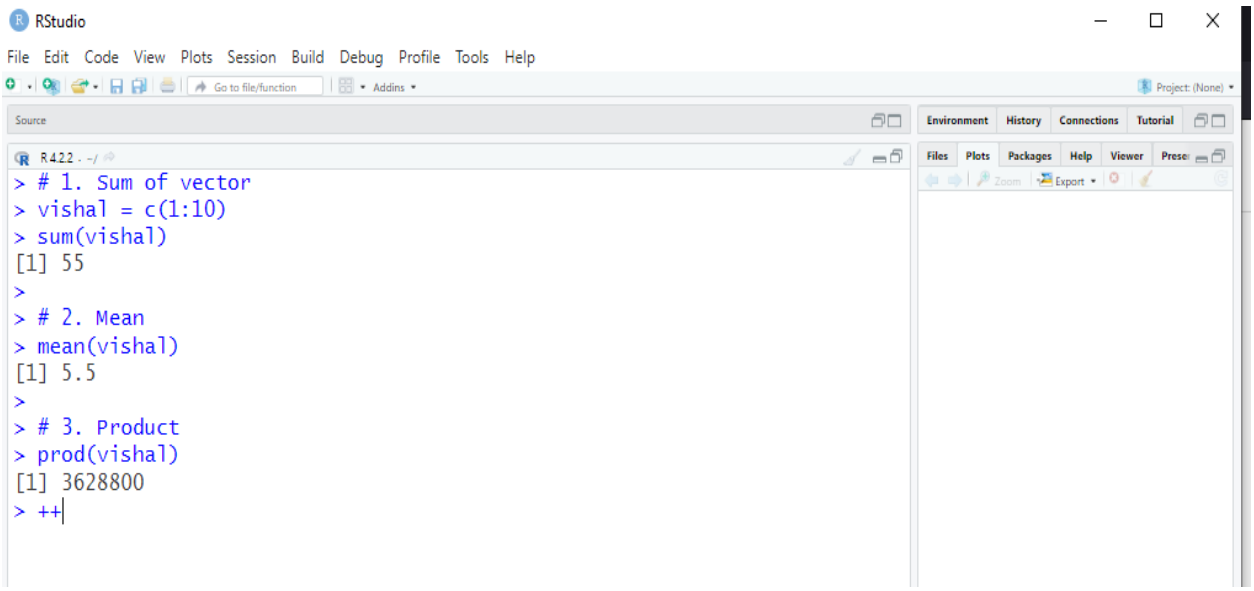
Big Data and Analytical Lab

Lab Assignment – 04

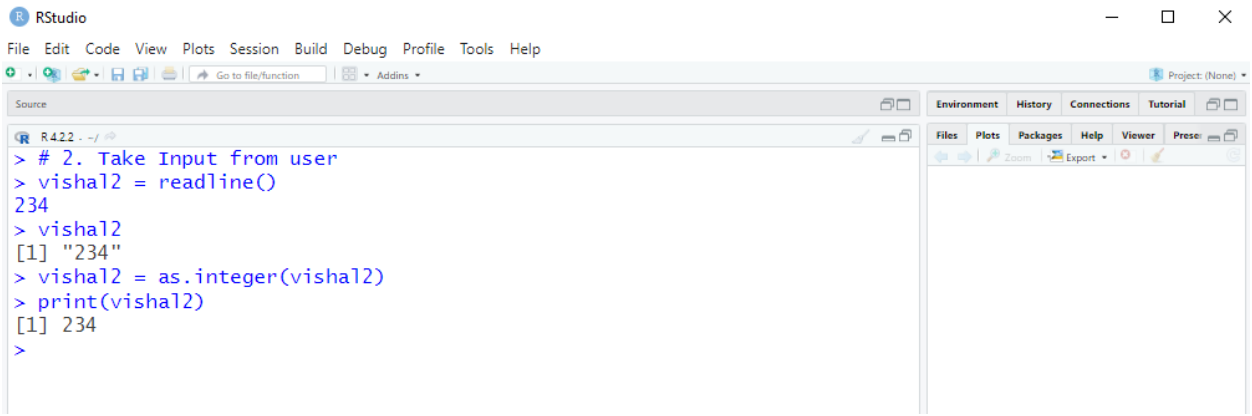
(BCSE0183)

