In [5]:
```
import numpy as np
# Creating zeros array of shape (4,5)
array1=np.zeros((4,5))
print("Array is:")
print(array1)
```

```
Array is:
[[0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]
 [0. 0. 0. 0. 0.]]
```

In [6]:
```
import numpy as np
# Creating zeros array of shape (3,2)
array2=np.zeros((3,2),dtype='int8')
print("Array is:")
print(array2)
```

```
Array is:
[[0 0]
 [0 0]
 [0 0]]
```

In [7]:
```
import numpy as np
# Creating random 2X2 array of random values 0 and 1
random_array1=np.random.rand(2,2)
print("Array of random values is:")
print(random_array1)
```

```
Array of random values is:
[[0.26671356 0.00970998]
 [0.94863522 0.09700394]]
```

In [11]:
```
import numpy as np

# Creating a 2×2 array of random integers between 1 and 20
random_array2 = np.random.randint(1, 20, (2, 2))

print("Array of random integer values:")
print(random_array2)
```

```
Array of random integer values:
[[18 12]
 [ 6 17]]
```

In [12]:
```
# Creating a 3X3 array of random integers between 1 and 20
import numpy as np
random_array3 = np.random.randint(1, 20, (3,3))

print("Array of random integer values:")
print(random_array3)
```

```
Array of random integer values:
[[17  5 12]
 [16  1 18]
 [15  5  8]]
```

In [15]:
```
import numpy as np

# Creating a 3×3×3 array of random integers between 0 and 10
random_array3D = np.random.randint(0, 10, (3, 3, 3))

print("3D Array:")
print(random_array3D)
```

```
3D Array:
[[[2 9 5]
  [1 2 5]
  [1 6 3]]

 [[9 2 5]
  [8 2 1]
  [2 9 7]]

 [[0 5 1]
  [9 9 2]
  [1 1 5]]]
```

In [16]:
```
import numpy as np

# Creating a 3×3×3 array of random integers between 0 and 10
random_array3D = np.random.randint(0, 10, (3, 3, 3))

# Reshaping into a 4D array (e.g., 3×3×3 -> 3×3×1×3)
random_array4D = random_array3D.reshape(3, 3, 1, 3)

print("Original 3D Array:")
print(random_array3D)

print("\nReshaped 4D Array:")
print(random_array4D)
```

```
Original 3D Array:
[[[6 8 0]
  [6 3 3]
  [9 3 0]]

 [[5 1 3]
  [8 2 2]
  [8 9 7]]

 [[5 7 1]
  [5 1 4]
  [6 2 7]]]

Reshaped 4D Array:
[[[[6 8 0]]

  [[6 3 3]]

  [[9 3 0]]]


 [[[5 1 3]]

  [[8 2 2]]

  [[8 9 7]]]


 [[[5 7 1]]

  [[5 1 4]]

  [[6 2 7]]]]
```

In [17]:
```
import numpy as np
random_array4D = random_array3D.reshape(3, 3, -1, 3)

print("3D Array:")
print(random_array3D)
```

```
3D Array:
[[[6 8 0]
  [6 3 3]
  [9 3 0]]

 [[5 1 3]
  [8 2 2]
  [8 9 7]]

 [[5 7 1]
  [5 1 4]
  [6 2 7]]]
```

In [23]:
```
import numpy as np
#Creating once array of shape (2,3)
array4 = np.ones((2,3))
```

```
print("First Array:")
print(array4)

print("-----------------------------------------------")
#Creating once int array of shape (4,5)
array5 = np.ones((4,5),dtype='int8')

print("Array:")
print(array5)
```

```
First Array:
[[1. 1. 1.]
 [1. 1. 1.]]
-----------------------------------------------
Array:
[[1 1 1 1 1]
 [1 1 1 1 1]
 [1 1 1 1 1]
 [1 1 1 1 1]]
```

In [25]:
```
import numpy as np
#Creating unit matrix
array6 = np.eye((4),dtype='int8')
print("matrix is:")
print(array6)
```

```
matrix is:
[[1 0 0 0]
 [0 1 0 0]
 [0 0 1 0]
 [0 0 0 1]]
```

In [26]:
```
import numpy as np
#Creating unit matrix
array7 = np.eye(4)
print("matrix is:")
print(array7)
```

```
matrix is:
[[1. 0. 0. 0.]
 [0. 1. 0. 0.]
 [0. 0. 1. 0.]
 [0. 0. 0. 1.]]
```

In [29]:
```
#indexing in on diamentional array
import numpy as np
array8 = np.array([60,78,9,67,45,34,69])
print ("array is:")
print (array8)
#Display 5th elemnt from end
print ("5th element is:",array8[4])
#Display 7th elemnt from end
print ("7th element is:",array8[-7])
```

```
array is:
[60 78  9 67 45 34 69]
5th element is: 45
7th element is: 60
```

In [34]:
```python
#indexing in two diamentional array
import numpy as np
array9 = np.array([[60,78,9,67],[67,56,98,45],[56,89,34,65]])
print ("array is:")
print (array9)

#Display elements from 3rd row and 2nd column
print("elements from 3rd row and 2nd column:",array9[2][1])
```

```
array is:
[[60 78  9 67]
 [67 56 98 45]
 [56 89 34 65]]
elements from 3rd row and 2nd column: 89
```

In [37]:
```python
#Write a Python program to find the sum of all even numbers in a given NumPy array

import numpy as np

# Creating a NumPy array
arr = np.array([10, 15, 22, 33, 40, 55, 66])

# Finding even numbers (divisible by 2)
even_numbers = arr[arr % 2 == 0]

print("Even numbers:", even_numbers)
print("Sum of even numbers:", even_sum)
```

```
Even numbers: [10 22 40 66]
Sum of even numbers: 138
```

In [38]:
```python
#Create single diamentional array with Students mark, display mark that is greater

import numpy as np

# Creating a 1D array with student marks
marks = np.array([45, 78, 88, 32, 56, 90, 49, 67, 25, 80])

# Marks greater than 50
marks_above_50 = marks[marks > 50]

print("Marks greater than 50:", marks_above_50)
```

```
Marks greater than 50: [78 88 56 90 67 80]
```

In [ ]:
```python

```