CS371 Spring 2007
Prof. Morgan McGuire

Assigned: Wed. 3/7/07
Due: Fri. 3/09/07 10:00am

Homework 4b

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Name

As with all homework in this class, work on this alone. You can use your notes, books, and the internet.

1. Derive the projection matrix P that maps 3D points in front of the lens (in camera space) into pixel coordinates. The sensor has a resolution of 640x480, measures 8mm vertically, and is located at the position where an object 4 meters in front of the f = 16mm lens is in perfect focus. Show your work.

2. The camera from question 1 is mounted on a boom arm that is jointed as shown in the picture and rides on a dolly track. Give an expression for the net transformation of points from world space to pixel coordinates for such a camera in terms of the parameters from the diagram. Show your work.