (-3,3) in steps of 0.1. The point character of the plot is to be triangle joined with the lines.
- 3) Write about scatter plot and histograms with examples? Explain its importance?
- 4) How to plot multiple curves in same graph? Explain with example?
- 5) Plot the function $g(t) = (t^2 + 1)^{0.5}$ for t between 0 and 5.(using curve and plot function)
- 6) What is Box plot? Explain importance of box plot with example?
- 7) Draw a pie chart for the following data

Section	:	I,	II,	III,	IV,	V
No. of workers:		220,	370,	190,	70,	250
- 8) Write about the following functions with example
 - a) points()
 - b) legend()
 - c)text()
 - d) locator()
- 9) Describe R functions for Reading a Matrix or Data Frame From a File
- 10) Write R program to create pie chart for the following data

Housing	-----600
Food	-----300
Clothes	-----150

Entertainment---100
Others -----200

UNIT-5

- 1) Write R code to generate the probability distribution table for number of successes from a binomial distribution where $n=5$ and probability of success in each trial is 0.25.
- 2) Compute the correlation coefficient for the following data
X: 68 64 75 50 64 80 75 40 55 64
Y: 62 58 68 45 81 60 68 48 50 70
- 3) Write about Poisson Distributions.
- 4) Explain t-test with example.
- 5) Explain about descriptive statistics? Write examples?
- 6) Fit a Binomial distribution to the following data
x= 0 1 2 3 4 5
f= 2 16 28 12 9 3
- 7) Write about Binomial Distribution.
- 8) Explain Anova test with example.
- 9) Fit a poisson distribution to the following data
x 0, 1, 2, 3, 4, 5
f 3, 9, 12, 27, 4, 1
Also test the adequacy of mode
- 10) Calculate the coefficient of correlation to the following data
X 10 12 18 24 23 27
Y 13 18 12 25 30 10

UNIT-6

- 1) The sales data of an item in six shops before and after a special promotional campaign are as under:
Shop: A B C D E F
Before campaigns: 53 28 31 48 50 42
After campaigns: 58 29 30 55 56 45
Can the campaign be judged to be a success?
- 2) Heights (in cm) of father and son are given as follows

Father(x): 150 152 155 157 160 161 164 166

Sons(y): 154 156 158 159 160 162 161 164

Fit a regression line predict the height of son given the height of father.

3) In a test given to two groups of students the marks obtained are as follows

Group1: 18, 20, 36, 50, 49, 36, 34, 49, 41

Group2: 28, 29, 26, 35, 30, 40, 44

Examine the significance of differences between the means of marks scored by students of the above groups.

4) Fit a straight line $Y=a+bx$ to the following data

X 12,17,19,25,32,38,43

Y 65,78,82,92,90,97,100

Also estimate Y when X=35

5) In a sample of 1000 cases, the mean of certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal, find

i) How many students score between 12 and 15?

ii) How many score above 18?

iii) How many score below 18?

6) Following are the runs scored by a batsman in 10 consecutive matches:

22,98,13,54,77,61,45,32,19,85

Compute coefficient of variation

7) Fit a polynomial of degree 2 to the following data

X 0 1 2

Y 1 6 17

8) Write in detail about Random Forest (7M)

9) The students taught by 3 different methods gave the following

Performance (marks):

A 19, 9, 12, 16, 7, 14, 11

B 8, 13, 3, 17, 15

C 14, 11, 10, 9, 15, 16

Calculate the analysis of variance

10) Explain about logistic regression.