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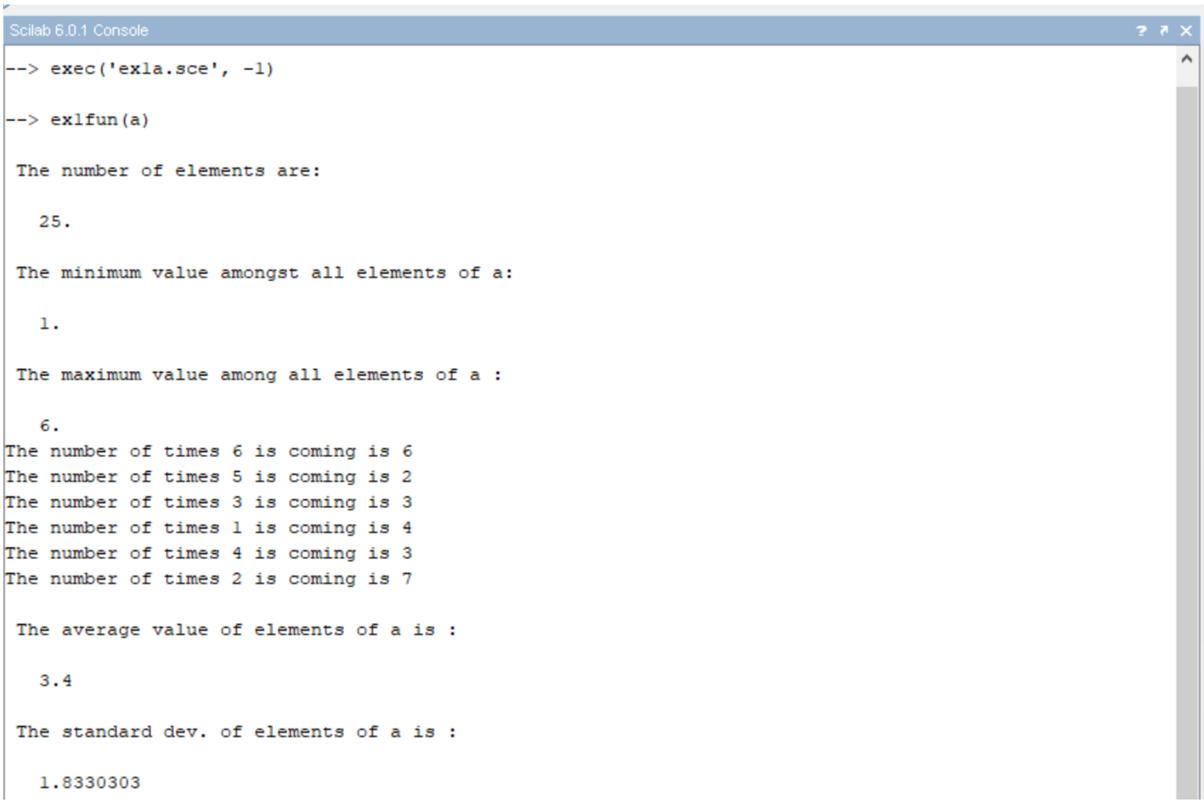
# ROLL NO: 18i190002

# MSC PHD (OR)

## Exercise 1):

## PART (c) [R]

For matric ‘a’ given in ‘ex1a.sce’, we have the following output:



```
Scilab 6.0.1 Console
--> exec('ex1a.sce', -1)

--> ex1fun(a)

 The number of elements are:

   25.

 The minimum value amongst all elements of a:

   1.

 The maximum value among all elements of a :

   6.
The number of times 6 is coming is 6
The number of times 5 is coming is 2
The number of times 3 is coming is 3
The number of times 1 is coming is 4
The number of times 4 is coming is 3
The number of times 2 is coming is 7

 The average value of elements of a is :

   3.4

 The standard dev. of elements of a is :

   1.8330303
```

1) The number of elements are:**25**.
2) The minimum value amongst all elements of a: **1**.
3) The maximum value among all elements of a : **6**.

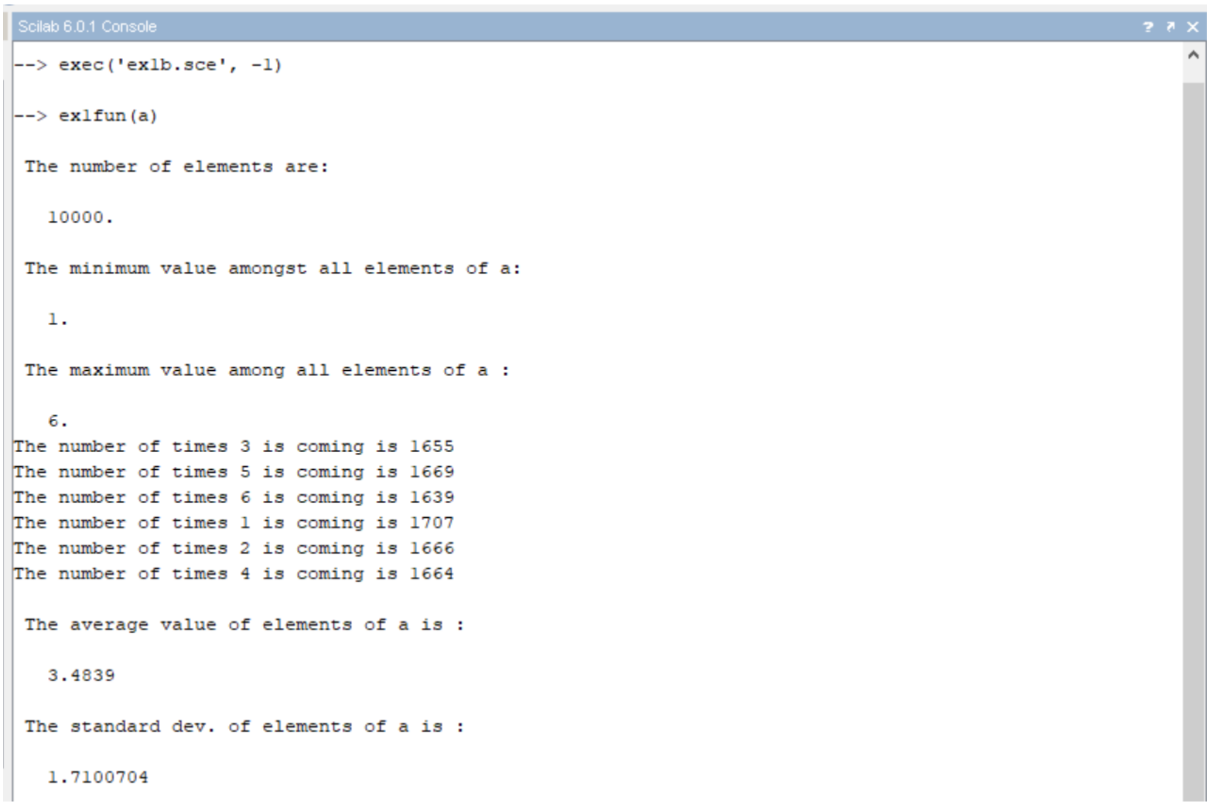
4) The number of times 6 is coming is **6**