Additional Problems on Basics o f R Programming Language

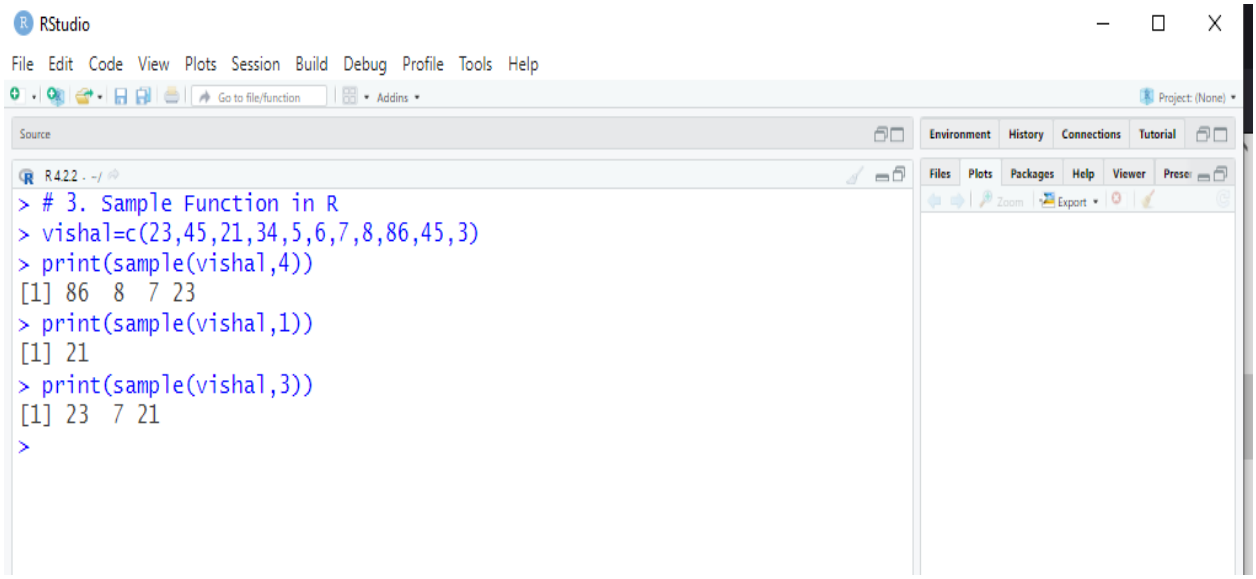
1) Write R Program to Find Sum, Mean and Product of Vector.



2) Write R Program to Take Input from User.

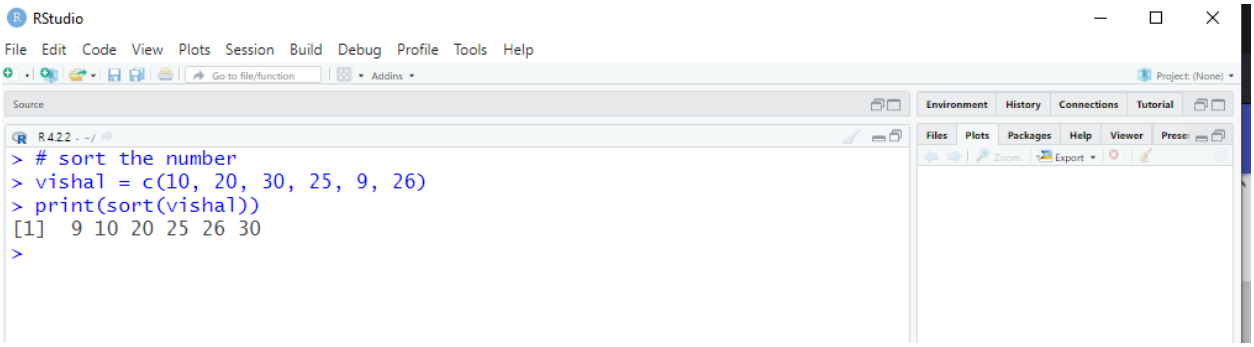


3) Write R Program to sample( ) function on given example.



4) Write R Program to minimum, maximum and range of a given Vector.

