Assignment: 2 (Unit TWO) ***2D and 3D Geometric Transformation***

Deadline: 12 Poush 2080 (Late submission is not entertained)

1. Find the transformation of a triangle A (1, 0), B (0, 1) and C (1, 1) by rotating 90 degree about the origin and then translating one unit in X and Y direction.
2. Find out the final coordinates of an image of a triangle ABC with vertices A (2, 0), B (3, 1) and C (1, 1) which is rotated about the arbitrary point (1, 1) through 30 degree.
3. Consider a triangle ABC with vertices A (3, 4), B (4, 7) and C (5, 8). What is the transformation if the triangle is to be doubled in size keeping A (3, 4) fixed? Obtain new vertices of the triangle.
4. Translate the given triangle A (1, 3), B (-2, -1), C (6, -2) with the translation vector T (-2, -6) and then reflect with y = x axis.
5. Reflect a triangle ABC with vertices A (1, 9), B (3, 3) and C (1, 6) about the line y = x+2.
6. A triangle A (4, 5), B (2, 1) and C (6, 1) is required to enlarge with scaling factors S (2, 2) and S (2, 0.5). Find the new vertices of the triangle.
7. Find the transformation matrix that transforms the given square ABCD to half its size with centre still remaining at the same position. The coordinates of the square are: A (1, 1), B (3, 1), C (3, 3), D (1, 3) and centre at (2, 2). Also find the coordinates of the square.
8. A 3D object with vertices A (-2, -4, 4), B (3, -6, -8), C (-6, 1, 0) and D (3, -6, 2) is required to be scaled with scale factor S (2, 4, 6) about origin. Find the final coordinates.
9. Given a 3D triangle with points (0, 0, 0), (1, 1, 2) and (1, 1, 3). Apply shear parameter 2 on X axis, 2 on Y axis and 3 on Z axis and find out the new coordinates of the object.
10. Given a 3D triangle with coordinate points A(3, 4, 1), B(6, 4, 2), C(5, 6, 3). Apply the reflection on the XY plane and find out the new coordinates of the object.
11. Given a 3D triangle with coordinate points A(3, 4, 1), B(6, 4, 2), C(5, 6, 3). Apply the reflection on the XZ plane and find out the new coordinates of the object.
12. Given a 3D object with coordinate points A(0, 3, 1), B(3, 3, 2), C(3, 0, 0), D(0, 0, 0). Apply the translation with the distance 1 towards X axis, 1 towards Y axis and 2 towards Z axis and obtain the new coordinates of the object