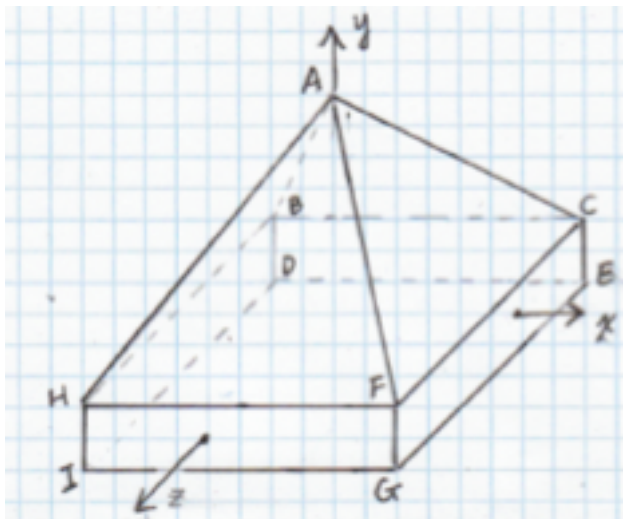


CSCI 4250/5250 Homework 7

Type your answer, **convert to PDF file**, and submit to D2L dropbox labelled “Homework 7”

- 1) Given the 3D cube example in programs: ortho.js and ortho.html (available on the course web page), if the view position and the orthographic viewing volume is changed into each of the following situations, how will the final 2D image change from its original image? Justify your answer.
 - a. $\text{mvMatrix}=\text{lookAt}(\text{vec3}(-4, 0, 0), \text{at}, \text{up});$ // pMatrix does not change
 - b. $\text{mvMatrix}=\text{lookAt}(\text{vec3}(3, 3, 3), \text{at}, \text{up});$ // pMatrix does not change
 - c. $\text{mvMatrix}=\text{lookAt}(\text{vec3}(3, 3, 3), \text{at}, \text{up});$
 $\text{pMatrix}=\text{ortho}(-3, 3, -3, 3, -1, 1);$
 - d. $\text{pMatrix}=\text{ortho}(-6, 6, -3, 3, 2, 10);$ // mvMatrix does not change
 - e. $\text{pMatrix}=\text{ortho}(0, 4, 0, 3, 2, 10);$ // mvMatrix does not change
- 2) Given: $\text{viewMatrix}=\text{lookAt}(\text{vec3}(4, 4, -4), \text{vec3}(0, 0, 0), \text{vec3}(0, 1, 0));$
Compute the viewMatrix. Show computation steps.
- 3) Given the 3D mesh object shown below, show
 - a. The vertex list
 - b. The normal vectors
 - i. For face HIGF, FGEC. You can directly write out the normal vectors without doing the computation.
 - ii. For face AFC. Apply Newell's method to compute the normal for this face. Show computation steps.
 - c. The face list. Each face should include the vertex (index) list, as well as the normal (index) list.



$A=(0, 6, 0)$, $B=(-4, 1, -1)$, $C=(6, 1, -1)$, $D=(-4, -1, -1)$, $E=(6, -1, -1)$,
 $F=(6, 1, 4)$, $G=(6, -1, 4)$, $H=(-4, 1, 4)$, $I=(-4, -1, 4)$