The number of times 5 is coming is **2**
The number of times 3 is coming is **3**
The number of times 1 is coming is **4**
The number of times 4 is coming is **3**
The number of times 2 is coming is **7**

5) The average value of elements of a is : **3.4**

6) The standard dev. of elements of a is : **1.8330303**

# For matric ‘a’ given in ‘ex1b.sce’, we have the following output:



```
Scilab 6.0.1 Console
--> exec('ex1b.sce', -1)

--> ex1fun(a)

 The number of elements are:

   10000.

 The minimum value amongst all elements of a:

   1.

 The maximum value among all elements of a :

   6.
The number of times 3 is coming is 1655
The number of times 5 is coming is 1669
The number of times 6 is coming is 1639
The number of times 1 is coming is 1707
The number of times 2 is coming is 1666
The number of times 4 is coming is 1664

 The average value of elements of a is :

   3.4839

 The standard dev. of elements of a is :

   1.7100704
```

The number of elements are:**10000**.

The minimum value amongst all elements of a: **1**.

The maximum value among all elements of a : **6**.

The number of times 3 is coming is **1655**

The number of times 5 is coming is **1669**

The number of times 6 is coming is **1639**

The number of times 1 is coming is **1707**

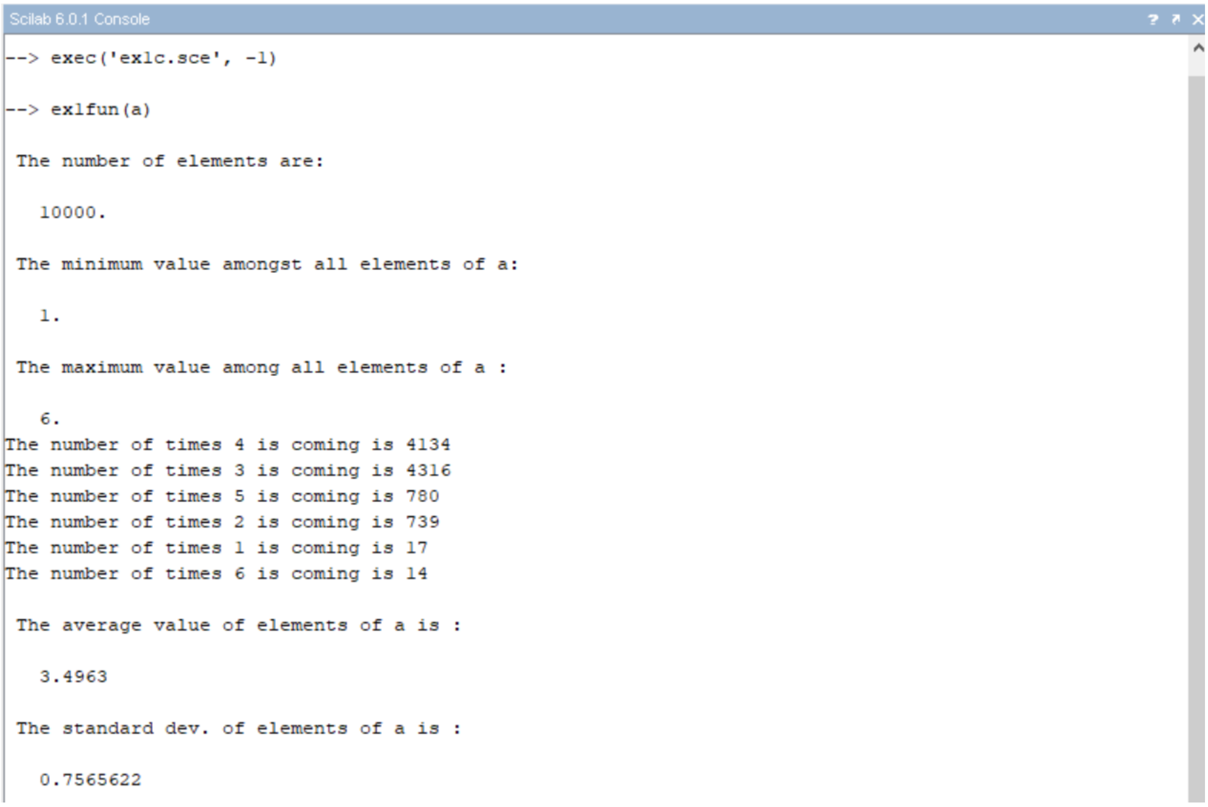
The number of times 2 is coming is **1666**

The number of times 4 is coming is **1664**

The average value of elements of a is :**3.4839**

The standard dev. of elements of a is : **1.7100704**

# For matric ‘a’ given in ‘ex1c.sce’, we have the following output:



```
Scilab 6.0.1 Console
--> exec('ex1c.sce', -1)

--> ex1fun(a)

 The number of elements are:

   10000.

 The minimum value amongst all elements of a:

   1.

 The maximum value among all elements of a :

   6.
The number of times 4 is coming is 4134
The number of times 3 is coming is 4316
The number of times 5 is coming is 780
The number of times 2 is coming is 739
The number of times 1 is coming is 17
The number of times 6 is coming is 14

 The average value of elements of a is :

   3.4963

 The standard dev. of elements of a is :

   0.7565622
```

The number of elements are: **10000**.

