United Technical College, Bharatpur, Chitwan

Computer Graphics
Chapter 4: Two Dimensional Geometric Transformations and Viewing
Homework #4

Date Assigned: 23th December, 2022   Date Due: 6th January, 2023

1. Rotate the triangle A (2, 3), B (5, 3) and C (3, 1) about a fixed point (1, 2) by 30^0.
2. Scale the triangle with vertices A (0, 0), B (1, 1), C (5, 2) to half its size while keeping B (1, 1) fixed.
3. What will be the final position of object whose vertices are (5, 5), (10, 5), (10, 10) and (5, 10) is first scaled with scaling factor Sx = 4 and Sy = 6 with reference to origin and then rotated with 450 in counter clockwise direction with reference to origin.
4. Consider a triangle ABC with vertices A(1,1), B(6,1), C(6, 6). Obtain the transformed coordinates for this triangle after rotating it about an angle 90˚ and about a reference point (x_r, y_r) = (3,3).
5. Prove that following transformations are commutative.
    i.   Two successive translation   ii. Two successive rotation
6. Reflect the triangle with vertices A (2, 2), B (4, 1) and C (5, 3) along the line y = 3.
7. Perform a 45 degree rotation of a line A(8,3) and B(14,10):
    I.   About the origin.
    II.   About a fixed point (4,2).
8. Reflect an object A(4,2), B(7,3), C(9,2), D(10,1) about a line y=3x.
9. Derive a composite transformation matrix for reflecting an object about a line y = x+4 in 2D. [2021]
10. What will be the final coordinates of a triangle with vertices A(2,3), B(3,3), C(3,2) after reflecting it about the line y=x?
11. A mirror is placed vertically such that it passes through the points (10,0) and (0,10). Find the reflected view of triangle ABC with A(5,50), B(20,40) and C(10,70).
12. ABCD is the rectangular window with A(20,20) B(90,20) C(90,70), and D(20,70). Find region codes for the end points and use Cohen Sutherland Algorithm to clip the line M(10,30) and N(80,90).
13. Let R be the rectangular window whose lower left hand cornet is at L(-3,1) and upper right hand corner is at R(2,6). Use Cohen Sutherland algorithm to clip the line segments A(-4,2) and B(-1,7) [2021].
14. Clip the line P1P2 with P1(0,120) and P2(130,5) using Cohen-Sutherland Line Algorithm. Given that rectangular window ABCD has end-points A(10,100), B(150,100), C(150,10) and (10,10).
15. Clip the below given figure using Sutherland Hodgeman polygon clipping algorithm.