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std -SY Bsc(CS)

Batch - F

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Practical 5 & 6: Application of Computational GeometrySection-A1) Write a python program to rotate the point (**2**, **2**) by an angle of 45` in the clockwise sense.

In [1]:
```
from sympy import*
P=Point(2,2)
P.rotate(-pi/4)
```

Out[1]: Point2D(2√2,0)

2) Write a python program to reflect the point (**3**, **3**) through the $\boldsymbol{x}$ **and** $\boldsymbol{y}$ − ***axes*** respectively.

In [5]:
```
from sympy import*
P=Point(3,3)
P.transform(Matrix([[-1,0,0],[0,-1,0],[0,0,1]]))
```

Out[5]: Point2D(−3,−3)

3) Write a python program to rotate the point (**1**, **0**) by an angle of **900** in the anticlockwise sense.

In [7]:
```
from sympy import*
P=Point(1,0)
P.rotate(pi/2)
```

Out[7]: Point2D(0,1)

4) Write a python program to reflect the point (**1**, **1**) through the origin.

In [9]:
```
from sympy import*
P=Point(1,1)
P.transform(Matrix([[-1,0,0],[0,-1,0],[0,0,1]]))
```

Out[9]: Point2D(−1,−1)

Section-B1) Write a Python program to reflect the line segment joining the points A[5,3] and B[1,4] through the line y = x + 1.

In [15]:
```
from sympy import*
A=Point(5,3)
B=Point(1,4)
S=Segment(A,B)
x,y=symbols('x,y')
S.reflect(Line(x-y+1))
```

Out[15]:

2) Using python, generate line passing through points (2,3) and (4,3) and find equation of the line.

In [13]:
```
from sympy import*
A=Point(2,3)
B=Point(4,3)
L=Line(A,B)
L.equation()
```

Out[13]: y − 3

3) Generate line segment having endpoints (0,0) and (10,10) find midpoint of line segment.

In [17]:
```
from sympy import*
A=Point(0,0)
B=Point(10,10)
S=Segment(A,B)
S.midpoint
```


Out[17]: Point2D(5,5)

4) Write a python program to rotate the line segment by 180 degrees having end points (1,0) and (2,−1).

In [19]:
```
from sympy import*
A=Point(1,0)
B=Point(2,-1)
S=Segment(A,B)
S.rotate(pi)
```

Out[19]:

5) Write a Python program to Reflect the Point P[3,6] through the line x−2y + 4 = 0

In [39]:
```
from sympy import*
P=Point(3,6)
x,y=symbols('x y')
P.reflect(Line(x-2*y+4))
```

Out[39]: Point2D(5,2)