Coms 331 **The View Matrix** **Fall 2007**

Homework 23

1. Let the eye point be $E = (10, 5, 10)$ and the look point L be the origin and let the up vector be $\mathbf{up} = (0, 1, 0)$. Find the unit normal vector $\mathbf{n}$ described in class.

2. Find the unit vector $\mathbf{u}$ described in class.

3. Find the unit vector $\mathbf{v}$ described in class.

4. Use $\mathbf{n}$, $\mathbf{u}$, and $\mathbf{v}$ from the previous exercises to write the 4×4 view matrix $\mathbf{V}$.

5. Verify that the matrix $\mathbf{V}$ of the previous problem maps $\mathbf{u}$ to $\mathbf{i}$, $\mathbf{v}$ to $\mathbf{j}$, and $\mathbf{n}$ to $\mathbf{k}$.

6. In the camera coordinate system, what are the coordinates of the origin in the world coordinate system?

7. Recall that in the camera coordinate system, the camera always looks down the negative z-axis. In the previous exercise, how far is the camera from the origin? Verify that your answer to the previous exercise is correct.

8. What is the default position and orientation of the "camera?" What are the default eye and look points and what is the default up vector?

9. Using the default eye and look points and the default up vector of the previous exercise, find the default 4×4 view matrix.