CS 230, Quiz 4

Solutions

You will have 10 minutes to complete this quiz. No books, notes, or other aids are permitted.

Problem 1 (5 points)

Construct 4×4 transformation matrices that accomplish each of the following:

(a) Rotation about the y axis by 90 degrees (you can rotate clockwise or counterclockwise).

(b) Translate in the y direction by 3.

(c) Scale in the y direction by 3.

(d) Translate in the y direction by 3, followed by a scale in the y direction by 3.

(e) Scale in the y direction by 3, followed by a translation in the y direction by 3.

$$(a) = \begin{pmatrix} 0 & 0 & -1 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \quad (b) = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \quad (c) = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 3 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$(d) = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 3 & 0 & 9 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \quad (e) = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 3 & 0 & 3 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

Note that (d) and (e) are different.