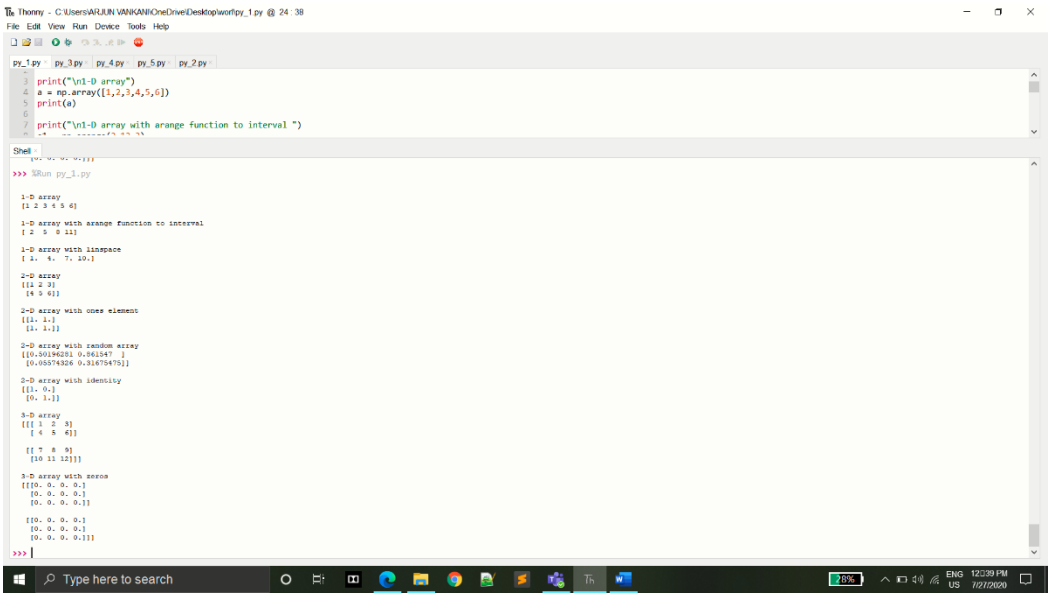
Python (Practical list 4)

1.Learn to Create 1-D, 2-Dand 3-D array using numpy in python.

Program:

```
import numpy as np

print("\n1-D array")
a = np.array([1,2,3,4,5,6])
print(a)

print("\n1-D array with arange function to interval ")
a1 = np.arange(2,12,3)
print(a1)

print("\n1-D array with linspace ")
a2 = np.linspace(1,10,4)
print(a2)


print("\n2-D array")
b = np.array([[1,2,3],[4,5,6]])
print(b)

print("\n2-D array with ones element ")
```

```
b1 = np.ones((2,2))
print(b1)

print("\n2-D array with random array ")
b2 = np.random.rand(2,2)
print(b2)

print("\n2-D array with identity")
b3 = np.identity(2)
print(b3)



print("\n3-D array")
c = np.array([[[1,2,3],
               [4,5,6]],
              [[7,8,9],
               [10,11,12]]])
print(c)

print("\n3-D array with zeros ")
c1 = np.zeros((2,3,4))
print(c1)
```

