Lab – 6: Data Structures

	Q1	Total
Matrices – II	$5 + 10 + 10 + 5$	30

1. This practice lab is expected to be completed by the end of **week 6** of the course.
2. This practice lab covers the following **one week** of lectures in the Syllabus. You are expected to watch these videos prior to doing this lab.

Lecture	Topics	Reading
11	**Matrix functions:** Exception handling,	1. Exception handling: https://youtu.be/p3xTtf2o-do
12	Matrix addition, Recursive functions and Determinant of a Matrix.	2. Matrix addition: https://youtu.be/YfNx0K7kljQ
		3. Recursive functions: https://youtu.be/Eh3bYJj7zfM
		4. Determinant of a Matrix: https://youtu.be/BX3Kq6-nQps

Q1) Write a **program** that:

1	A function that initializes $X_{m \times n}$ and $Y_{l \times k}$, where {m, n, l, k} are user defined and also its contents. (This function can be reused from HW-4)	5
2	A function that evaluates $Z = X \times Y$.	10
3	A function that evaluates $Z = \det(X)$.	10
4	A function called 'print' that simply prints the answer (This function can be reused from the previous lab).	5

Rubrics (Associated Marks)

S. No.	Content	Meets Criteria (1)	Marks	Does not meet expectations (0)	Marks
1	Indentation	Perfect	100%	Code not indented properly	0
2	Code works	Code compiles and executes properly for any variable sized matrices	100%	Code has errors	Based on the code
3	Comments	Code is properly commented	100%	Code is not properly commented.	0

<u>Sample Output:</u>

Inputs by the user are marked in red. Sample 1:

Dear User. What is your name?
> Bilal

Dear Bilal, please tell me the dimensions of matrix X
> 3
> 3
Dear Bilal, please input the contents of X.
> 3
> 6
> 9
> 0
> 8
> 1
> 2
> 7
> 5

Dear Bilal, Matrix X has the following contents:
[3   6   9]
[0   8   1]
[2   7   5]

Dear Bilal, please tell me the dimensions of matrix Y
> 3
> 3
Dear Bilal, please input the contents of Y.
> 2
> 1
> 0
> 3
> 4
> 1
> 0
> 7
> 8

Dear Bilal, Matrix Y has the following contents:
[2   1   0]
[3   4   1]
[0   7   8]

Dear Bilal, Z = X * Y is shown below:
[24   90   78]
[24   39   16]
[25   65   47]

Dear Bilal, Z = det(X) = -33

Inputs by the user are marked in red. Sample 2:

Dear User. What is your name?
> Bilal

Dear Bilal, please tell me the dimensions of matrix X
> 4
> 4
Dear Bilal, please input the contents of X.
> 3
> 6
> 9
> 2
> 0
> 8
> 1
> 3
> 2
> 7
> 5
> 3
> 1
> 2
> 3
> 4

Dear Bilal, Matrix X has the following contents:
```
[3      6      9      2]
[0      8      1      3]
[2      7      5      3]
[1      2      3      4]
```

Dear Bilal, please tell me the dimensions of matrix Y
> 4
> 1
Dear Bilal, please input the contents of Y.
> 2
> 3
> 4
> 1
Dear Bilal, Matrix Y has the following contents:
```
[2]
[3]
[4]
[1]
```

Dear Bilal, Z = X * Y is shown below:
```
[62]
[31]
[48]
[24]
```
Dear Bilal, Z = det(X) = -110