

Computer Graphics Lab

Lab 3 Manual

[A separate source file is provided for your understanding about transformation. Have a look and understand the code.

The only difference is `glutSpecialFunc(key)` call where a callback function `key(int key, int x, int y)` invoked.

Add source codes of Task 1,2 & 3 and hand in]

*** You may take the help of the textbook but not any online resources*

*** Use black background and white for scan converting color*

*** Use the coordinates limits large enough to execute enough transformations*

Suppose, you're given a triangle in counter-clockwise direction,

$$V = \{(4, 10), (1, 7), (7, 7)\}$$

Task 1:

30%

Let's say, our up-key(↑) means counter-clockwise rotation and down-key(↓) means clockwise-rotation. For each press, we can assume, the angle changes by 1 degree.

Your task is to implement this rotation (both CW & CCW) with respect to the top point i.e. (4,10).

[Hint:

Task 2:

30%

You can move the triangle up, down, left or right by pressing the arrow key (just translation). Let's say (4,8.5) is the center of our triangle and the distance of the center from the origin is d .

Now, after each move, the center reach to a new position (x',y') and let the distance of the center from the origin becomes d' .

Now, we take $S_x = S_y = \frac{d'}{d}$

After, moving to a new location, the triangle will change according to the scaling factor it achieves for the new position.

Implement this scaling transformation.

Task 3:

40%

Let's say, we perform a rotation by θ degree with respect to the center (4,8.5). We take the scaling factor as $S_x = S_y = \frac{\theta+360}{360}$ and do scaling with respect to this center.

We perform rotation as before, our up-key(\uparrow) means counter-clockwise rotation and down-key(\downarrow) means clockwise-rotation. For each press, we can assume, the angle changes by 1 degree.

Now, after each rotation, the triangle will both rotate and scale. Perform this compound transformation.