The minimum value amongst all elements of a: **1**.

The maximum value among all elements of a : **6**.

The number of times 4 is coming is **4134**

The number of times 3 is coming is **4316**

The number of times 5 is coming is **780**

The number of times 2 is coming is **739**

The number of times 1 is coming is **17**

The number of times 6 is coming is **14**

The average value of elements of a is : **3.4963**

The standard dev. of elements of a is : **0.7565622**

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# PART (d) [R]

We know that **mean** and **variance** of the uniform distribution is as follows:

Mean = (a+b)/2

Variance = $(b-a)^2/12$

where a is the minimum value and b is the maximum value

Now we'll check the mean and variance of all the vector 'a' from all the **ex1a.sce, ex1b.sce, ex1c.sce** and calculate the corresponding (a+b)/2 and $(b-a)^2/12$ and compare them.

## Let a = minimum value

## b = maximum value

## In ex1a.sce:

a = 1

b = 6

then (a+b)/2 = **3.5**

& $(b-a)^2/12$ = 2.08 and square root of this is **1.44337**

and we have found the mean=**3.4** and standard deviation=**1.833**

That is , we are getting the mean standard deviation approximately equal to the uniform distribution , thus, 'a' in 'ex1.sce' is likely to have **UNIFORM DISTRIBUTION**

## In ex1b.sce:

a = 1

b = 6

then (a+b)/2 = **3.5**

& $(b-a)^2/12$ = 2.08 and square root of this is **1.44337**

and we have found the mean=**3.4839** and standard deviation=**1.7100704**

That is , we are getting the mean standard deviation approximately equal to the uniform distribution , thus, 'a' in 'ex1.sce' is likely to have **UNIFORM DISTRIBUTION**.

## In ex1c.sce:

a = 1

b = 6

then (a+b)/2 = **3.5**

& $(b-a)^2/12$ = 2.08 and square root of this is **1.44337**

and we have found the mean=**3.4963** and standard deviation=**0.7565622**

That is , we are non getting the mean standard deviation approximately equal or equal to the uniform distribution , thus, 'a' in 'ex1.sce' will not UNIFORM DISTRIBUTION.

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# PART (e) [R]

We have shown in the above part only that 'a' in 'ex1b.sce' is likely to have UNIFORM DISTRIBUTIONS i.e.,

## Let a = minimum value

## b = maximum value

## In ex1b.sce:

a = 1

b = 6

then (a+b)/2 = **3.5**

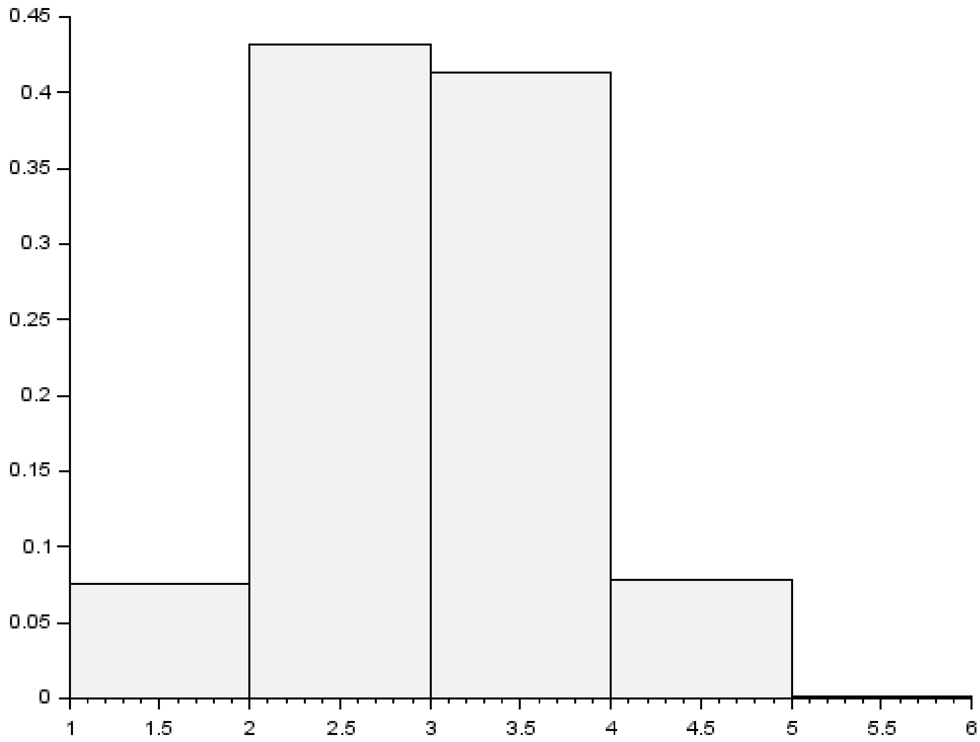
& $(b-a)^2/12$ = 2.08 and square root of this is **1.44337**

and we have found the mean=**3.4839** and standard deviation=**1.7100704**

That is , we are getting the mean standard deviation approximately equal to the uniform distribution , thus, 'a' in 'ex1.sce' is likely to have **UNIFORM DISTRIBUTION**.

## In ex1c.sce:

We have seen that that the graph is symmetric, so it is likely to have normal distributions




The histogram is approximately symmetric , then the likely distribution of ‘a’ in ‘ex1c.sce’ is **NORMAL DISTRIBUTION**.

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# Exercise 2):

# PART (b) [R]

```
Scilab 6.0.1 Console

--> exec('ex2a.sce', -1)

--> ex2fun(a,4)

 The size of vector b is :

   6250.

 The minimum value amongst all elements of the matrix b is :

   1.

 The maximum value amongst all elements of the matrix b is :

   6.

  The average value of elements of b :

   3.50424

 The Standard Deviation of elements of b is :

   0.84827
```

The size of vector b is : **6250**.

