CS 371 – Exam Review Problem(s) – RP10 – Out Oct. 4, Due Before Class Oct. 6

What happens to the point $P = (-9, -10, 12)$ as it travels down the pipeline from its present state in world coordinates to view coordinates and finally to perspective projection coordinates?

The world-to-view transformation is determined by:

```
lookAt(vec3(-6, -6, 12), vec3(-12, -6, 12), vec3(0, 0, 1))
```

The projection transformation is determined by:

```
perspective(45.0, 1.0 , 1.5, 20.0);
```

1. What are the view coordinates of the point P?
   (a) (-4.0, 0.0, -3.0)
   (b) (4.0, 0.0, -3.0)
   (c) (-3.0, 0.0, -4.0)
   (d) (3.0, 0.0, -4.0)
2. What are the (x_p, y_p) projection coordinates of the point P?
   (a) (2.0, 0.0)
   (b) (-2.0, 0.0)
   (c) (-4.0, 0.0)
   (d) (4.0, 0.0)

The next two problems are just like what you did for the previous two – just to be sure you get some extra practice. What happens to the point $P = (-4, 12, 15)$ as it travels down the pipeline from its present state in world coordinates to view coordinates and finally to perspective projection coordinates?

The world-to-view transformation is determined by:

```
lookAt(vec3(14, -6, -20), vec3(14, -6, -10), vec3(0, -1, 0))
```

The projection transformation is determined by:

```
perspective(170.0, 1.0, 10, 50);
```

3. What are the view coordinates of the point P?
   (a) (18, 18, -35)
   (b) (18, -18, -35)
   (c) (-18, 18, -35)
   (d) (-18, -18, -35)
4. What are the (x_p, y_p) projection coordinates of the point P?
   (a) (5.1, 5.1)
   (b) (5.1, -5.1)
   (c) (-5.1, 5.1)
   (d) (-5.1, -5.1)
5. Start with the same settings for gluLookAt and gluPerspective that you had for Problems 3 and 4. Now consider the following six points with their world coordinates given as:
   - (6,3,-5)
   - (-2,1,5)
   - (3,6,-25)
   - (-2,1,25)
   - (1,-2,-18)
   - (1,-2,38)

   How many of these points are visible in the scene that is depicted in the view volume. *Hint*: To make this easier, I have chosen a field of vision so unrealistically broad that you need not worry about the (x_p, y_p) projection coordinates.
   (a) 0
   (b) 1
   (c) 2
   (d) 3
   (e) 4
   (f) 5
   (g) 6