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)
min(vec)
max(vec)
```

Output:

```
> #(1)max and min of vector
> vec = c(5,10,15,20,25,30)
> min(vec)
[1] 5
> max(vec)
[1] 30
```

(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=scan()
{
  if(n<0)
  {
    print("number is negative!")
  }
  else
  {
    i=1;fact=1
    for(i in 1:n)
    {
      fact = fact*i
      i=i+1
    }
    print(fact)
  }
}
```

Output:

```
> n=scan()
1: 6
2:
Read 1 item
> {
+   if(n<0)
+   {
+     print("number is negative!")
+   }
+   else
+   {
+     i=1;fact=1
+     for(i in 1:n)
+     {
+       fact = fact*i
+       i=i+1
+     }
+     print(fact)
+   }
+ }
[1] 720
```

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

```
m=scan()
a=0;b=1;result=0
for(i in 1:m)
{
  print(a)
  result=a+b
  a=b
  b=result
}
```

Output:

```
> m=scan()
1: 10
2:
Read 1 item
> a=0;b=1;result=0
> for(i in 1:m)
+ {
+   print(a)
+   result=a+b
+   a=b
+   b=result
+ }
[1] 0
[1] 1
[1] 1
[1] 2
[1] 3
[1] 5
[1] 8
[1] 13
[1] 21
[1] 34
```

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

```
a=scan()
b=scan()
print("Enter the choice:
      (1)addition   (2)subtraction    (3)multiplication    (4)division")
choice=scan()
result=switch(
  choice,
  a+b,
  a-b,
  a*b,
  a/b
)
print(result)
```

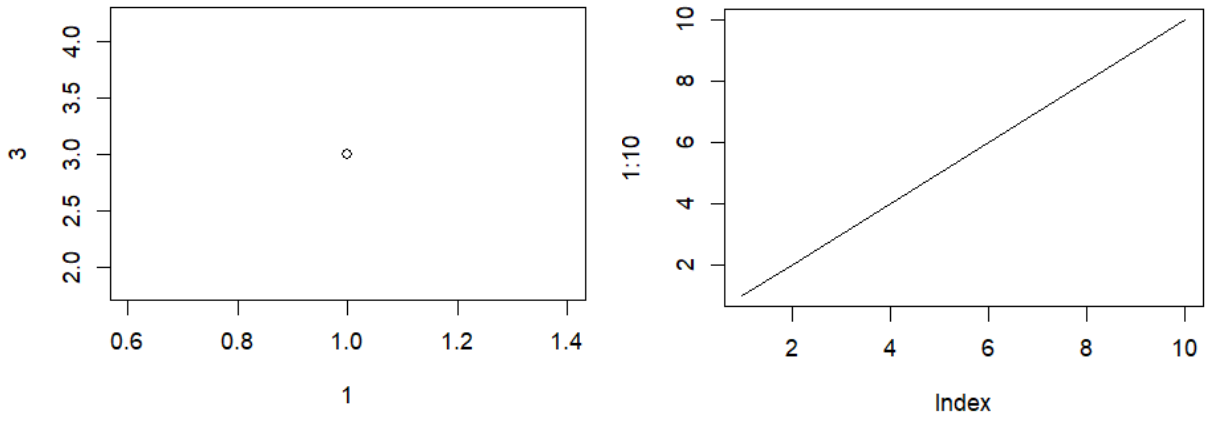
Output:

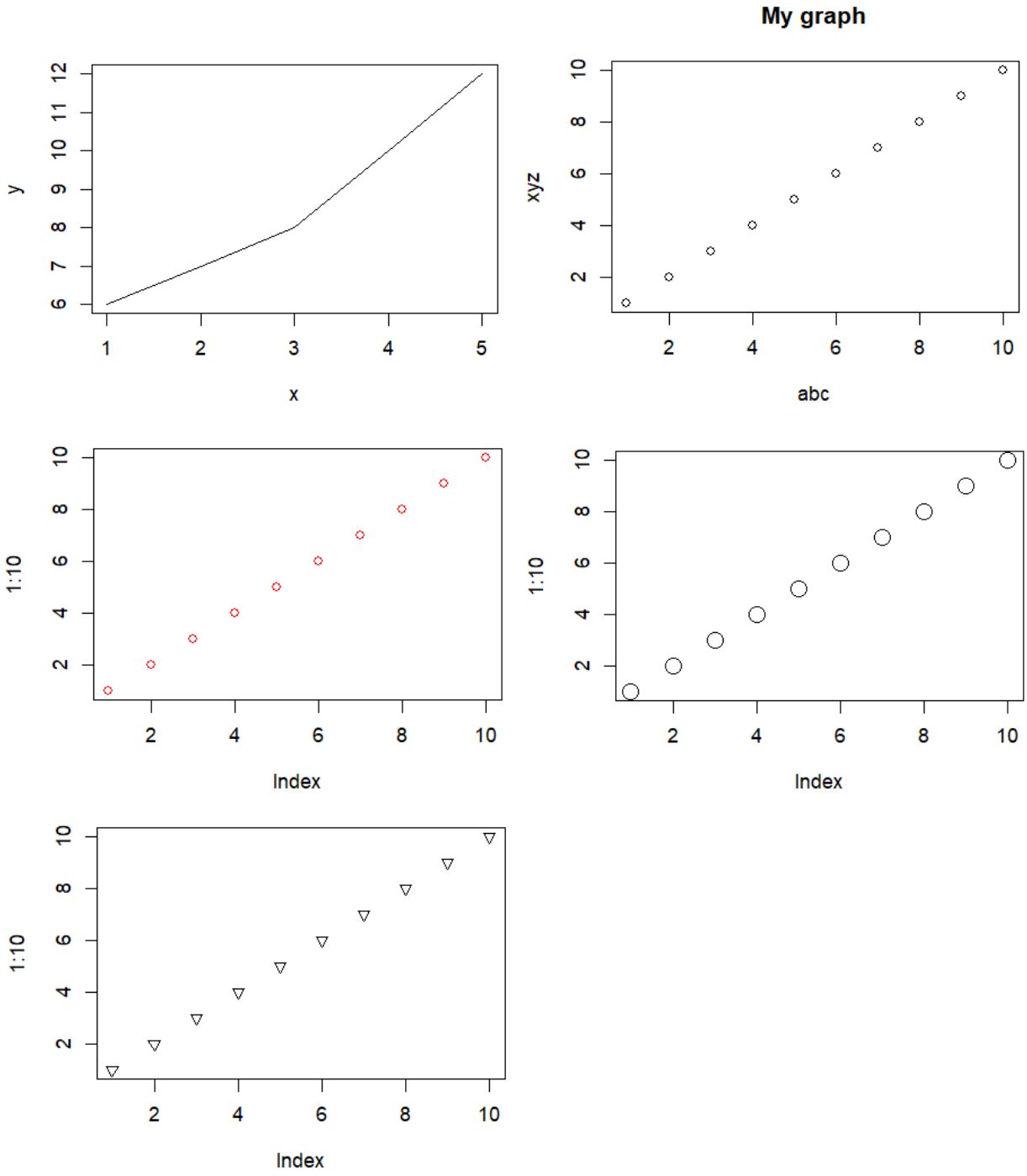
```
> a=scan()
1: 3
2:
Read 1 item
> b=scan()
1: 4
2:
Read 1 item
> print("Enter the choice:
+       (1)addition   (2)subtraction    (3)multiplication    (4)division")
[1] "Enter the choice:\n      (1)addition   (2)subtraction    (3)multiplication    (4)division"
> choice=scan()
1: 3
2:
Read 1 item
> result=switch(
+   choice,
+   a+b,
+   a-b,
+   a*b,
+   a/b
+ )
> print(result)
[1] 12
```

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

```
plot(1,3)
plot(1:10,type='l')
x=c(1,2,3,4,5)
y=c(6,7,8,10,12)
plot(x,y,type='l')
plot(1:10,main="My graph",xlab="abc",ylab="xyz")
plot(1:10,col="red")
plot(1:10,cex=2)
plot(1:10,pch=6)
```

Output:




My graph
y
x
xyz
abc
1:10
Index
1:10
Index
1:10
Index