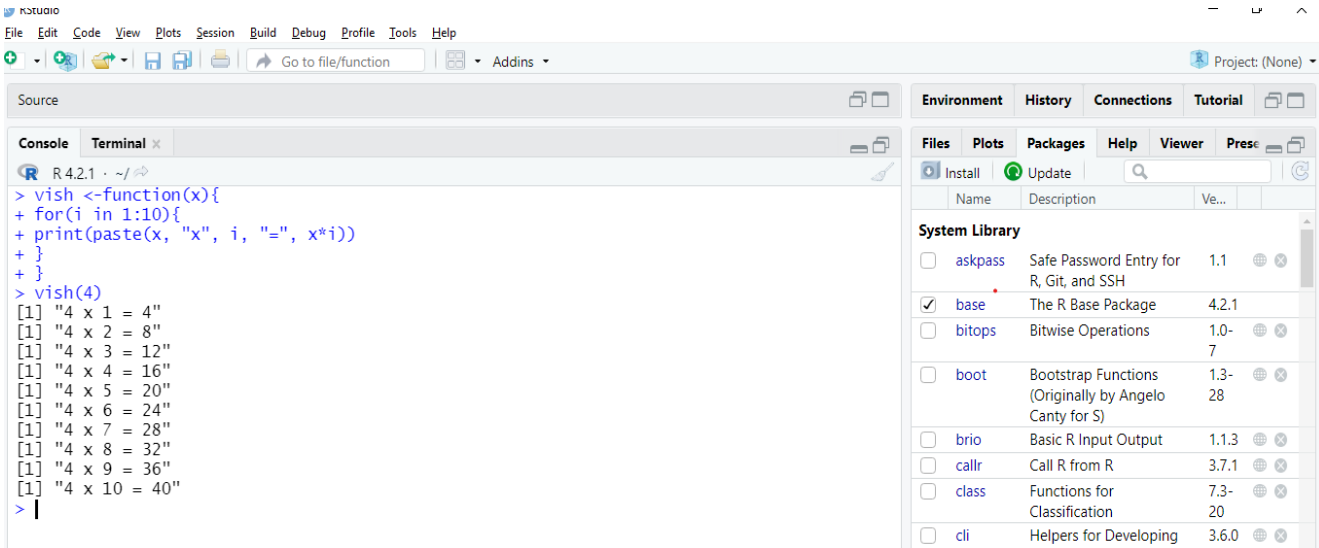
5) Write R Program to Sort a given Vector.