The minimum value amongst all elements of the matrix b is : **1**.

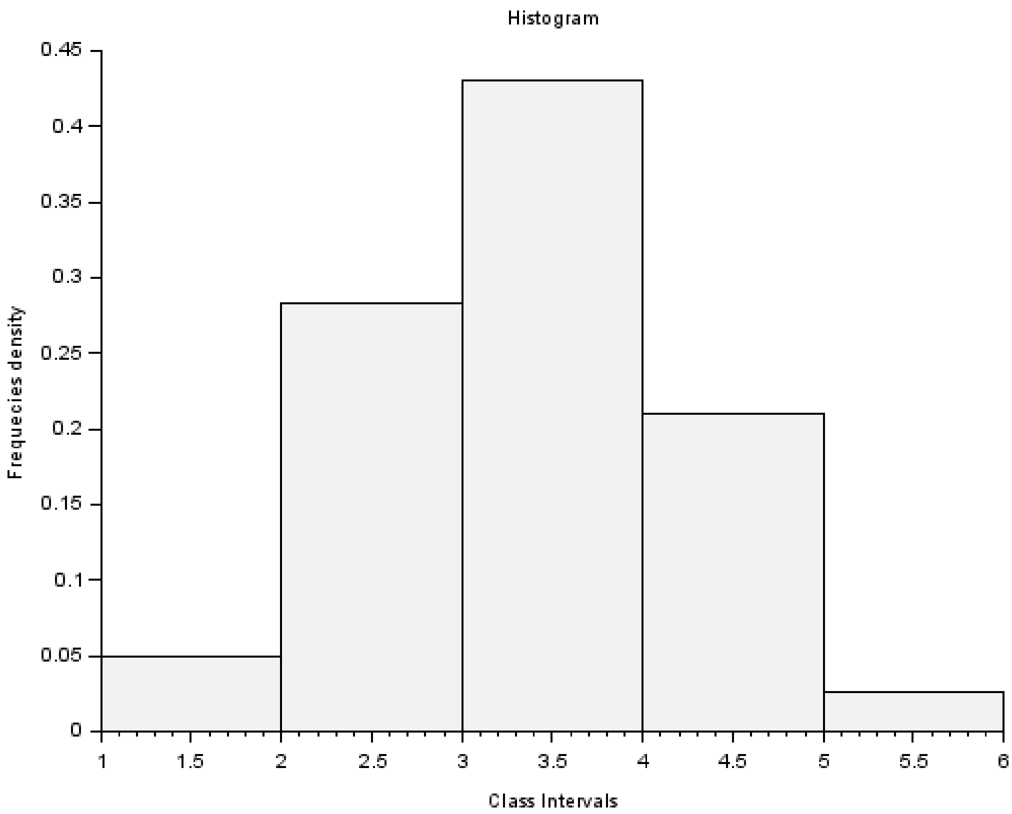
The maximum value amongst all elements of the matrix b is : **6**.

The average value of elements of b : **3.50424**

The Standard Deviation of elements of b is : **0.84827**

# PART (c) [R]

The Histogram of the above plot is :




The likely distribution of the elements of array b is NORMAL DISTRIBUTION because from the histogram we can see that that this distribution is symmetric.

