Experiment – 13

Aim: Create NumPy arrays using Python Data Structures, Intrinsic NumPy objects and Random Functions.

Objective 1: Array creation using Python Data Structures (List, Tuples):

Program:

```
import numpy as np

#Create a 0-D array with value 42
a = np.array(42)
print(a)
print("Created", a.ndim, "dimension array")

#Create a 1-D array
b = np.array([1, 2, 3, 4, 5])
print(b)
print("Created", b.ndim, "dimension array \n")

#Create a 2-D array
c = np.array([[1, 2, 3], [4, 5, 6]])
print(c)
print("Created", c.ndim, "dimension array \n")

#Create a 3-D array
d = np.array([[[1, 2, 3], [4, 5, 6]], [[1, 2, 3], [4, 5, 6]]])
print(d)
print("Created", d.ndim, "dimension array \n")

#Create an array with 5 dimensions
e = np.array([1, 2, 3, 4], ndmin=5)
print(e)
print("Created", e.ndim, "dimension array \n")
```

Output:

```
42
Created 0 dimension array

[1 2 3 4 5]
Created 1 dimension array

[[1 2 3]
 [4 5 6]]
Created 2 dimension array

[[[1 2 3]
  [4 5 6]]

 [[1 2 3]
  [4 5 6]]]
Created 3 dimension array

[[[[[1 2 3 4]]]]]
Created 5 dimension array
```

Objective 2: Intrinsic Numpy Array Creation

Program:

```
import numpy as np

# Create an array of ones
print(np.ones((3,4)))

# Create an array of zeros
print(np.zeros((2,3,4),dtype=np.int16))

# Create an array with random values
```

```
print(np.random.random((2,2)))

# Create an empty array
print(np.empty((3,2)))

# Create a full array
print(np.full((2,2),7))

# Create an array of range
print(np.arange(10,25,5))

#Creating 1D array using random function
array = np.random.rand(5)
print("1D Array filled with random values : \n", array)


#Creating 2D array using random function
array = np.random.rand(2, 2)
print("\n\n2D Array filled with random values : \n", array)


#Creating 3D array using random function
array = np.random.rand(2, 2 ,2)
print("\n\n3D Array filled with random values : \n", array)
```

Output:

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

[[[0 0 0 0]
  [0 0 0 0]
  [0 0 0 0]]

 [[0 0 0 0]
  [0 0 0 0]
  [0 0 0 0]]]

[[0.99157359 0.88639036]
 [0.65898915 0.51122295]]

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

[[7 7]
 [7 7]]

[10 15 20]

[0.   0.25 0.5  0.75 1.   1.25 1.5  1.75 2.  ]

1D Array filled with random values :
 [ 0.84503968  0.61570994  0.7619945   0.34994803  0.40113761]


2D Array filled with random values :
 [[ 0.94739375  0.5557614]
[ 0.61683839  0.40570269]]

3D Array filled with random values :
 [[[ 0.97942627  0.01068711]
  [ 0.35749073  0.22484643]]

 [[ 0.99733022  0.8029555 ]
  [ 0.44111692  0.90537128]]]
```