In [1]:
```
#program-1:rank of a matrix
import numpy as np
A=np.array([[0,2,3,4],[2,3,5,4],[4,8,13,12]])
print("A",A)
rank=np.linalg.matrix_rank(A)
print ("\n the rank of the given matrix=",rank)
```

```
A [[ 0  2  3  4]
 [ 2  3  5  4]
 [ 4  8 13 12]]

 the rank of the given matrix= 2
```

In [3]:
```
#program-2:rank of a matrix
import numpy as np
B=np.array([[1,2,4,3],[2,4,6,8],[4,8,12,16],[1,2,3,4]])
print("B",B)
rank=np.linalg.matrix_rank(B)
print ("\n the rank of the given matrix=",rank)
```

```
B [[ 1  2  4  3]
 [ 2  4  6  8]
 [ 4  8 12 16]
 [ 1  2  3  4]]

 the rank of the given matrix= 2
```

In [5]:
```
#program-3:rank of a matrix
import numpy as np
C=np.array([[2,-1,-3,-1],[1,2,3,-1],[1,0,1,1],[0,1,1,-1]])
print("C",C)
Rank=np.linalg.matrix_rank(C)
print("\n the rank of the given matrix",rank)
```

```
C [[ 2 -1 -3 -1]
 [ 1  2  3 -1]
 [ 1  0  1  1]
 [ 0  1  1 -1]]

 the rank of the given matrix 2
```

In [8]:
```
#program-4:rank of a matrix
import numpy as np
D=np.array([[4,0,2,1],[2,1,3,4],[2,3,4,7],[2,3,1,4]])
print("D",D)
Rank=np.linalg.matrix_rank(D)
print("\n the rank of the given matrix",rank)
```

```
D [[4 0 2 1]
 [2 1 3 4]
 [2 3 4 7]
 [2 3 1 4]]

 the rank of the given matrix 2
```

In [10]:
```
#program-5:rank of a martix
import numpy as np
E=np.array([[0,1,-3,-1],[1,0,1,1],[3,1,0,2],[1,1,-2,0]])
print("E",E)
rank=np.linalg.matrix_rank(E)
print("\n the rank of the given martix",rank)
```

```
E [[ 0  1 -3 -1]
 [ 1  0  1  1]
 [ 3  1  0  2]
 [ 1  1 -2  0]]

 the rank of the given martix 2
```

In [12]:
```
#program-6:rank of a matrix
import numpy as np
F=np.array([[2,3,-1,-1],[1,-1,-2,-4],[3,1,3,-2],[6,3,0,7]])
print("F",F)
rank=np.linalg.matrix_rank(F)
print("\n the rank of the given matrix",rank)
```

```
F [[ 2  3 -1 -1]
 [ 1 -1 -2 -4]
 [ 3  1  3 -2]
 [ 6  3  0  7]]

 the rank of the given matrix 4
```