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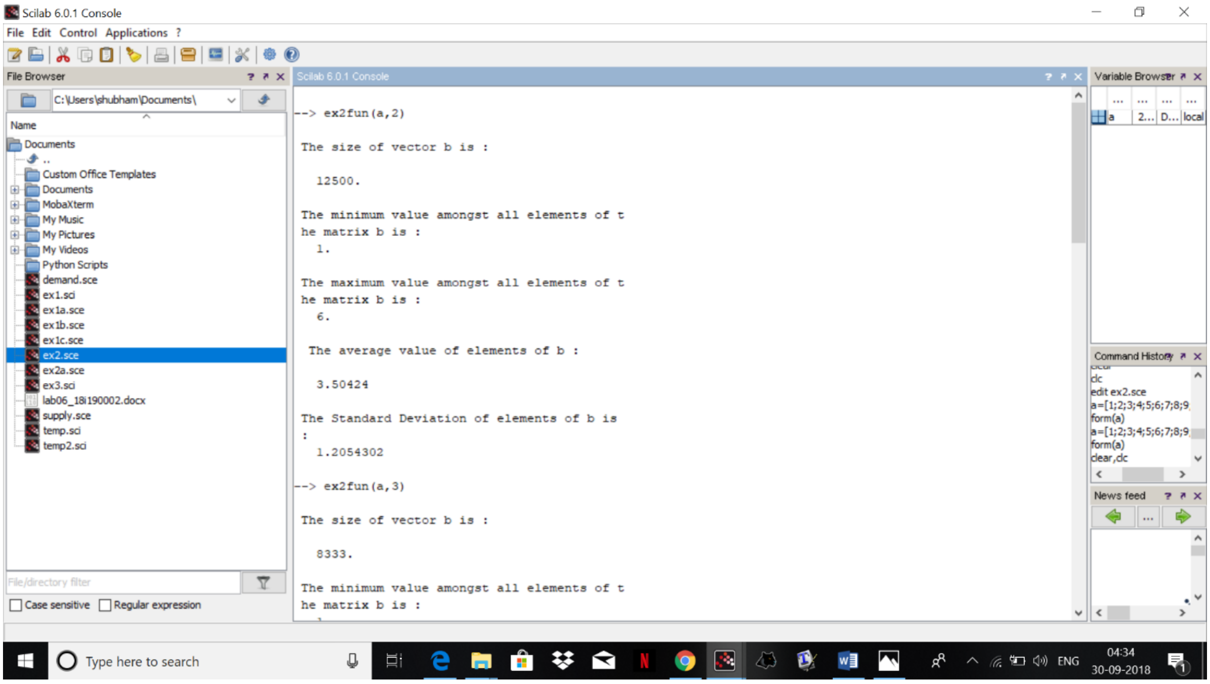
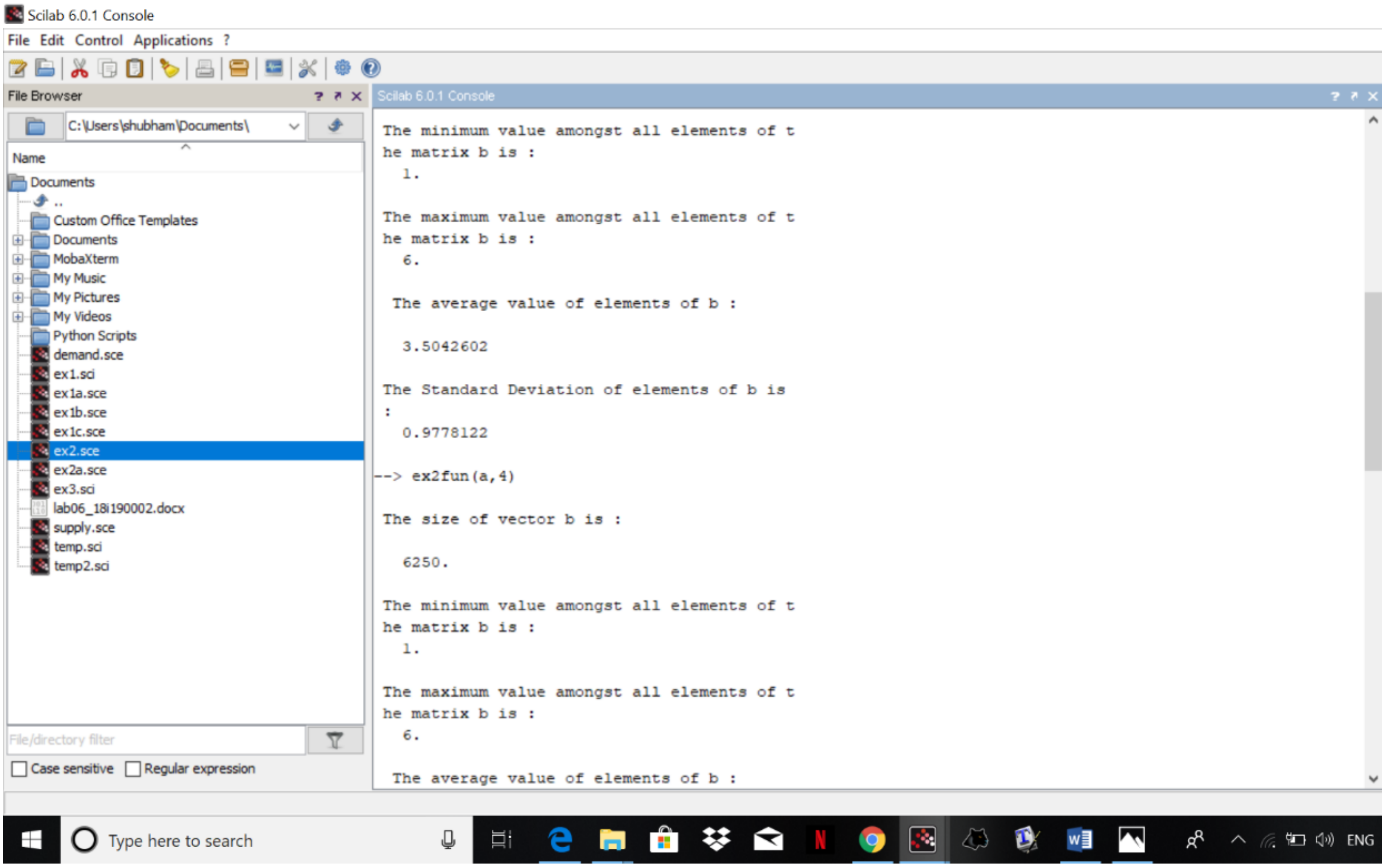
