

## Probability and Statistics (UCS410)

### Experiment 1: Basics of R programming

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- (1) Create a vector  $c = [5, 10, 15, 20, 25, 30]$  and write a program which returns the maximum and minimum of this vector.

```
vec<-c(5,10,15,20,25,30)
max(vec)
min(vec)
> vec<-c(5,10,15,20,25,30)
> max(vec)
[1] 30
> min(vec)
[1] 5
```

- (2) Write a program in R to find factorial of a number by taking input from user. Please print error message if the input number is negative.

```
n=as.integer(readline(prompt = "Enter a number: "))
fact=1
if(n<0) {
  print("Factorial does not exist for negative numbers")
} else if(n==0) {
  print("The factorial of 0 is 1")
} else{
  for(i in 1:n) {
    fact=fact*i
  }
  print(paste("The factorial of ", n, " is ", fact))
}
> source("~/R/Assignment1/Q2.R")
Enter a number: 5
[1] "The factorial of 5 is 120"
```

- (3) Write a program to write first  $n$  terms of a Fibonacci sequence. You may take  $n$  as an input from the user.

```
fib <- function(n) {
  if(n<=1){
    return (n)
  } else{
    return (fib(n-1)+fib(n-2))
  }
}
```

```
n=as.integer(readline(prompt = "Enter the number of terms to be printed: "))
if(n<=0) {
  print("Enter a positive integer")
} else {
```

```
print("Fibonacci Sequence:")
for(i in 0:(n-1)) {
  print(fib(i))
}
}
> source("~/R/Assignment1/Q3.R")
Enter the number of terms to be printed: 8
[1] "Fibonacci Sequence:"
[1] 0
[1] 1
[1] 1
[1] 2
[1] 3
[1] 5
[1] 8
[1] 13
```

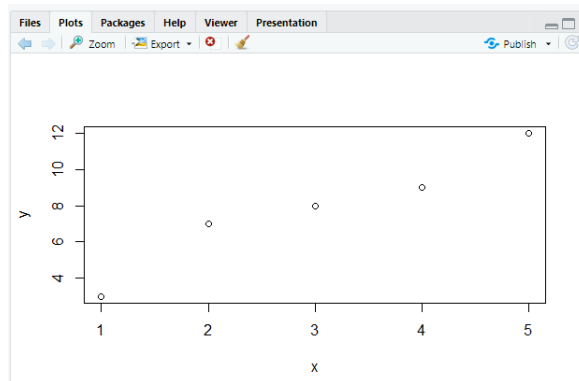
- (4) Write an R program to make a simple calculator which can add, subtract, multiply and divide.

```
print("1.Addition\n2.Subtraction\n3.Multiplication\n4.Division")
choice=as.integer(readline("Enter your choice: "))
a=as.integer(readline("Enter 1st number: "))
b=as.integer(readline("Enter 2nd number: "))
if(choice==1){
  print(a+b)
} else if(choice==2){
  print(a-b)
} else if(choice==3){
  print(a*b)
} else if(choice==4){
  print(a/b)
}
> source("~/R/Assignment1/Q4.R")
[1] "1.Addition\n2.Subtraction\n3.Multiplication\n4.Division"
Enter your choice: 3
Enter 1st number: 79
Enter 2nd number: 84
[1] 6636
```

- (5) Explore plot, pie, barplot etc. (the plotting options) which are built-in functions in R.

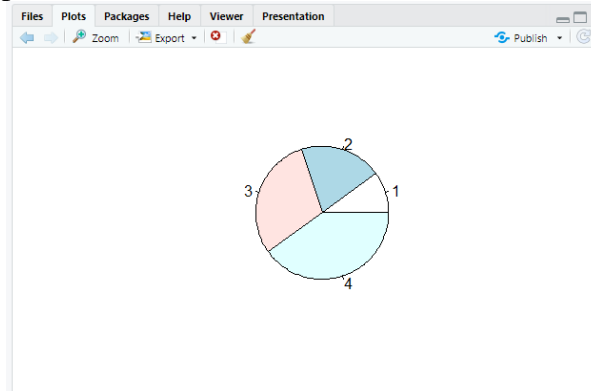
**(i)Plot**

```
x<-c(1, 2, 3, 4, 5)
y<-c(3, 7, 8, 9, 12)
plot(x,y)
```

**(ii) Pie**

```
x<-c(10,20,30,40)
```

```
pie(x)
```

**(iii) Barplot**

```
x<-c("A", "B", "C", "D", "E")
```

```
y<-c(20,40,10,30,50)
```

```
barplot(y, names.arg=x)
```

