

**MAE 473/573
Graphics in CAD
Fall, 2001**

**Registration #: 497656
Time: M W F, 16:00 - 16:50
Location: 97 Alumni**

Homework #3 – Transformations in X-Graphics

Making use of Transformation theory, please add the following features to your preliminary X-code, which you created in Homework #2:

Write routines that will perform the following operations on the vertices of 2D primitives:

- a. Translation
- b. Rotation
- c. Scaling
- d. Mirroring

In Homework #2, you utilized *squares* exclusively as your primitives. In this assignment, you may do the same, or if you feel ambitious, you might wish to add additional primitives (circles, triangles, arcs, etc.) These transformation operations should be incorporated into your code, and should be made possible through event actions; i.e. mouse clicks and/or keystrokes. For example, you might have the user create a square on the screen, and then select that square for an “event”. Then, by pressing the “T” key, you can queue that selected square for translation. Then, by pressing the “y” key, the square would then translate some user-defined number of units in the y-direction, each time the y-key is pressed. You could also have the “x” key govern translation in the x-direction. You could then, for example, strike the “d” key to deselect the selected square, once the translation(s) are complete. The final operability of your code is ultimately up to each of you. You should plan to create similar features for Rotation, Scaling, and axis-shift (i.e. Mirroring).

Note that you already have created matrix multiplication routines in Homework #1, so much of the work necessary for creating these transformation routines has already been accomplished!

You should plan to hand in the following:

- a. A printout of your computer code.
- b. Screen shots that display numerous features of your code – both X-generated graphics primitives, and the successful transformations of these primitives.
- c. A 1-2 page TYPEWRITTEN discussion describing your approach to solving this assignment.

Due date: October 12, 2001, BEFORE class.