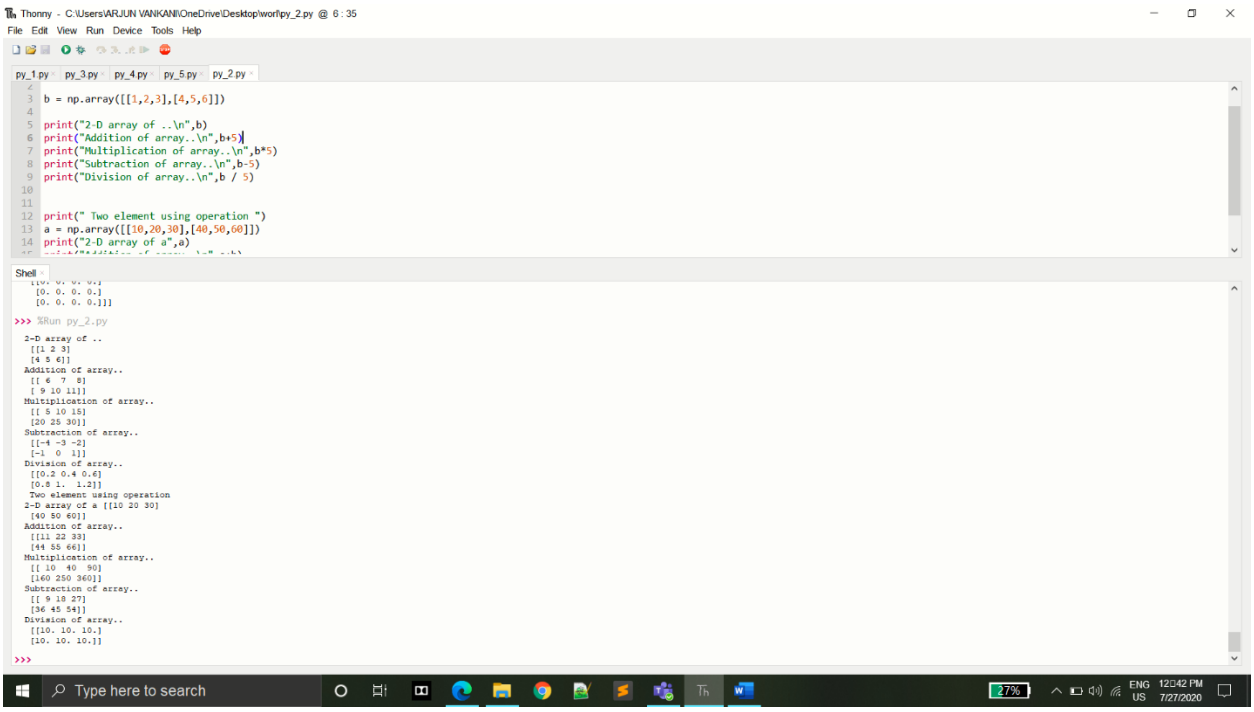


2.Perform mathematical operations on 2-D arrays like addition, multiplication, subtraction and division using a single integer(b = a+5). Perform the same operations using two arrays as operands(c = a*b).

Program:

```
import numpy as np


b = np.array([[1,2,3],[4,5,6]])


print("2-D array of ..\n",b)
print("Addition of array..\n",b+5)
print("Multiplication of array..\n",b*5)
print("Subtraction of array..\n",b-5)
print("Division of array..\n",b / 5)
```

```
print(" Two element using operation ")
a = np.array([[10,20,30],[40,50,60]])
print("2-D array of a",a)
print("Addition of array..\n",a+b)
print("Multiplication of array..\n",a*b)
print("Subtraction of array..\n",a-b)
print("Division of array..\n",a/b)
```

