**SAVEETHA SCHOOL OF ENGINEERING**

**SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES**

**COURSE CODE / SUBJECT: ITA 0448 / STATISTICS WITH R PROGRAMMING FOR VECTORIZED EXPRESSIONS**

**DAY 3 – LAB ASSESSMENT**

**Reg No:**

**Name:**

1. (i) Write a function in R programming to print generate Fibonacci sequence using    
Recursion in R

**Program:**

fibonacci <- function(n) {

if (n <= 1) {

return(n)

} else {

return(fibonacci(n-1) + fibonacci(n-2))

}

}

for (i in 0:9) {

cat(fibonacci(i), " ")

}

**Output:**

0 1 1 2 3 5 8 13 21 34

(ii) Find sum of natural numbers up-to 10, without formula using loop statement.

**Program:**

sum <- 0

for (i in 1:10) {

sum <- sum + i

}

cat("The sum of natural numbers up to 10 is", sum)

**Output:**

The sum of natural numbers up to 10 is 55

(iii) create a vector 1:10 and Find a square of each number and store that in a  
separate list.

**Program:**

numbers <- seq(1, 10)

squares <- list()

for (i in numbers) {

squares[[i]] <- i^2

}

squares

**Output:**

[[1]]

[1] 1

[[2]]

[1] 4

[[3]]

[1] 9

[[4]]

[1] 16

[[5]]

[1] 25

[[6]]

[1] 36

[[7]]

[1] 49

[[8]]

[1] 64

[[9]]

[1] 81

[[10]]

[1] 100

2.    (motor trend car road test) comprises fuel consumption, performance and  10 aspects of automobile  
design for 32 automobiles. It comes pre-installed  with  package in R.

(i)Find the dimension of the dataset

**Program:**

data(mtcars)

dim(mtcars)

**Output:**

[1] 32 11

(ii)Give the statistical summary of the features.

**Program:**

data(mtcars)

summary(mtcars)

mpg cyl disp hp

Min. :10.40 Min. :4.000 Min. : 71.1 Min. : 52.0

1st Qu.:15.43 1st Qu.:4.000 1st Qu.:120.8 1st Qu.: 96.5

Median :19.20 Median :6.000 Median :196.3 Median :123.0

Mean :20.09 Mean :6.188 Mean :230.7 Mean :146.7

3rd Qu.:22.80 3rd Qu.:8.000 3rd Qu.:326.0 3rd Qu.:180.0

Max. :33.90 Max. :8.000 Max. :472.0 Max. :335.0

drat wt qsec vs

Min. :2.760 Min. :1.513 Min. :14.50 Min. :0.0000

1st Qu.:3.080 1st Qu.:2.581 1st Qu.:16.89 1st Qu.:0.0000

Median :3.695 Median :3.325 Median :17.71 Median :0.0000

Mean :3.597 Mean :3.217 Mean :17.85 Mean :0.4375

3rd Qu.:3.920 3rd Qu.:3.610 3rd Qu.:18.90 3rd Qu.:1.0000

Max. :4.930 Max. :5.424 Max. :22.90 Max. :1.0000

am gear carb

Min. :0.0000 Min. :3.000 Min. :1.000

1st Qu.:0.0000 1st Qu.:3.000 1st Qu.:2.000

Median :0.0000 Median :4.000 Median :2.000

Mean :0.4062 Mean :3.688 Mean :2.812

3rd Qu.:1.0000 3rd Qu.:4.000 3rd Qu.:4.000

Max. :1.0000 Max. :5.000 Max. :8.000

(iii)Print the categorical features in Dataset

**Program:**

data(mtcars)

cat\_features <- c("cyl", "vs", "am", "gear")

for (f in cat\_features) {

print(paste("Levels of", f, ":", toString(levels(factor(mtcars[,f])))))

}

**Output:**

[1] "Levels of cyl : 4, 6, 8"

[1] "Levels of vs : 0, 1"

[1] "Levels of am : 0, 1"

[1] "Levels of gear : 3, 4, 5"

(iv)Find the average weight(wt) grouped by Engine shape(vs)

**Program:**

data(mtcars)

agg\_wt\_vs <- aggregate(mtcars$wt, by=list(mtcars$vs), FUN=mean)

print(agg\_wt\_vs)

**Output:**

Group.1 x

1 0 3.768895

2 1 2.611619

(v)Find the largest and smallest value of the variable weight with respect to Engine shape  

**Program:**

data(mtcars)

agg\_wt\_vs <- aggregate(mtcars$wt, by=list(mtcars$vs), FUN=function(x) c(min=min(x), max=max(x)))

print(agg\_wt\_vs)

**Output:**

Group.1 min max

1 0 1.513000 5.424000

2 1 2.465556 3.850000