

R Programming Lab Programs (1–12)

1. 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  
  }  
}  
-----
```

2. 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)  
-----
```

3. 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)  
-----
```

4. STRING MANIPULATION

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

```

gsub( "R", "Python",text1)
strsplit(text1," ")

-----
5. DATA STRUCTURES

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)

-----
6. READ CSV AND ANALYZE

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

-----
7. 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)

-----
8. STATISTICAL ANALYSIS

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)

-----
9. CORRELATION AND COVARIANCE

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

-----
10. REGRESSION MODEL

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")

-----
11. KNN CLASSIFICATION

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)

-----
12. K-MEANS CLUSTERING

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)
```