Kernel: SageMath 10.1

NAME SUMIT HELONDE
ROLL NO = 58
EXPERIMENT NO :

In [0]:
```
AIM : TO STUDY VARIOUS BASIC OPERATION ON MATRICES OF ANY ORDER.
```

OPERATION ON 3X3 MATRIX

In [23]:
```
A = matrix([[2,3,4],[1,1,1],[-4,2,0]])
```

In [24]:
```
print(A)
```

Out[24]:
```
[ 2  3  4]
[ 1  1  1]
[-4  2  0]
```

In [25]:
```
det(A)
```

Out[25]: 8

In [26]:
```
B = matrix([[3,2,4],[6,5,7],[8,7,9]])
```

In [27]:
```
print(B)
```

Out[27]:
```
[3 2 4]
[6 5 7]
[8 7 9]
```

In [28]:
```
det(B)
```

Out[28]: 0

MATRIX ADDITION

In [29]:
```
A+B
```

Out[29]:
```
[5 5 8]
[7 6 8]
[4 9 9]
```

MATRIX MULTIPLICATION

In [32]:
```
A*B
```

Out[32]:
```
[56 47 65]
[17 14 20]
[ 0  2 -2]
```

MATRIX SUBTRACTION

In [31]:
```
A-C
```

Out[31]:
```
[ -1   1   3]
[ -5  -4  -3]
[-13  -6  -7]
```

ADJOINT

In [40]:
```
A.adjugate()
```

Out[40]:
```
[ -2   8  -1]
[ -4  16   2]
[  6 -16  -1]
```

INVERSE

In [36]:
```
A.inverse()
```

Out[36]:
```
[-1/4    1 -1/8]
[-1/2    2  1/4]
[ 3/4   -2 -1/8]
```

TRANSPOSE

In [38]:
```
A.transpose()
```

Out[38]:
```
[ 2  1 -4]
[ 3  1  2]
[ 4  1  0]
```

UPPER TRIANGULAR

In [47]:
```
upper_triangular_matrix=A.echelon_form()
```

In [48]:
```
print(upper_triangular_matrix)
```

Out[48]:
```
[1 0 7]
[0 1 2]
[0 0 8]
```

LOWER TRIANGULAR

In [51]:
```
lower_triangular_matrix=B.echelon_form().transpose()
```

In [52]:
```
print(lower_triangular_matrix)
```

Out[52]:
```
[ 1  0  0]
[ 0  1  0]
[ 2 -1  0]
```

DIAGONAL MATRIX

In [60]:
```
A.diagonal()
```

Out[60]:
```
[2, 1, 0]
```

In [61]:
```
B.diagonal()
```

Out[61]:
```
[3, 5, 9]
```

OPERATION ON 2X2 MATRIX

In [53]:
```
X=matrix([[1,2],[3,4]])
```

In [54]:
```
print(X)
```

Out[54]:
```
[1 2]
[3 4]
```

In [55]:
```
det(X)
```

Out[55]:
```
-2
```

In [56]:
```
X.adjugate()
```

Out[56]:
```
[ 4 -2]
[-3  1]
```

In [57]:
```
X.inverse()
```

Out[57]:
```
[  -2    1]
[ 3/2 -1/2]
```

In [58]:
```
X.transpose()
```

Out[58]:
```
[1 3]
[2 4]
```

In [59]:
```
X.diagonal()
```

Out[59]:
```
[1, 4]
```

In [66]:
```
upper_triangular_matrix=X.echelon_form()
```

In [67]:
```
print(upper_triangular_matrix)
```

Out[67]:
```
[1 0]
[0 2]
```

In [71]:
```
lower_triangular_matrix=X.echelon_form().transpose()
```

In [72]:
```
print(lower_triangular_matrix)
```

Out[72]:
```
[1 0]
[0 2]
```

CONCLUSION : BASIC OPERATION ON MATRICES ARE STUDIED SUCCESSFULLY.