## Assignment-1

**Problem Statement 1:** Write a Python program to multiply a $M \times N$ matrix by $N \times A$ matrix and create a real matrix product.

**Example:**

**Input:**

```
Enter value M: 5

Enter value N: 3

Enter value A: 2
```

**Output:**

```
First array:
[[0.92825664 0.62790011 0.80130199]
 [0.64283876 0.16558409 0.54573802]
 [0.04319311 0.80229079 0.72512472]
 [0.8005622  0.98844625 0.6982794 ]
 [0.46600134 0.51451131 0.6415925 ]]

Second array:
[[0.31898348 0.49050318]
 [0.53845583 0.48259499]
 [0.89102055 0.35539951]]

Dot product of two arrays:
[[1.34817154 1.04311661]
 [0.78047845 0.58917954]
 [1.09187707 0.66607684]
 [1.40978205 1.11786566]
 [0.99736045 0.70489738]]
```

**Problem Statement 2:** Write a NumPy program to check if each element of an array of your choice is composed of digits, lower case letters, and upper case letters only.

**Hint:** You can use isdigit(),islower(), and isupper() function.

**Example:**

```
    Input: Original Array:
           ['Python' 'PHP' 'JS' 'Examples' 'html5' '5']
```

```
    Output: Digits only = [False False False False False  True]
            Lower cases only = [False False False False  True
False]
            Upper cases only = [False  True  True False False
False]
```

**Problem Statement 3:** Write a program that reads two space-separated positive integers $X$ and $Y$ as input and perform the following tasks:

**Tasks to be performed:**

1. Create a list (lst1) starting at one (1) with 16 elements at a step of $X$
2. Create a list (lst2) starting at one (1) with 16 elements at a step of $Y$
3. Create two NumPy arrays np1 and np2 using lst1 and lst2 respectively
4. Reshape both the NumPy arrays to (4,4)
5. Create a new np array (np3) with values obtained by subtracting both the arrays (np1 - np2)
6. Print all the elements of np3 in a single dimension list like the format as shown below:
    a. [n0 n1 n2 n3 n4 n5 n6 n7 n8]



**Example:**

**Input:**

```
7 9
```

**Output:**

```
[ 0 -2 -4 -6 -8 -10 -12 -14 -16 -18 -20 -22 -24 -26 -28 -30]
```

**Problem Statement 4:** Write a Python program that takes two integer-NumPy arrays, $P$ and $Q$ of shape $[3 * 3]$ and perform the following task:

**Task to be performed:**

Print the element-wise difference of the matrix $P$ and $Q$ $(P - Q)$.

**Example:**

**Input:**

```
23 56 87 3 6 96 4 6 78
12 34 54 7 2 54 6 2 78
```

**Output:**

```
[[11 22 33]
[-4  4 42]
[-2  4  0]]
```