

- 1) a) What are the different ways to create vectors?
 b) Create vector v: (3,8,4,5,0,11, -9, 304) and perform following operations:
 1. Sort the elements of v in decreasing order.
 2. Print the length and type of the vector v
 3. Check whether 11 is present in vector v
 4. Print the length and type of vector v.
 5. Create v1(3,8,4,5,0,11) & v2 (4,11,0,8,1,2): add, subtract, multiply, division

- 2) a) Explain Dataframe in R.
 b) Create Data Frame “my_data_frame” with following information:
 animal(sheep, pig, sheep, pig, sheep, pig), year (2019,2020,2021, 2019,2020,2021),
 weight (110, 120, 140, NA, 300, 800), height(2.2, 2.4, 2.7, 2, 2.1, 2.3) ,
 condition(“excellent”, “good”, NA, “excellent”, “good”, “average”)
 1. Print class and structure of my_data_frame
 2. Get the summary statistics for each variable of my_data_frame
 3. Add the new observation: animal = "pig", year = 2018, weight = 200, height = 1.9, condition = "excellent"
 4. Print the following output using subsetting : 110

- 3) a) How to import data from .csv file in R? .
 b) Write R-code to perform Descriptive Data Analysis on ‘iris’ Dataset to compute the following:
 1. Display the structure of dataset and first six observations
 2. Find minimum, maximum and range of Sepal.Length
 3. Find Mean, Median and Mode on Sepal.Length
 4. Find First and third quartile and Interquartile range
 5. Find Standard deviation and variance

- 4) Explain dataframe in R . Create a DataFrame “stats” with following information:
 Player('A', 'B', 'C', 'D', 'A', 'A'), Runs(100, 200, 408, 19, 56, 100), Wickets(17, 20, NA, 5, 2, 17)
 Perform the following operations using the functions of ‘dplyr’ package:
 1. Fetch the data of players who scored more than 100 runs
 2. Remove duplicate rows from data frame
 3. Arrange data based on runs low to high
 4. Display the wickets taken by each player
 5. Change the column name “runs” to “runs_scored” in stats data frame.

- 5) Explain pie chart. Write R script to create Pie chart for following information:
 The tax revenue of India (in crores of Rs.), as provided in 1984-85 budget, when broken into various sources are given below.

Sources	Excise	Custom	Corporation tax	Income tax	Other
Tax revenue	6526	7108	2568	560	763

6) a) Explain Layers of ggplot2 package.

b) Create a scatterplot 'Sepal.Length vs Petal.Length' on "iris" dataset using ggplot2 package. Add colour to the points based on types of species.

7) a) Write benefits of using word cloud for visualization.

b) Create a word cloud for text file present at given url:

<http://www.sthda.com/sthda/RDoc/example-files/martin-luther-king-i-have-a-dream-speech.txt>

8) What is waffle chart? Prepare a Waffle Charts for the following information.

Dataset of 91822 persons categorized as:

Infants <1 = 16467

Children <11 = 30098

Teens 12-17 = 20354

Adults 18+ = 12456

Elderly 65+ = 12456

9) a) Write different packages used for creating maps in R.

b) Write a R script to plot the cities "Patna", "New Delhi", "Chennai" on India map using mapview Package in R.