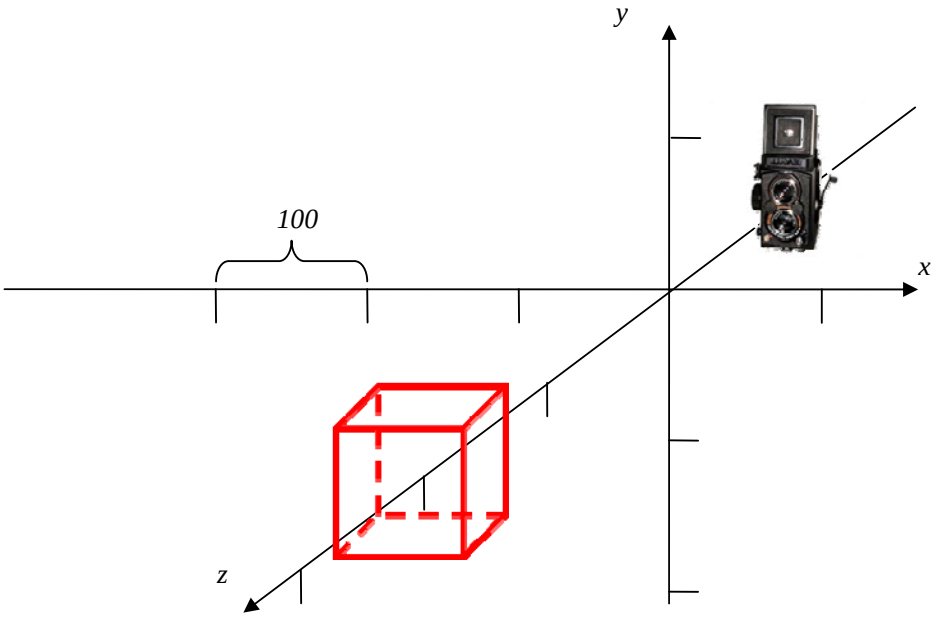
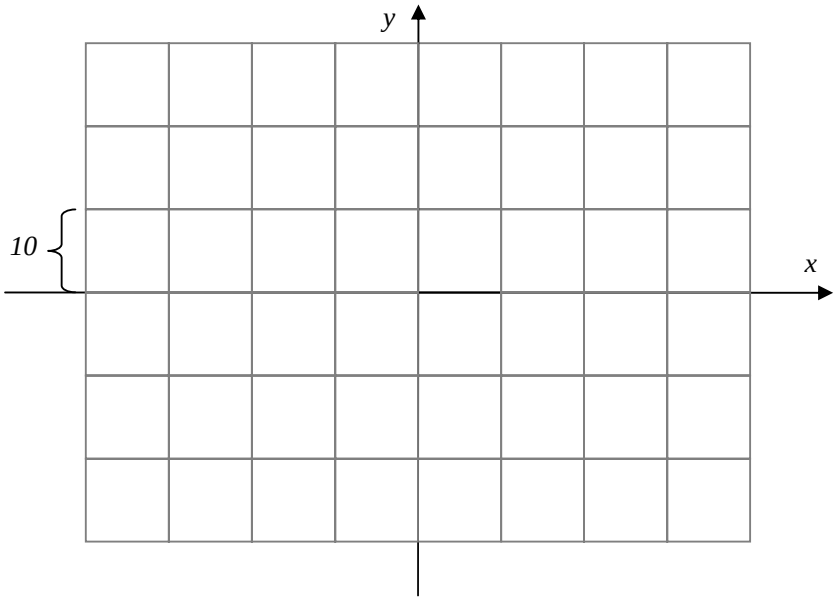
Tutorial #3: Perspective Transformation

A cube with vertices (± 50, ±50, 200±50) is viewed by a camera at (0,0,-100) with focal length 100, look-at direction (0,0,1) and up vector (0,1,0). The viewplane is the *xy*-plane.



a. Compute P_f and the *x*, *y* AND *z* positions of all vertices of the cube and draw the wireframe of the cube in the screen below.



b. Let the faces that are perpendicular to the x, y and z-axis be red, blue and green respectively. Label the corresponding colors in your drawing. And what is the screen supposed to look like if all faces are opaque?

c. We use OpenGL and draw the six faces one by one. The **FIRST** faces to be drawn are the two blue faces (parallel to the *xz*-plane). Then we draw the green faces, and then finally draw the red ones afterwards. What will be the final result on the screen? Will it appear as what you predict in (b)?

d. What should be the drawing order?

e. What do we have to do if the camera position is at (0,100,-100) instead of (0,0,-100)?