Lab 11

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CO1: To write, test, and debug simple Python programs

CO2: To implement Python programs with conditional, loops and functions

Task 1:- Matrix Dot Multiplication

Python Code:

```
matmul1 = np.array([[1,2],[3,4]])
matmul2 = np.array([[5,6],[7,8]])
resultmul = np.dot(matmul1, matmul2)
print(resultmul)
```

Output:

```
PS C:\Users\abc> & D:/python.exe "d:/Aryan/Semester
"
[[19 22]
 [43 50]]
PS C:\Users\abc>
```

Task 2:- Transpose Of A Matrix

Python Code:

```
A = np.array([[1,2,3],[4,5,6],[7,18,9]])
print(np.transpose(A))
```

Output:

```
PS C:\Users\abc> & D:/python.exe
"
[[ 1  4  7]
 [ 2  5 18]
 [ 3  6  9]]
```

Task 3:- Determinant Of A Matrix

Python Code:

```
A = np.array([[1,2,3],[4,5,6],[7,18,9]])
print(np.linalg.det(A))
```

Output:

```
PS C:\Users\abc> & D:/python.exe "d:/Aryan/Semester - 3/
"
59.999999999999986
```

Task 4:- Inverse Of A Matrix

Python Code:

```
A = np.array([[1,2,3],[4,5,6],[7,18,9]])
print(np.linalg.inv(A))
```

Output:

```
PS C:\Users\abc> & D:/python.exe "d:/Aryan/Semester - 3/Programming
"
[[-1.05        0.6        -0.05      ]
 [ 0.1        -0.2         0.1       ]
 [ 0.61666667 -0.06666667 -0.05      ]]
```

Task 5:- Converting matrix in a single row

Python Code:

```
A = np.array([[1,2,3],[4,5,6],[7,18,9]])
print(A.flatten())
```

Output:

```
PS C:\Users\abc> & D:/python.exe "d:/Aryan/Semester - 3/Programming
"
[ 1  2  3  4  5  6  7 18  9]
```

Task 6:- Numpy Array Itteration

Python Code:

```
Mat = np.array([[1,2,3],[4,5,6]])
for i in Mat :
    print(i)
```

Output :-

```
PS C:\Users\abc> & D:/python.exe "d:/Aryan/Semester - 3/
"
[1 2 3]
[4 5 6]
```

Task 7:- Print The Element Of Matrix With only one for - loop

Python Code:

```
arr= np.array([[[1,2],[3,4]],[[5,6],[7,8]]])
arr1 = np.array([[1,2],[5,6]])
for x in np.nditer(arr) :
    print(x,end=" ")
print()
for x in np.nditer(arr1) :
    print(x,end=" ")
print()
```

Output:

```
PS C:\Users\abc> & D:/python.exe "d:/Aryan/Semester - 3/Programming
1 2 3 4 5 6 7 8
1 2 5 6
```

Task 8:- Split Matrix The Matrix

Python Code:

```
arr2 = np.array([1,2,3,4,5,6])
newarr = np.array_split(arr2,2)
print(newarr,"\n").
```

Output:

```
PS C:\Users\abc> & D:/python.exe "d:/Aryan/Semester - 3/Programming With
[array([1, 2, 3]), array([4, 5, 6])]
```

Task 9:- Split Matrix The Matrix

Python Code:

```
arr3 = np.array([1,2,3,4,5,4,4])
x = np.where(arr3 == 4)
print(x,"\n")
```

Output:

```
PS C:\Users\abc> & D:/python.exe "d:/Aryan/Semester - 3/Programming With
(array([3, 5, 6], dtype=int64),)
```

Task 10:- Sorting Array

Python Code:

```
arr5 = np.array([3,2,0,1])
print(np.sort(arr5))
arr6 = np.array(['Banana','Cheery','Apple'])
print(np.sort(arr6))
```

Output:

```
PS C:\Users\abc> & D:/python.exe "d:/Aryan/Semester - 3/Programming
[0 1 2 3]
['Apple' 'Banana' 'Cheery']
```

Task 11:- Save and Load Arrays As Binary FilePython Code:

```
# Creating The File
arr4 = np.array([[[11,12,13,14],[15,16,17,18]],[[18,19,20,21],[22,23,24,25]]])
file = open("arr","wb")
np.save(file, arr4)
file.close()

# Creating The File
arr4 = np.array([[[11,12,13,14],[15,16,17,18]],[[18,19,20,21],[22,23,24,25]]])
file = open("arr","wb")
np.save(file, arr4)
file.close()
```

Output:

```
PS C:\Users\abc> & D:/python.exe "d:/Aryan/Semester - 3/Programming With Python/Lab
[[[11 12 13 14]
  [15 16 17 18]]

 [[18 19 20 21]
  [22 23 24 25]]]
```