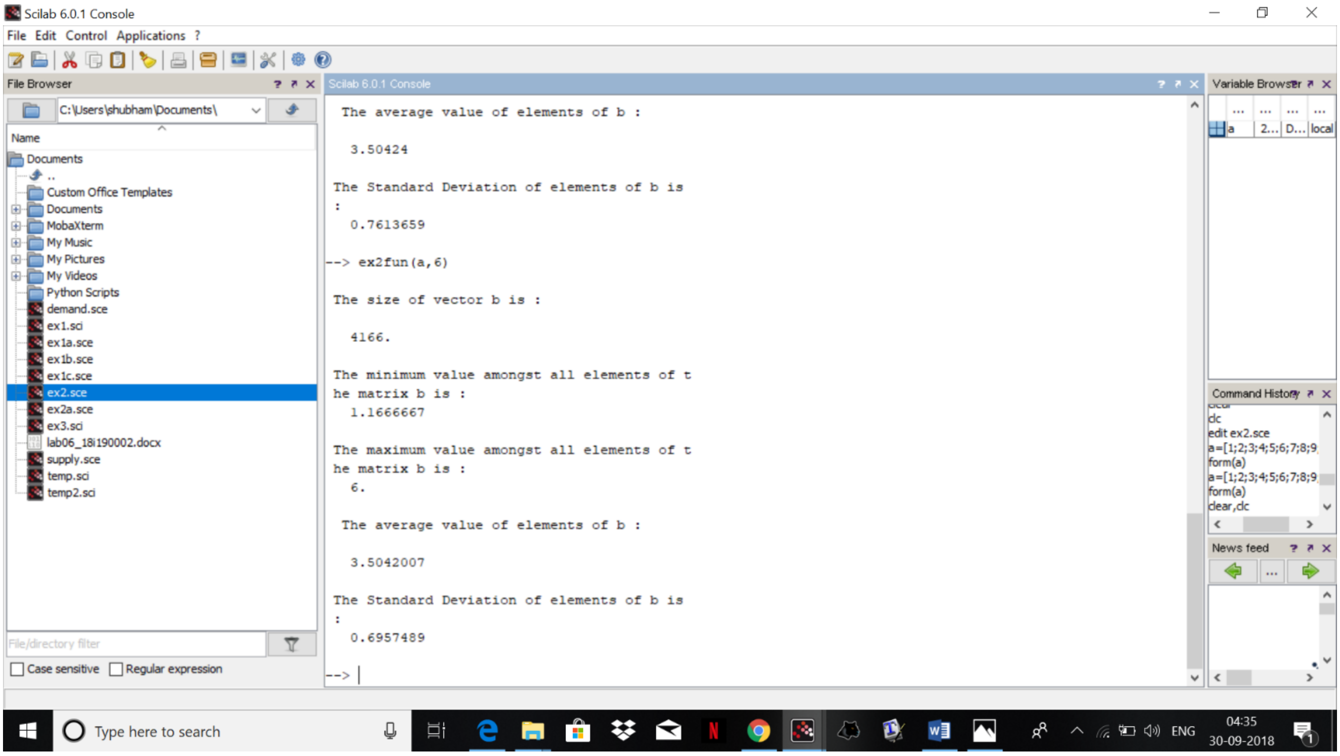
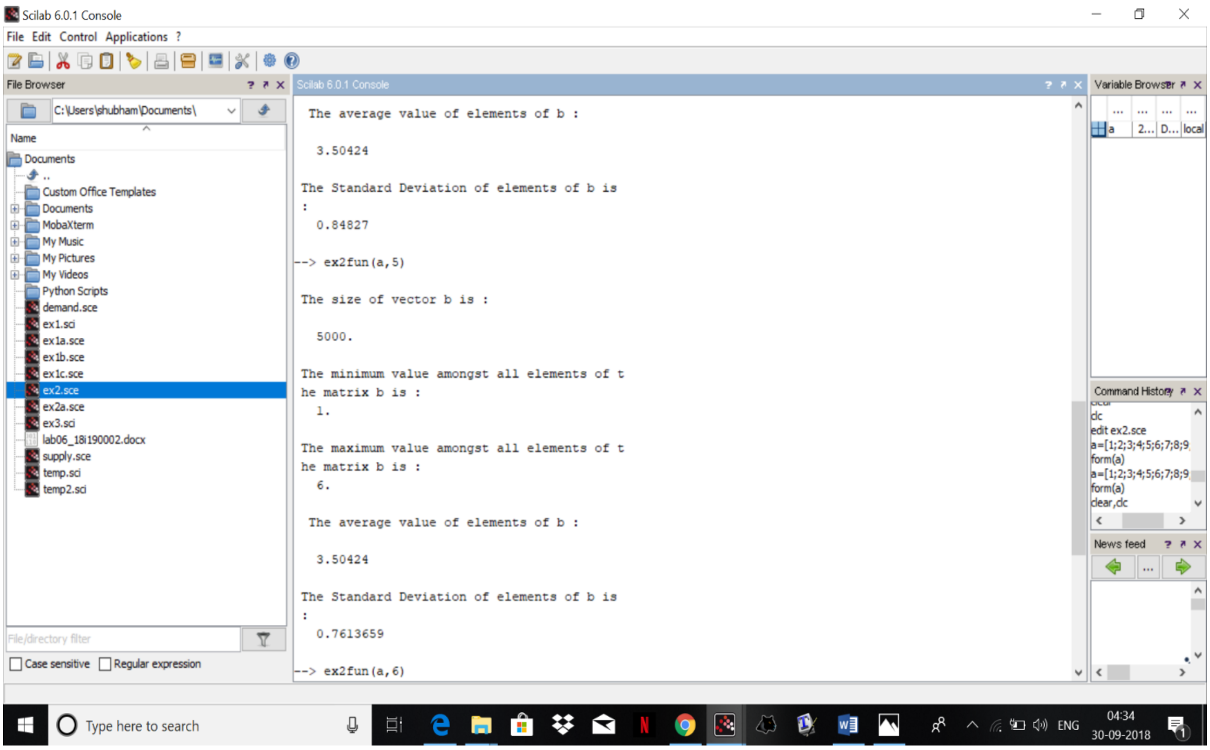
# PART (d) [R]