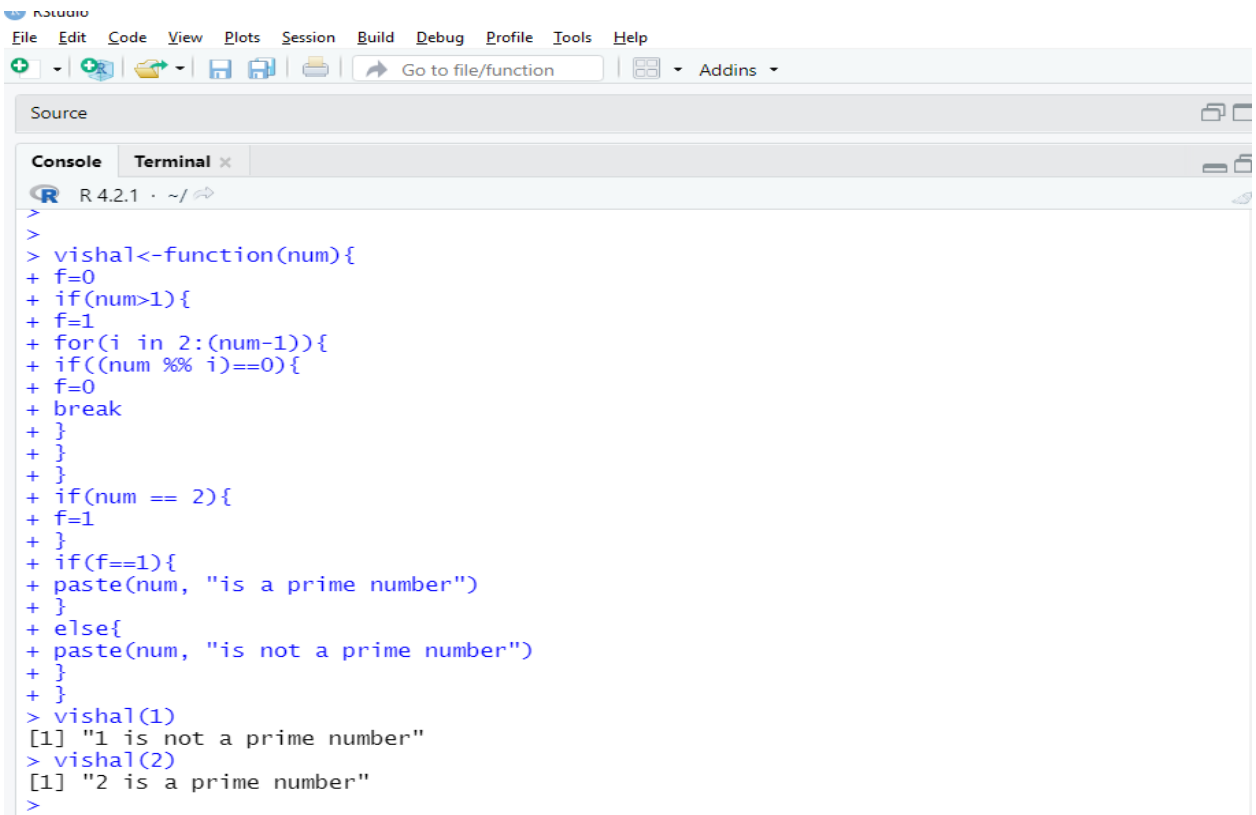
6) Write R Program to Find the Factorial of a Number.

```
> factorial<-function(x){
+ f=1
+ if(x<0){
+ print("Sorry factorial does not exist")}
+ else if(x==0){
+ print("The factorial of 0 is 1")}
+ else{
+ for(i in 1:x){
+ f=f*i}
+ print(paste("The factorial of", x , "is",f))}
+ }
> factorial(0)
[1] "The factorial of 0 is 1"
> factorial(1)
[1] "The factorial of 1 is 1"
> factorial(-1)
[1] "Sorry factorial does not exist"
> factorial(2)
[1] "The factorial of 2 is 2"
> factorial(3)
[1] "The factorial of 3 is 6"
> factorial(4)
[1] "The factorial of 4 is 24"
> factorial(5)
[1] "The factorial of 5 is 120"
```

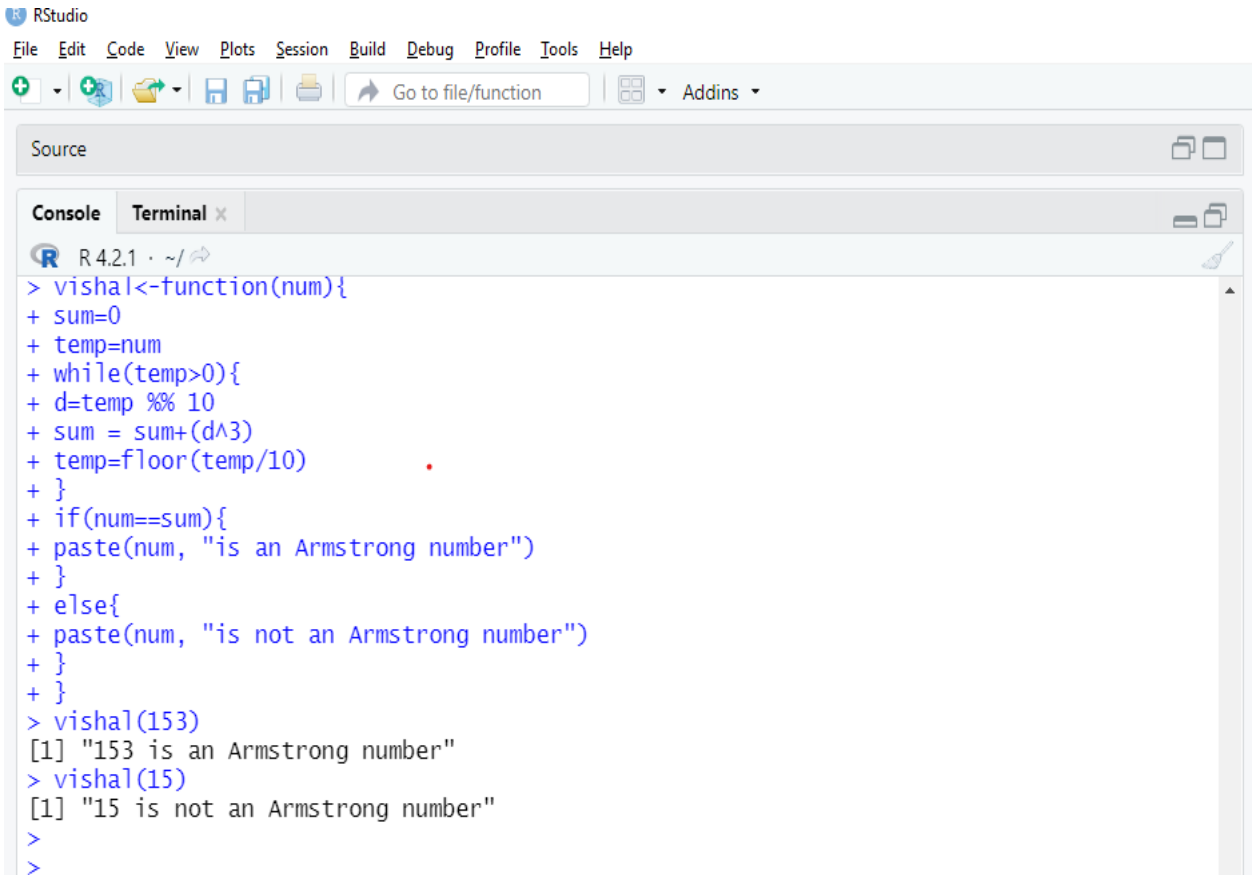
7) Write R Program to Print Table of given Number.



