**Exp-1**

**Aim: Apply R to calculate and visualize measures of central tendency (Arithmetic Mean, Median, Mode) for a given dataset.**

**Introduction:**

Measures of central tendency, including the arithmetic mean, median, and mode, provide essential insights into the central or typical values within a dataset. In this practical, we will use R to calculate and visualize these measures for a given dataset. Understanding and applying these measures are fundamental skills in statistical analysis and data exploration.

**Objective:** The main objectives of this practical are:

1. Calculate the arithmetic mean, median, and mode for a given dataset.
2. Utilize R functions to perform central tendency calculations.
3. Create visualizations to illustrate the distribution and central tendency measures.

**Materials:**

1. RStudio or R environment installed.

**Procedure:**

Step 1: Load the Dataset

Load a dataset or create a vector containing the data you want to analyse.

# Example dataset

data <- c (23, 45, 67, 12, 89, 45, 23, 67, 34, 56)

Step 2: Calculate Measures of Central Tendency

Use R functions to compute the arithmetic mean, median, and mode.

# Calculate the mean

mean\_value <- mean(data)

# Calculate the median

median\_value <- median(data)

# Calculate the mode (using a custom function)

mode\_value <- function(x) {

  ux <- unique(x)

  ux[which.max(tabulate(match(x, ux)))]

}

mode\_result <- mode\_value(data)

Step 3: Visualize the Data and Measures

Create visualizations to better understand the dataset and illustrate the central tendency measures.

# Create a histogram for data distribution

hist (data, main = "Histogram of Data", xlab = "Values", col = "lightblue", border = "black")

# Add a vertical line for the mean

abline (v = mean\_value, col = "red", lwd = 2)

# Add a vertical line for the median

abline (v = median\_value, col = "blue", lwd = 2)

# Add a vertical line for the mode

abline (v = mode\_result, col = "green", lwd = 2)

# Add a legend

legend ("topright", legend = c ("Mean", "Median", "Mode"), col = c("red", "blue", "green"), lwd = 2)

Step 4: Interpretation

Interpret the central tendency measures and the visualizations. Discuss any notable characteristics of the dataset based on these measures.

Step 5: Additional Analysis (Optional)

Explore additional measures or transformations based on the characteristics of the dataset. For instance, consider calculating the standard deviation for a more comprehensive understanding of variability.

# Calculate the standard deviation

sd\_value <- sd(data)

**Conclusion:** Summarize the insights gained from calculating and visualizing measures of central tendency. Emphasize the importance of these measures in understanding the distribution and typical values within a dataset. This practical exercise provides a hands-on experience in applying R for statistical analysis, enhancing your skills in exploring and summarizing data.