R programs:
Prepared by AK…

1. Write an R program Illustrate with if-else statement and how does it operate on vectors of variable
length.

```
x=11:15
y=ifelse(x%%2==0,paste(x, 'is even no'),paste(x,'is odd no'))
y
```

2. Write an R program Illustrate with for loop and stop on condition, to print the error message.

```
cat('enter the no of words',"\n")
n=as.integer(readLines("stdin",n=1))
cat('enter the words',"\n")
words=readLines("stdin",n=n)
for(w in words){
  w=toupper(w)
  if(w=='STOP'){
    stop('stop word has occurred')
  }

  else{
    l=nchar(w)
    cat('the no of characters in the word= ', w, 'is', l, "\n")
  }
}
```

3. Write an R Program To find Factorial of given number using recursion.

```
fact=function(n){
  if(n==1){
    return(1)
  }else{
    return(n*fact(n-1))
  }
}

cat("enter the no")
n=as.integer(readLines("stdin",n=1))
result=fact(n)
```

```
cat("factorial of a no",n,"=",result,"\n")
```

4. Write an R Program to implement T-Test for Anova.

```
x = c(65, 72, 68, 74, 70, 62, 75, 69, 71, 67)
y = c(68, 74, 66, 73, 71, 62, 71, 64, 72, 63)

t.test(x,y,conf.level=0.95,alternative="two.sided",paired=TRUE,mu=70)
aov(x~y,data=data.frame(x,y))
```

5. Write an R Program Compute mean values for vector aggregates defined by factors tapply and sapply.

```
df = data.frame(age = c(10, 14, 16, 18, 17),
                marks = c(40, 34, 35, 46, 43),
                gender = c('male', 'female', 'male',       'male', 'female'))
df
df1 = df[c("age", "marks")]
df1
sapply(df1, mean)
lapply(df1, mean)
tapply(df$marks, df$gender, mean)
```

6. Write a R program for finding stationary distribution of markanov chains

```
p = matrix(c(0.5, 0.3, 0.2,
             0.4, 0.4, 0.2,
             0.3, 0.3, 0.4),
           nrow = 3, ncol = 3, byrow = TRUE)

p

if (all(rowSums(p) == 1)) {
  print("Transition matrix is valid")
} else {
  stop("Transition matrix is not valid because not all rows sum to 1")
}

eigen_result = eigen(t(p))
eigen_values = eigen_result$values
```

```
eigen_vectors = eigen_result$vectors

print(eigen_values)
print(eigen_vectors)

vector = eigen_vectors[, which(abs(eigen_values - 1) < 1e-8)]
steady_state = vector / sum(vector)
final = steady_state * 100
final
```

7. Write an R Program for implementing Quick Sort for Binary Search.

```
quick_sort <- function(arr) {
  if(length(arr) <= 1) return(arr)
  pivot <- arr[1]
  return(c(quick_sort(arr[arr < pivot]), arr[arr == pivot], quick_sort(arr[arr > pivot])))
}

binary_search <- function(arr, low, high, key) {
  if (low > high) return(0)
  mid <- (low + high) %/% 2
  if (arr[mid] == key) return(mid)
  if (key < arr[mid]) return(binary_search(arr, low, mid - 1, key))
  return(binary_search(arr, mid + 1, high, key))
}

cat("Enter number of elements: ")
n <- as.numeric(readLines("stdin", n = 1))

cat("Enter the elements:\n")
arr <- as.numeric(readLines("stdin", n = n))

sorted_arr <- quick_sort(arr)
cat("Sorted elements:\n", sorted_arr, "\n")

cat("Enter element to search: ")
key <- as.numeric(readLines("stdin", n = 1))

pos <- binary_search(sorted_arr, 1, length(sorted_arr), key)

if (pos == 0) {
  cat("Element not found\n")
} else {
```

```
  cat("Element", key, "is found at position", pos, "\n")
}
```

8. Write an R Program Illustrate Reading & Writing Files.

```
df = read.table('stud.csv', sep = ',', header = TRUE)
print(df)
row = c(6, 'ak', 'male', 'bca', 15000)
df = rbind(df, row)
write.table(df, 'stud1.csv', row.names = FALSE)
print('Data exported to the same file')
x = scan(file = 't.txt', sep = ',')
print(x)
print(length(x))
temp = matrix(x, nrow = 4, ncol = 7, byrow = TRUE)
row.names(temp) = c('W1', 'W2', 'W3', 'W4')
colnames(temp) = c('d1', 'd2', 'd3', 'd4', 'd5', 'd6', 'd7')
print(temp)
data = temp[c('W1', 'W2'), ]
avgwk1 = sum(data['W1', ]) / length(data['W1', ])
print(avgwk1)
avgwk2 = sum(data['W2', ]) / length(data['W2', ])
print(avgwk2)
output = paste('Average temperature of first week is', avgwk1, '\n',
               'Average temperature of second week is', avgwk2)
writeLines(output, file('temp.txt'))
print('Temperature data exported succesfully')
```

9. Write a R program for any visual representation of an object with creating graphs using graphic functions: Plot(),Hist(),Linechart(),Pie(),Boxplot(), Scatterplots()

```
x=1:10
y=51:60
plot(x,y,main='scatter plot', xlab='x-axis' ,
ylab='y-axis',col='red',pch=7,cex=1.5)
plot(x,y,main='line chart', xlab='x-axis' , ylab='y-axis',col='green',type='l')
fruites=c('apple','banana','mango','orange')
prices=c(100,200,300,400)
barplot(prices,names.arg=fruits,main='bar
chart',xlab='fruits',ylab='prices',col='red')
pie(prices,labels='fruits',main='pie chart',col='green')
```

```
x=rnorm(1000,mean=0.5)
hist(x,breaks=5)
boxplot(x)
```

10. Write a R program for with any dataset containing data frame objects, and employ manipulating and analyzing data

```
df= data.frame(
  name = c('ak', 'pr', 'rah', 'pj', 'har'),
  age = c(21, 20, 21, 19, 21),
  gender = factor(c('male', 'female', 'male', 'male', 'male'), levels = c('male', 'female')),
  pet = c(90, 93, 92, 95, 96)
)

head(df, 2)
str(df)

df1 = df[, c('name', 'pet')]
print(df1)

df2 = df[df$pet > 50, ]
print(df2)

df$grade = ifelse(df$pet >= 70, 'A', ifelse(df$pet >= 60, 'B', ifelse(df$pet >= 50, 'C', 'D')))
print(df)

df = df[order(-df$pet), ]
print(df)

barplot(df$pet, names.arg = df$name, main = 'Barplot showing pet values vs percentage',
        xlab = 'Names of students', ylab = 'Percentage', col = 'red')
write.csv(df,'studentsak.csv')
print('Data exported successfully')
```

11. Write a program to create an any application of Linear Regression in multivariate context for predictive purpose.

```
x=c(21,52,63,12,45,21,32,63,25,12)
y=c(36,21,85,65,45,21,32,63,74,54)
t.test(x,y,conf.level = 0.95,alternative = "two.sided",paired=TRUE,mu=70)
aov(x~y,data=data.frame(x,y))
```

12. Write an R Program to Find Mean, Mode & Median.

```
x=c(40,50,10,30,20,10)
avg=mean(x)
print(paste("mean=",avg))
m=median(x)
print(paste("median=",m))
y=table(x)
z=sort(y)
z
i=which.max(z)
e=as.integer (names(z))
t=z[i]
v=e[i]
print(paste("mode that is maximum repeated value=", v, "times=",t))
```