We have chosen five different values of **m** =2,3,4,5,6






| m | Size of vector b | Minimum Value | Maximum Value | Average Value | Standard Deviation |
|---|---|---|---|---|---|
| 2 | 12500 | 1 | 6 | 3.50424 | 1.2054302 |
| 3 | 8333 | 1 | 6 | 3.5042602 | 0.9778122 |
| 4 | 6250 | 1 | 6 | 3.50424 | 0.84827 |
| 5 | 5000 | 1 | 6 | 3.50424 | 0.7613659 |
| 6 | 4166 | 1.1666667 | 6 | 3.5042007 | 0.6957489 |

# Exercise 3):

# PART (2) [R]

We have to compute some statistical measures on the vector Profit for the given data that may be important in analysing the operations on Bindu's shop.

```
Scilab 6.0.1 Console

the minimum value among profit is :

  395.

the maximum value among profit is :

  2750.

The mean of the data is :

  2014.0726

the standard Deviation of the given data is :

  616.44267

-->
```

The minimum value among profit is : **395**

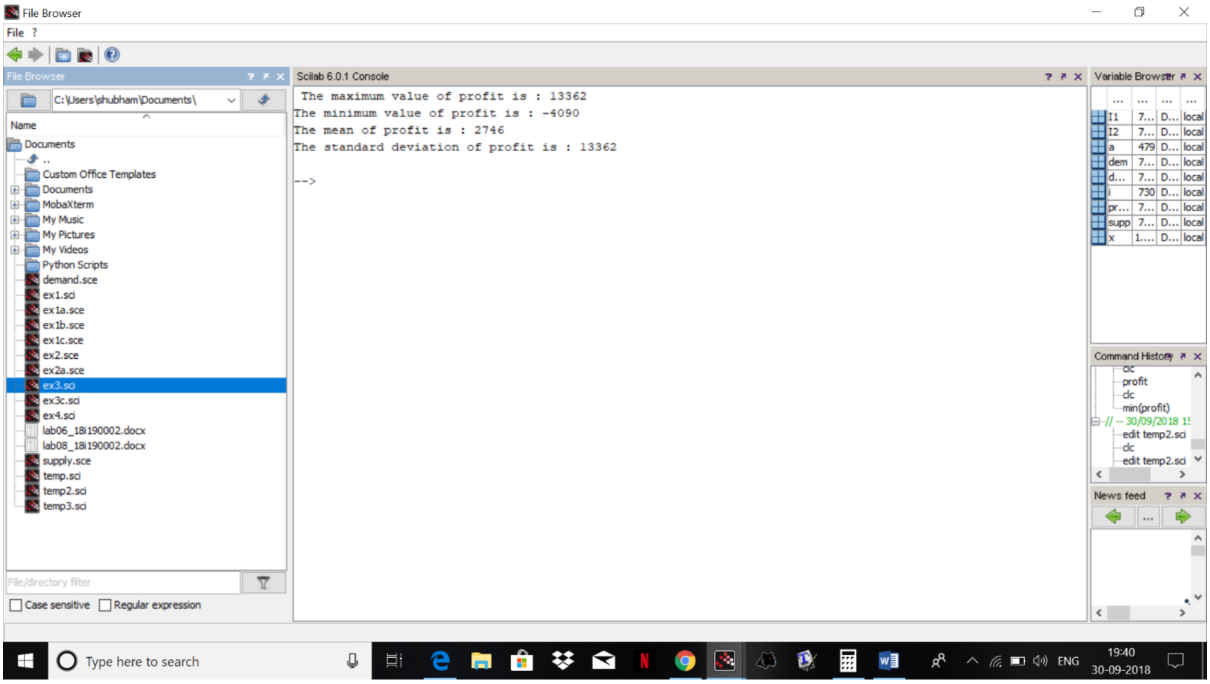
The maximum value among profit is : **2750**

The mean of the Profit is : **2014.0726**

The standard deviation of the given data is : **616.44267**

# PART (2) [R]

We have to compute some statistical measures on the vector Profit for the given data that may be important in analysing the operations on Bindu's shop.




**The method of solving this question has been told in the comment section in the code itself:**

The maximum value of profit is : **13362**

The minimum value of profit is : **-4090**

The mean of profit is : **2746**

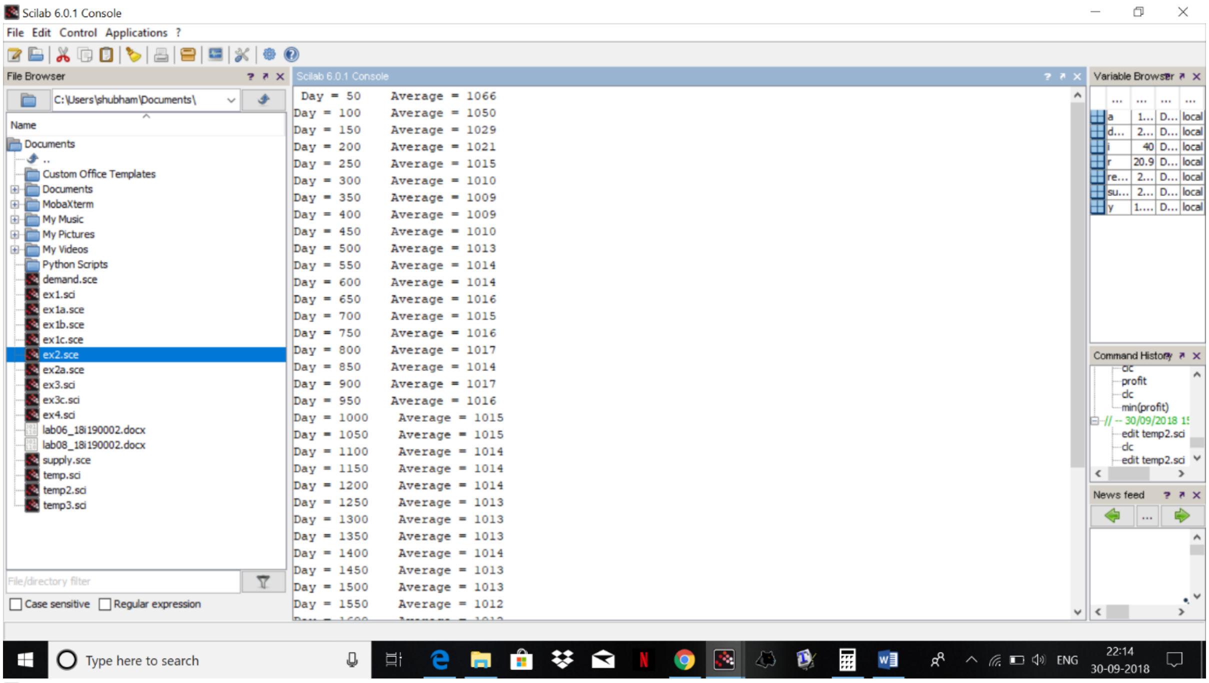
The standard deviation of profit is : **13362**

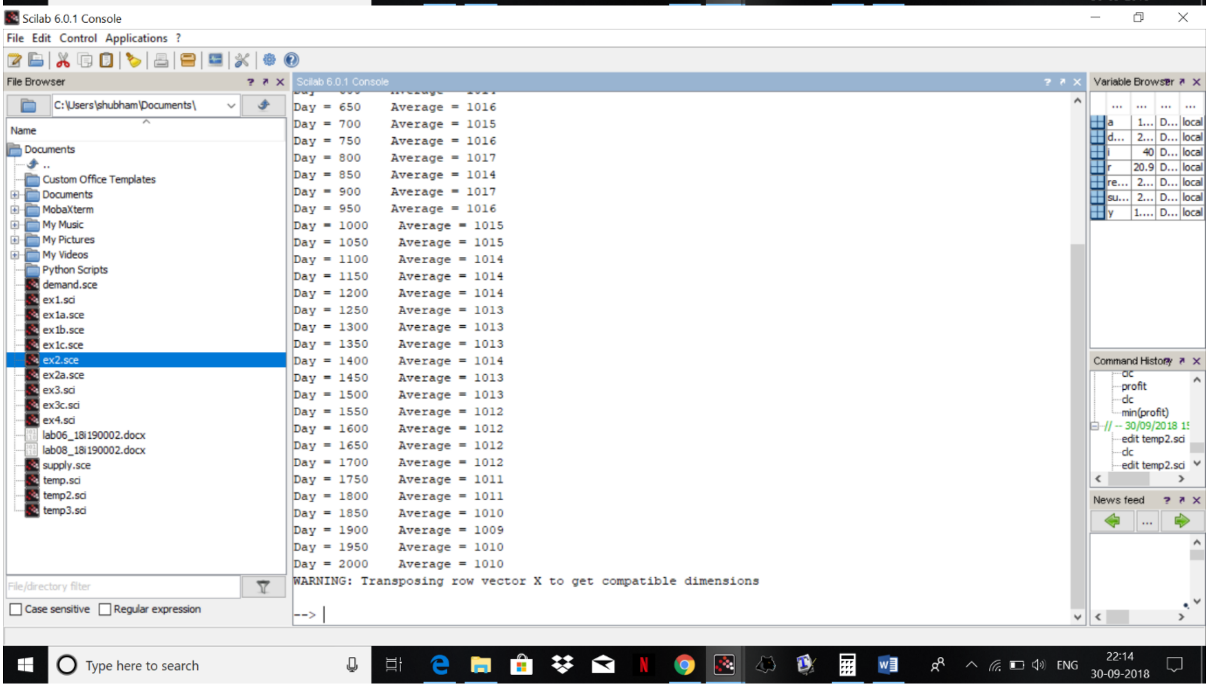
comparing the values of part a and part c:

