In [32]:

```
a = np.array([[1,2,3],[4, 5, 6], [7, 8, 9]])

#np.array to list conversion
l1 = list(a)

#print(a)
print(l1)

print(l1[0])

print(l1[0][0])
```

```
[array([1, 2, 3]), array([4, 5, 6]), array([7, 8, 9])]
[1 2 3]
1
```

In [85]:

```
# Program to multiply two matrices using nested loops

# take a 3x3 matrix
A = [[1, 2, 3],
    [4, 5, 6],
    [7, 8, 9]]

# take a 3x4 matrix
B = [[1, 2, 3],
    [4, 5, 6],
    [7, 8, 9]]

result = [[0, 0, 0],
        [0, 0, 0],
        [0, 0, 0]]

# iterating by row of A
for i in range(len(A)):

    # iterating by column by B
    for j in range(len(B[0])):
    # iterating by rows of B
        for k in range(len(B)):
            result[i][j] += A[i][k] * B[k][j]

for r in result:
    print(r)
```

```
[30, 36, 42]
[66, 81, 96]
[102, 126, 150]
```

In [24]:

```
import numpy as np
a = np.array([[1,2,3],[4, 5, 6], [7, 8, 9]])

b = np.array([[1,2,3],[4, 5, 6], [7, 8, 9]])

print(' A Matrix Dimensions = ', a.shape)
print(' B Matrix Dimensions = ', b.shape)
print('\n')

print('A Matrix:')
print(a[0])
print(a[1])
print(a[2])

print('B Matrix:')
print(b[0])
print(b[1])
print(b[2])

print('First element in each row of A Matrix:')
print(a[0][0])
print(a[1][0])
print(a[2][0])
```

```
 A Matrix Dimensions =  (3, 3)
 B Matrix Dimensions =  (3, 3)


A Matrix:
[1 2 3]
[4 5 6]
[7 8 9]
B Matrix:
[1 2 3]
[4 5 6]
[7 8 9]
First element in each row of A Matrix:
1
4
7
```

In [74]:

```
# Program to print a matrix using a nested loop

a = np.array([[1,2,3],[4, 5, 6], [7, 8, 9]])

#l1 = list(a)
#result = [[0,0,0], [0,0,0], [0, 0, 0]]

# iterate through rows and print diagonal elements of a matrix
for row in range(len(a)):
    for col in range(len(a)):
            print(a[row][col], end = " ")
    print()
```

```
1 2 3
4 5 6
7 8 9
```

In [75]:

```
# Program to print a matrix using a nested loop

a = np.array([[1,2,3],[4, 5, 6], [7, 8, 9]])

l1 = list(a)
#result = [[0,0,0], [0,0,0], [0, 0, 0]]

# iterate through rows and print diagonal elements of a matrix
for row in range(len(l1)):
    for col in range(len(l1)):
            print(a[row][col], end = " ")
    print()
```

```
1 2 3
4 5 6
7 8 9
```

In [77]:

```
import numpy as np

R = int(input("Enter the number of rows:"))
C = int(input("Enter the number of columns:"))


print("Enter the entries in a single line (separated by space): ")

# User input of entries in a
# single line separated by space
entries = list(map(int, input().split()))

#entries

# For printing the matrix
matrix = np.array(entries).reshape(R, C)
print(matrix)
```

```
Enter the number of rows:2
Enter the number of columns:2
Enter the entries in a single line (separated by space):
1 2 3 4
[[1 2]
 [3 4]]
```

In [79]:

```
import numpy as np

a1 = int(input("Enter the number of values:"))

row1 = int(input("Enter the Row Dimension:"))
col1 = int(input("Enter the Column Dimension:"))


print("Enter the entries in a single line (separated by space): ")

# User input of entries in a
# single line separated by space
entries = list(map(int, input().split()))

#entries

# For printing the matrix
matrix = np.array(entries).reshape(row1, col1)
print(matrix)
```

```
Enter the number of values:6
Enter the Row Dimension:2
Enter the Column Dimension:3
Enter the entries in a single line (separated by space):
1 2 3 4 5 6
[[1 2 3]
 [4 5 6]]
```

In [86]:

```
#CODE FOR MATRIX ADDITION.

import numpy as np

# A MATRIX INPUT AND PRINT
R1 = int(input("Enter the number of rows:"))
C1 = int(input("Enter the number of columns:"))


print("Enter the entries in a single line (separated by space): ")

# User input of entries in a
# single line separated by space
entries1 = list(map(int, input().split()))

# For printing the matrix
A = np.array(entries1).reshape(R1, C1)
print(' A Matrix Entries')
print(A)

# B MATRIX INPUT AND PRINT
R2 = int(input("Enter the number of rows:"))
```

```
C2 = int(input("Enter the number of columns:"))

print("Enter the entries in a single line (separated by space): ")

# User input of entries in a
# single line separated by space
entries2 = list(map(int, input().split()))

# For printing the B matrix
B = np.array(entries2).reshape(R2, C2)
print('B Matrix Entries')
print(B)
```

```
Enter the number of rows:2
Enter the number of columns:2
Enter the entries in a single line (separated by space): 
1 2 3 4
 A Matrix Entries
[[1 2]
 [3 4]]
Enter the number of rows:2
Enter the number of columns:2
Enter the entries in a single line (separated by space): 
1 2 3 4
B Matrix Entries
[[1 2]
 [3 4]]
```

In [92]:

```
#CODE FOR MATRIX ADDITION.

import numpy as np

# A MATRIX INPUT AND PRINT
R1 = int(input("Enter the number of rows:"))
C1 = int(input("Enter the number of columns:"))


print("Enter the entries in a single line (separated by space): ")

# User input of entries in a
# single line separated by space
entries1 = list(map(int, input().split()))

# For printing the matrix
A = np.array(entries1).reshape(R1, C1)
print(' A Matrix Entries')
print(A)

# B MATRIX INPUT AND PRINT
R1 = int(input("Enter the number of rows:"))
C1 = int(input("Enter the number of columns:"))


print("Enter the entries in a single line (separated by space): ")

# User input of entries in a
# single line separated by space
entries1 = list(map(int, input().split()))

# For printing the B matrix
B = np.array(entries1).reshape(R2, C2)
print('B Matrix Entries')
print(B)

#Matrix Addition Code
result = [[0,0], [0,0], [0,0]]
```

```python
# iterate through rows
for i in range(len(A)):
# iterate through columns
    for j in range(len(A[0])):
        result[i][j] = A[i][j] + B[i][j]

#Print the output matrix
# iterate through rows and print diagonal elements of a matrix
for row in range(len(A)):
    for col in range(len(A)):
               print(result[row][col], end = " ")
    print()
```

```
Enter the number of rows:2
Enter the number of columns:2
Enter the entries in a single line (separated by space):
1 2 3 4
 A Matrix Entries
[[1 2]
 [3 4]]
Enter the number of rows:2
Enter the number of columns:2
Enter the entries in a single line (separated by space):
1 2 3 4
B Matrix Entries
[[1 2]
 [3 4]]
2 4
6 8
```