8) Write R Program to Check Prime Number.



9) Write R Program to check Armstrong Number.



10) Write R Program to Print the Fibonacci Sequence.

```
Console   Terminal
R 4.2.1 · ~/
>
> vishal <- function(num){
+ a=0
+ b=1
+ c=2
+ if(num<=0){
+ print("Enter positive number")
+ }
+ else{
+ if(num==1){
+ print(a)
+ }
+ else{
+ print(a)
+ print(b)
+ while(c<num){
+ n=a+b
+ print(n)
+ a=b
+ b=n
+ c=c+1
+ }
+ }
+ }
+ }
> vishal(10)
[1] 0
[1] 1
[1] 1
[1] 2
[1] 3
[1] 5
[1] 8
[1] 13
[1] 21
[1] 34
>
```

11) Write R Program to find nth highest value in a given vector.

```
Console   Terminal
R 4.2.1 · ~/
>
> vishal<-function(n){
+ vis<-c(15,36,24,67,86,2,34,5,6,33)
+ paste(n, " th highest value is ", sort(vis, TRUE)[n])
+ }
> vishal(4)
[1] "4  th highest value is  34"
> vishal(7)
[1] "7  th highest value is  15"
>
```

12) Write R Program to create a vector using : operator and seq( ) function.

```
Console   Terminal
R 4.2.1 · ~/
>
> vishal1<-c(1:10)
> vishal1
 [1]  1  2  3  4  5  6  7  8  9 10
> vishal2<-c(seq(1,5, by=0.5))
> vishal2
[1] 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0
>
>
>
>
```

13) Write R Program to convert a given list to vector.

```
Console   Terminal
R 4.2.1 · ~/
>
>
>
>
>
>
>
> vishal = list(1,2,3,4,5)
> vishal
[[1]]
[1] 1

[[2]]
[1] 2

[[3]]
[1] 3

[[4]]
[1] 4

[[5]]
[1] 5

> vishal1 = unlist(vishal)
> vishal1
[1] 1 2 3 4 5
>
```

14) Write R Program for Convert Decimal into Binary using Recursion.

```
> d2b<-function(x){
+ if(x>1){
+ d2b(as.integer(x/2))}
+ cat(x %% 2)}
> d2b(8)
1000
> d2b(5)
101
```

15) Write R Program to Find H.C.F. or G.C.D.

```
> hcf<-function(x,y){
+ if(x>y){
+ s=y}
+ else{
+ s=x}
+ for(i in 1:s){
+ if((x%%i==0) && (y%%i==0)){
+ hcf=i}}
+ return(hcf)}
> hcf(4,3)
[1] 1
> hcf(72,120)
[1] 24
```

