***Python Assignment -1: NumPy Exercise***

***Total Questions: 10*** ***Total Marks: 5\*10 = 50*** ***marks***

***Instructions:***

1) Open a new notebook in ***Jupyter notebook.***

2) Solve the following NumPy problems and execute the correct outputs.

3) After completing the assignment, submit the .ipynb files in the assigned assignment portal in your classrooms.

***QUESTIONS:***

**1) Write a NumPy program to create an array of 10 zeros,10 ones, 10 fives.**

**2) Write a NumPy program to create an array of all the even integers from 30 to 70.**

**3) Write a NumPy program to create a 10x10 matrix, in which the elements on the borders will be equal to 1, and inside 0.**

***Sample output:***

[[ 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.]

[ 1. 0. 0. 0. 0. 0. 0. 0. 0. 1.]

[ 1. 0. 0. 0. 0. 0. 0. 0. 0. 1.]

[ 1. 0. 0. 0. 0. 0. 0. 0. 0. 1.]

[ 1. 0. 0. 0. 0. 0. 0. 0. 0. 1.]

[ 1. 0. 0. 0. 0. 0. 0. 0. 0. 1.]

[ 1. 0. 0. 0. 0. 0. 0. 0. 0. 1.]

[ 1. 0. 0. 0. 0. 0. 0. 0. 0. 1.]

[ 1. 0. 0. 0. 0. 0. 0. 0. 0. 1.]

[ 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.]]

**4) Write a NumPy program to reverse an array (first element becomes last).**

***An example:***

**Original: [12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37]**

**Output: [37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12]**

**5) Write a NumPy program to find common values between two arrays.**

***An example:*  
Array1: [ 0 10 20 40 60]   
Array2: [10, 30, 40]  
Common values between two arrays:  
[10 40]**

**6) Write a NumPy program to create an array. Then change it to a new shape of the array, without changing its data.**

**7) Write a NumPy program to concatenate two 2-dimensional arrays in the following manner as below.**

***Expected Output:*  
Sample arrays: ([[0, 1, 3], [5, 7, 9]], [[0, 2, 4], [6, 8, 10]]  
Expected Output:  
[[ 0 1 3 0 2 4]  
[ 5 7 9 6 8 10]]**

**8) Write a NumPy program to split an array of 14 elements into 3 arrays, each of which has 2, 4, and 8 elements in the original order.**

***Expected Output:*  
Original array: [ 1 2 3 4 5 6 7 8 9 10 11 12 13 14]  
After splitting:   
[array([1, 2]), array([3, 4, 5, 6]), array([ 7, 8, 9, 10, 11, 12, 13, 14])]**

**9) Write a NumPy program to create an 1-D array of 20 elements. Now create a new array of shape (5, 4) from the said array, then restores the reshaped array into a 1-D array.**

***Original array*:  
[ 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38]  
*New array of shape*(5, 3):  
[[ 0 2 4 6]  
[ 8 10 12 14]  
[16 18 20 22]  
[24 26 28 30]  
[32 34 36 38]]  
*Restore the reshaped array into a 1-D array:*  
[ 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38]**

**10) Write a NumPy program to create an array of 4,5 shape and swap column1 with column4.**

**Original array:  
[[ 0 1 2 3 4]  
[ 5 6 7 8 9]  
[10 11 12 13 14]  
[15 16 17 18 19]]  
After swapping column1 with column4:  
[[ 3 1 2 0 4]  
[ 8 6 7 5 9]  
[13 11 12 10 14]  
[18 16 17 15 19]]**