COSC686: Computer Graphics
Spring 2016, Assignment 2
(Total points: 100)
Due date: March 27th, 2016 (before midnight)

Submission Instructions

1. Compress your solutions and programs by using WinZip or sending the folder to a compressed (Zip) file in Windows.
2. Rename the compressed file following this notation:
   FirstnameLastnameHW2.zip
   Do not use a space in the filename.
3. Upload and submit the zip file through Blackboard.
4. NO late submission is accepted.

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1. Write the transformation matrix (in homogenous coordination system) for rotation, scale and translation of a 3D point. Write the corresponding WebGL function and explain the relationship of matrix and function parameters.
2. Write the transformation matrix for rotating a 3D point in homogeneous coordinates by 45 degree about a rotation axis given by (0, 1, 0).
3. Write the transformation matrix for rotating a 3D point in homogeneous coordinates by 45 degree about a rotation axis given by (1, 1, 0).
4. Write the orthographic and perspective projection matrix and view matrix (camera position). Write the corresponding WebGL function and explain the relationship of matrix and function parameters.
5. Programming transformation and projection
   a) Rendering at least two complex objects' movement. You can choose to use the objects provided with this assignment (in geometry package, there are cube, cylinder, sphere, and teapot), get any object online (provide reference), or create your own object.
   b) Transformation: apply translation, scaling and rotation to the objects. You can use buttons or keyboard to control transformation, or apply automatic transformation.
   c) Moving the camera.: the user should be able to rotate the camera about the object (left/right/up/down) and zoom in/out by using the keyboard or buttons.
   d) Projection: apply both orthographic and perspective projections to the object.

Bonus: Apply different transformations to different objects and rendering them in the same view.