16) Write R Program to create an array of two 3x3 matrices each with 3 rows and 3 columns from two given two vectors. Print the second row of the second matrix of the array and the element in the 3rd row and 3rd column of the 1st matrix.

```
> v1=c(1,2,3,4)
> v2=c(5,6,7,8,9,0)
> arr=array(c(v1,v2),dim=c(3,3,2))
> arr
, , 1

     [,1] [,2] [,3]
[1,]    1    4    7
[2,]    2    5    8
[3,]    3    6    9

, , 2

     [,1] [,2] [,3]
[1,]    0    3    6
[2,]    1    4    7
[3,]    2    5    8

> arr[2,,2]
[1] 1 4 7
> arr[3,3,1]
[1] 9
```

17) Write R Program to create two 2x3 matrix and add, subtract, multiply and divide the matrixes.

```
> m1=matrix(c(1,2,3,4,5,6),nrow=2)
> m2=matrix(c(7,8,9,10,11,12),nrow=2)
> m1+m2
     [,1] [,2] [,3]
[1,]    8   12   16
[2,]   10   14   18
> m1-m2
     [,1] [,2] [,3]
[1,]   -6   -6   -6
[2,]   -6   -6   -6
> m1*m2
     [,1] [,2] [,3]
[1,]    7   27   55
[2,]   16   40   72
> m1/m2
           [,1]      [,2]      [,3]
[1,] 0.1428571 0.3333333 0.4545455
[2,] 0.2500000 0.4000000 0.5000000
```

18) Write R Program to access the element at 3rd column and 2nd row, only the 3rd row and only the 4th column of a given matrix.

```
> m=matrix(c(1:16),nrow=4,byrow=TRUE)
> m
     [,1] [,2] [,3] [,4]
[1,]    1    2    3    4
[2,]    5    6    7    8
[3,]    9   10   11   12
[4,]   13   14   15   16
> m[2,3]
[1] 7
> m[3,]
[1]  9 10 11 12
> m[,4]
[1]  4  8 12 16
```

19) Write R Program to find row and column index of maximum and minimum value in a given matrix.

```
> m=matrix(c(1:16),nrow=4)
> m
     [,1] [,2] [,3] [,4]
[1,]    1    5    9   13
[2,]    2    6   10   14
[3,]    3    7   11   15
[4,]    4    8   12   16
> which(m==max(m),arr.ind=TRUE)
     row col
[1,]   4   4
> which(m==min(m),arr.ind=TRUE)
     row col
[1,]   1   1
```

20) Write R Program to concatenate two given matrices ofsame column but different rows.

```
> m1=matrix(1:12,ncol=3)
> m2=matrix(13:24,ncol=3)
> m1
     [,1] [,2] [,3]
[1,]    1    5    9
[2,]    2    6   10
[3,]    3    7   11
[4,]    4    8   12
> m2
     [,1] [,2] [,3]
[1,]   13   17   21
[2,]   14   18   22
[3,]   15   19   23
[4,]   16   20   24
> dim(rbind(m1,m2))
[1] 8 3
```

21) Write R Program to extract specific column from a data frame using column name.

```
> df=data.frame(
+ name=c("Abhay","Prateek","Vanshika","Neha","Nishi","Tushar","Balram","Sapna","Nikita","Gautam"),
+ score=c(95,70,85,80,83,72,60,67,75,80),
+ attempts=c(1,2,2,1,2,3,3,2,1,1),
+ qualify=c('y','n','y','y','y','n','n','n','n','n'))
> df
       name score attempts qualify
1     Abhay    95        1       y
2   Prateek    70        2       n
3  Vanshika    85        2       y
4      Neha    80        1       y
5     Nishi    83        2       y
6    Tushar    72        3       n
7    Balram    60        3       n
8     Sapna    67        2       n
9    Nikita    75        1       n
10   Gautam    80        1       n
> data.frame(df$name,df$score)
    df.name df.score
1     Abhay       95
2   Prateek       70
3  Vanshika       85
4      Neha       80
5     Nishi       83
6    Tushar       72
7    Balram       60
8     Sapna       67
9    Nikita       75
10   Gautam       80
```