

Name – Ritesh Anil Badhe Roll No. 115

std -SY Bsc(CS)

Batch - F

Date 18 /01/2025

Practical 5 & 6: Application of Computational Geometry
Section-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 *x* and *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 90° 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)
```

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Practical 5 & 6

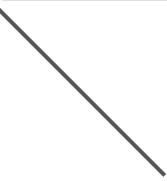
```
B=Point(10,10)  
S=Segment(A,B)  
S.midpoint
```

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)