| | PART a | PART c |
|---|---|---|
| **Maximum value of Profit** | 2750 | 13362 |
| **Minimum value of Profit** | 395 | -4090(loss of 4090) |
| **Mean Profit** | 2014.0726 | 2674 |
| **Standard Deviation** | 616.44267 | 13362 |

# Exercise 4):

The approach of solving the question has been told with the code file itself






That is, The results are as follows:

Day = 50 Average = 1066

Day = 100 Average = 1050

Day = 150 Average = 1029

Day = 200 Average = 1021

Day = 250 Average = 1015

Day = 300 Average = 1010

Day = 350 Average = 1009

Day = 400    Average = 1009

Day = 450    Average = 1010

Day = 500    Average = 1013

Day = 550    Average = 1014

Day = 600    Average = 1014

Day = 650    Average = 1016

Day = 700    Average = 1015

Day = 750    Average = 1016

Day = 800    Average = 1017

Day = 850    Average = 1014

Day = 900    Average = 1017

Day = 950    Average = 1016

Day = 1000    Average = 1015

Day = 1050    Average = 1015

Day = 1100    Average = 1014

Day = 1150    Average = 1014

Day = 1200    Average = 1014

Day = 1250    Average = 1013

Day = 1300    Average = 1013

Day = 1350    Average = 1013

Day = 1400    Average = 1014

Day = 1450    Average = 1013

Day = 1500    Average = 1013

Day = 1550    Average = 1012

Day = 1600    Average = 1012

Day = 1650    Average = 1012

Day = 1700    Average = 1012

Day = 1750    Average = 1011

Day = 1800    Average = 1011

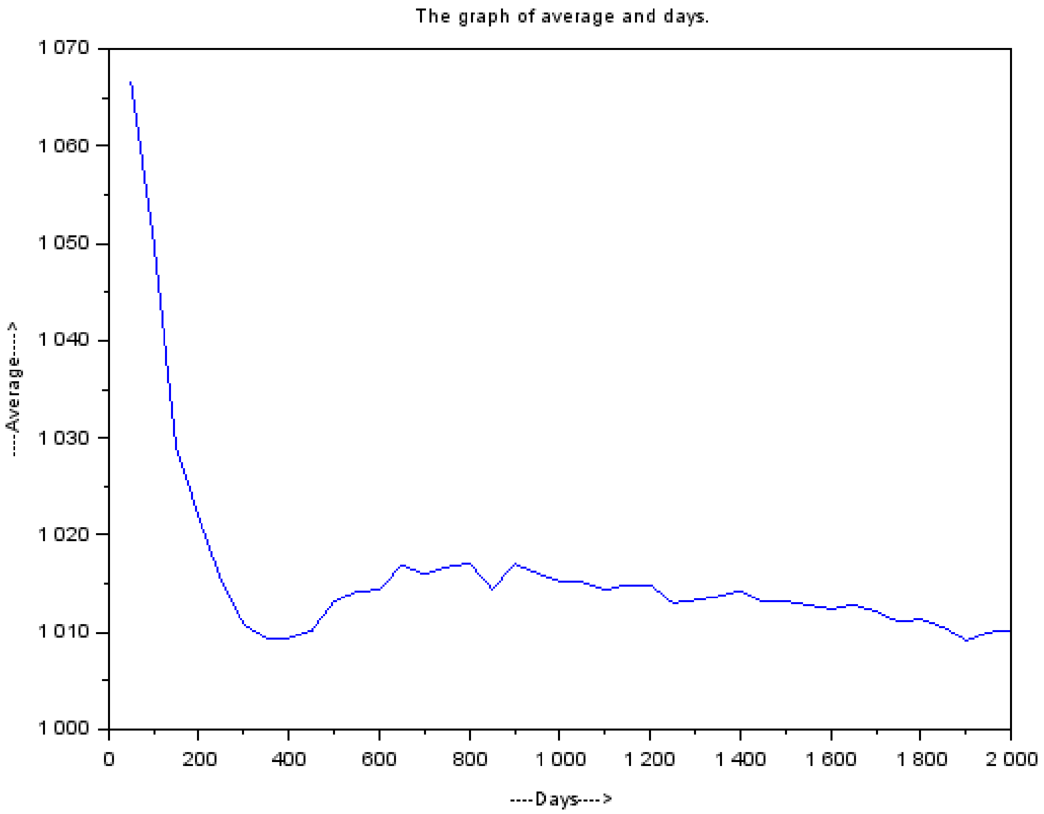
Day = 1850    Average = 1010

Day = 1900    Average = 1009

Day = 1950    Average = 1010

Day = 2000    Average = 1010

**THE PLOT IS AS FOLLOWS:-**




RESULT: The average of the revenue tends to converge the a point in a long run in a randomised data