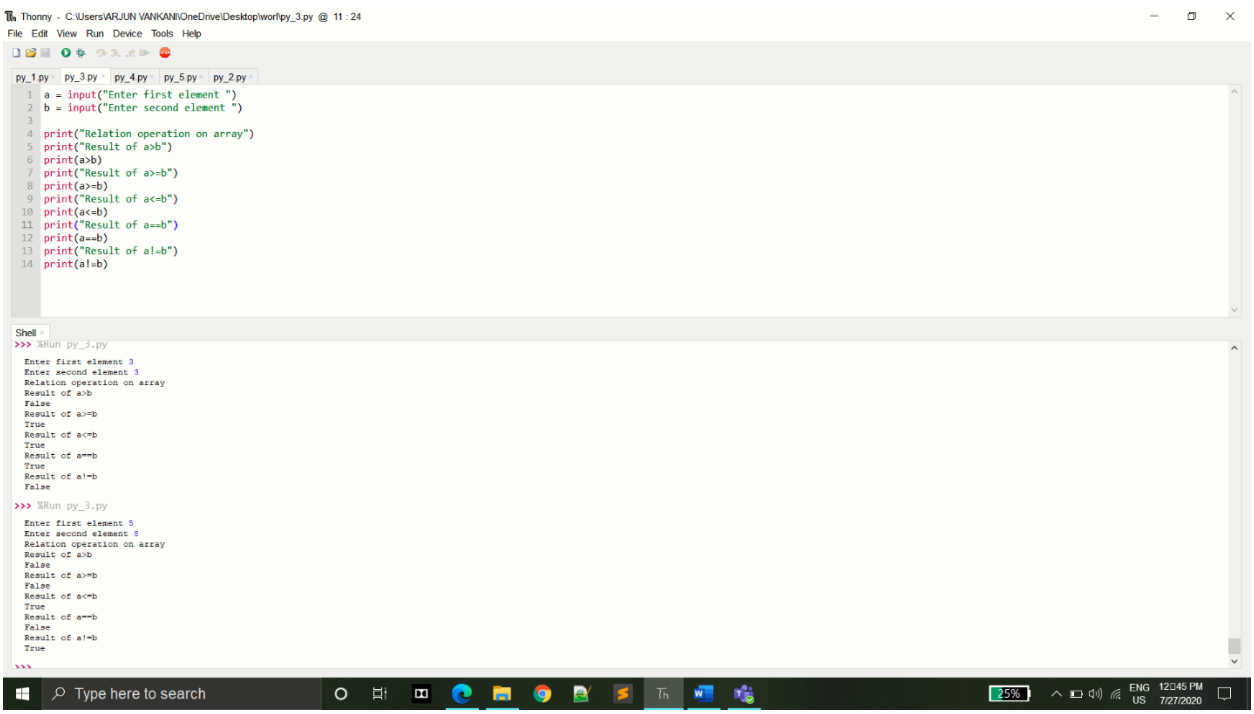


3.Perform different relational operations like >,>=,<,<=,== and !=on two arrays

Program:

```
a = input("Enter first element ")
b = input("Enter second element ")


print("Relation operation on array")
```

```
print("Result of a>b")
print(a>b)
print("Result of a>=b")
print(a>=b)
print("Result of a<=b")
print(a<=b)
print("Result of a==b")
print(a==b)
print("Result of a!=b")
print(a!=b)
```



4.Perform operations like view(), copy(), shape(), reshape(), flatten() on arrays

Program:

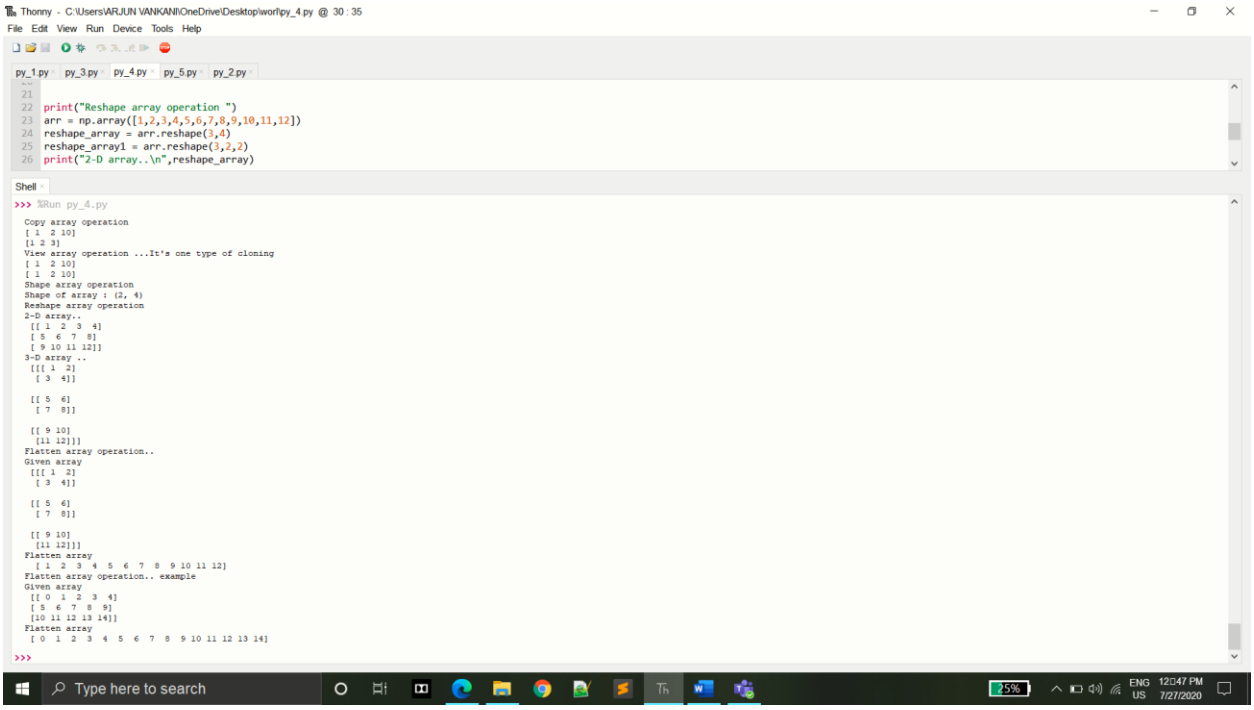
```
import numpy as np
```

```
print("Copy array operation ")
a = np.array([1,2,3])
copy1 = a.copy()
a[2] = 10
print(a)
print(copy1)

print("View array operation ...It's one type of cloning")
view1 = a.view()
a[2] = 10
print(a)
print(view1)


print("Shape array operation ")
arr1 = np.array([[1, 2, 3, 4], [5, 6, 7, 8]])
print("Shape of array :",arr1.shape)


print("Reshape array operation ")
arr = np.array([1,2,3,4,5,6,7,8,9,10,11,12])
reshape_array = arr.reshape(3,4)
reshape_array1 = arr.reshape(3,2,2)
```

```
print("2-D array..\n",reshape_array)
print("3-D array ..\n",reshape_array1)
```

```
print("Flatten array operation..")
print("Given array\n",reshape_array1)
print("Flatten array\n ", reshape_array1.flatten())
```

```
print("Flatten array operation.. example ")
array = np.arange(15).reshape(3, 5)
print("Given array\n",array)
print("Flatten array \n", array.flatten())
```



5.Create matrix in numpy and perform operations like transpose, sort, addition, multiplication, find maximum and minimum element and find sum, average and product of all elements in the matrix.

Program:

```
import numpy as np
print("Matrix operation ..\n")
matrix = np.array( [ [ 4, 5, 6 ],
                     [ 7, 8, 9 ],
                     [ 10, 11, 12 ] ] )
matrix1 = np.array( [ [ 1, 2, 3 ],
                     [ 4, 5, 6 ],
                     [ 7, 8, 9 ] ] )
mat = np.random.rand(4)
print(matrix)
print(matrix1)
print("\nTranspot of matrix\n",matrix.transpose())
print("Array of random ",mat)
mat.sort()
print("\n sort all element from matrix\n",mat)
print("\nAddition of two matrix \n",matrix+matrix1)
print("\nMultiplication of two matrix \n",matrix*matrix1)
print("\nMinimum element from matrix \n",matrix.max())
print("\nMultiplication of from matrix \n",matrix.min())
```

```
print("\nSum of the matrix \n",matrix.sum())
print("\nAverage of matrix \n",matrix.mean())
print("\nProduct of matrix \n",matrix.prod())
```