R Programming Lab Record

Program 1: Implementation of R Loops

```
# FOR LOOP
numbers <- c(10, 20, 30, 40, 50)
total <- 0
for(i in numbers){
  print(paste("Current value:", i))
  total <- total + i
}
print(paste("Total Sum:", total))

# WHILE LOOP
count <- 1
factorial <- 1
while(count <= 5){
  factorial <- factorial * count
  count <- count + 1
}
print(factorial)

# REPEAT LOOP
num <- 1
repeat{
  print(num)
  num <- num + 2
  if(num > 10){
    break
  }
}
```

Program 2: Basics of Functions in R

```
calculate_values <- function(x){
  square <- x^2
  cube <- x^3
  return(list(square=square, cube=cube))
}
calculate_values(5)

math_operations <- function(a, b){
  return(list(Add=a+b, Sub=a-b, Mul=a*b, Div=a/b))
}
math_operations(10,5)
```

Program 3: Joining Rows and Columns using cbind() and rbind()

```
student1 <- data.frame(ID=c(1,2,3), Name=c("A","B","C"), Marks=c(78,85,90))
attendance <- data.frame(Attendance=c(90,88,95))
cbind(student1, attendance)

student2 <- data.frame(ID=c(4,5), Name=c("D","E"), Marks=c(82,76))
rbind(student1, student2)
```

Program 4: String Manipulation in R

```
text1 <- "R Programming Language"
toupper(text1)
tolower(text1)
nchar(text1)
substr(text1,1,12)
gsub("R","Python",text1)
strsplit(text1," ")
```

Program 5: Data Structures in R

```
# Vector
marks <- c(70,80,90,85,75)
mean(marks)

# List
student_list <- list(name="Surya", age=21, marks=c(80,85,90))
student_list$name

# Data Frame
student_df <- data.frame(RollNo=c(1,2,3), Name=c("A","B","C"), Score=c(65,75,85))
summary(student_df)
```

Program 6: Reading CSV File and Data Analysis

```
data <- read.csv("data.csv")
str(data)
head(data)
summary(data)
dim(data)
sum(is.na(data))
```

Program 7: Creating Bar Chart and Pie Chart

```
subjects <- c("Maths","Science","English","CS")
marks <- c(85,90,75,88)
barplot(marks, names.arg=subjects)
pie(marks, labels=subjects)
```

Program 8: Statistical Analysis in R

```
data_values <- c(10,20,30,40,50,60,70)
mean(data_values)
median(data_values)
var(data_values)
sd(data_values)
range(data_values)
```

Program 9: Correlation and Covariance

```
x <- c(2,4,6,8,10)
y <- c(1,3,5,7,9)
cov(x,y)
cor(x,y)
```

Program 10: Regression Modeling in R

```
x <- c(1,2,3,4,5,6)
y <- c(2,4,5,4,5,7)
model <- lm(y ~ x)
summary(model)
plot(x,y)
abline(model,col="red")
```

Program 11: KNN Classification Model

```
library(class)
train <- matrix(c(1,2,2,3,3,3,6,7,7,8,8,8), ncol=2, byrow=TRUE)
cl <- c("Class1","Class1","Class1","Class2","Class2","Class2")
test <- matrix(c(5,6), ncol=2)
knn(train, test, cl, k=3)
```

Program 12: K-Means Clustering Model

```
data <- matrix(c(1,2,1,4,1,0,10,2,10,4,10,0,5,5,6,6), ncol=2, byrow=TRUE)
set.seed(123)
kmeans(data, centers=2)
```