

## Computing Tools – Numpy

### Instructions

1. File and folder names should be followed strictly as mentioned in the questions below (including case sensitivity). Marks will not be awarded if any discrepancies occur.  
“roll\_number\_numpy”
2. nxm means 'n' number of rows and 'm' number of columns.
3. **No excuses for forgetting to upload programs or any other problems whatsoever. Pls respect the deadlines**

### Questions

1. Write a python program to take a 3X3 matrix as a user input. Convert the matrix into numpy array. Print the matrix, rank, shape of the matrix.

For example :

Input :

```
python 1.py
1 2 3
4 5 6
7 8 9
```

Output :

```
matrix
[1 2 3]
[4 5 6]
[7 8 9]
range 2
shape (3,3)
```

2. Write a function that generates 10 integers and use it to build an array
3. Create a random vector (1D array) of size 10 and sort it
4. Write a Python program to generate five random numbers from the normal distribution.  
[Hint: use np.random.normal]
5. Write a numpy program program to add and subtract two random matrices. The size of the matrix will a user input. All the matrix element should be a positive integer value. Suppose 'A' and 'B' are two matrix. All the value of 'A' matrix cannot be greater than 10 and values of 'B' matrix cannot be greater than 20.

Example :

Input:

```
python 5.py 2 2
```

Output:

```
A
[1 5]
[4 7]
B
```

```
[ 8 0]
[12 9]
Addition
[ 9 5]
[16 16]
Subtraction
[-7 5]
[-8 -2]
```

6. Write a numpy program to multiply two random matrices. The size of the matrices will be a user input. All the matrix elements should be positive integer values. Suppose 'A' and 'B' are two matrices. All the values of 'A', 'B' matrices cannot be greater than 10.

Example :

Input:

```
python 6.py 1 2 2 3
```

Output:

A

```
[3 2]
```

B

```
[2 3 5]
```

```
[1 4 3]
```

Multiplication

```
[8 17 21]
```

7. Write a python program 4.py to take nXm matrix as a user input. 'n' and 'm' are command line arguments which are separated by a space. Where  $n \geq 3$  and  $0 \leq m \leq 7$ . If this condition is false, ask the user to enter the 'n' and 'm' again. Create a zero matrix with same dimension and convert all columns in the matrix into a fibonacci series. For  $i^{\text{th}}$  column, the first element should be the sum of  $i+(i-1)$  value. Print this matrix on the terminal.