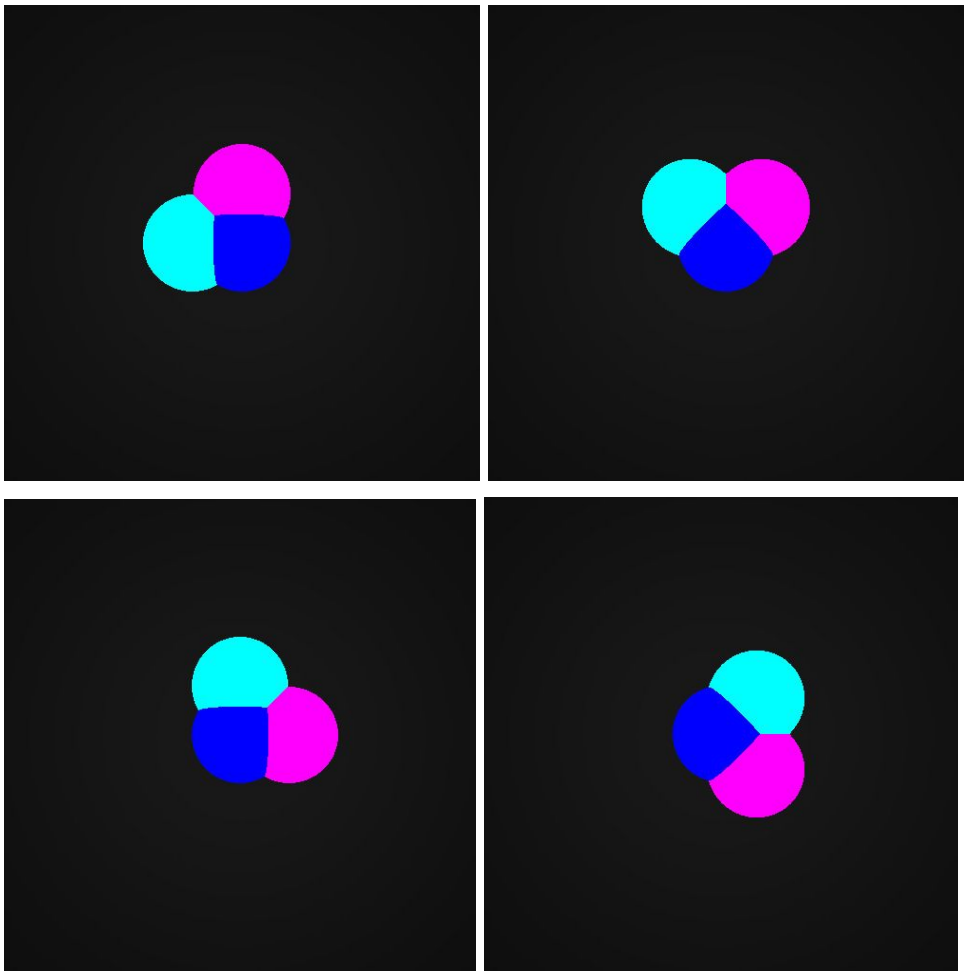
CSCI 5607 - Homework 1a

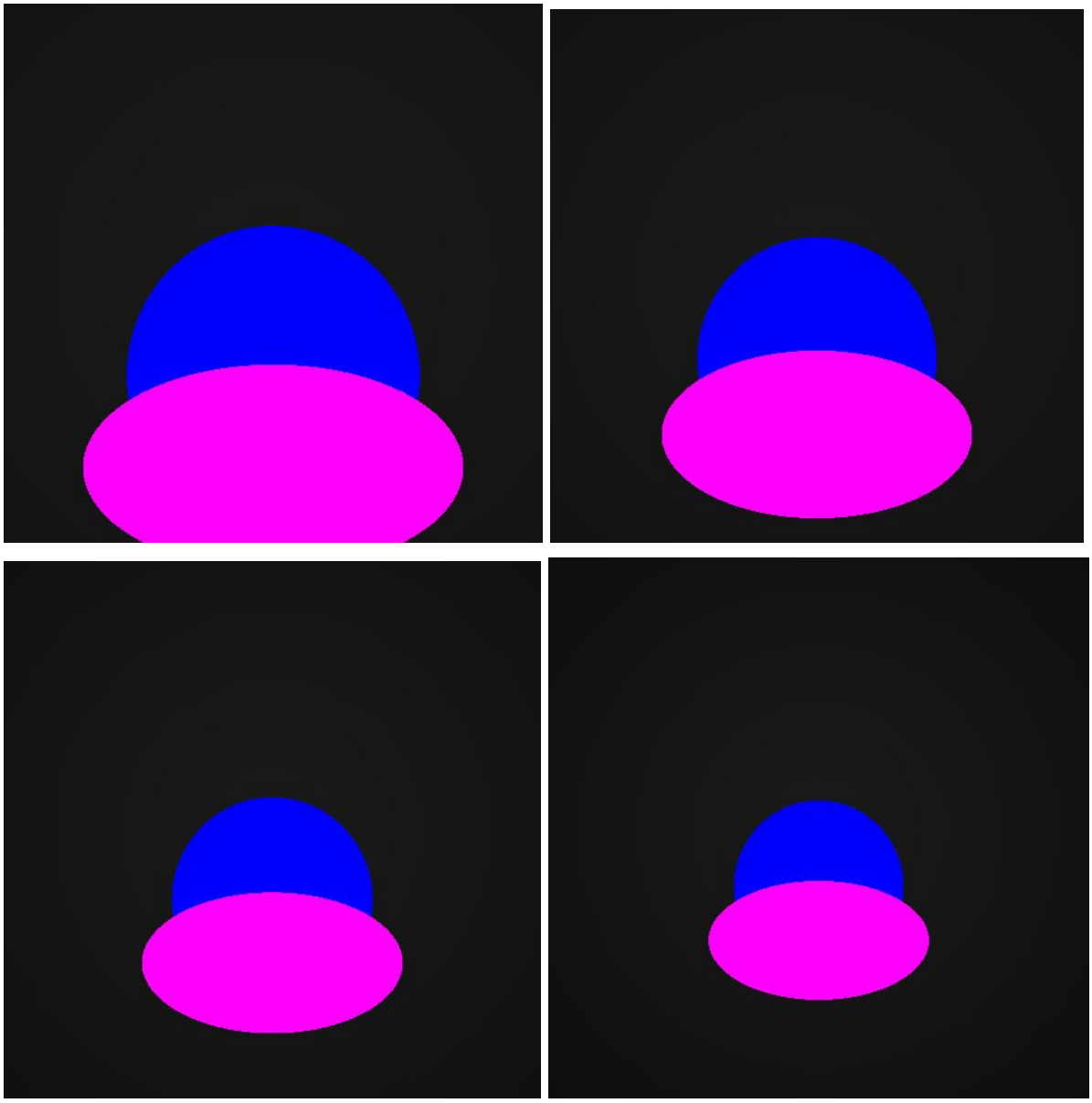
Effect of rotation of up vector on rendered image



The above images are rendered by varying the direction of up vector and keeping everything else constant. From left to right the up direction vectors are (1, 0, 0), (1/sqrt(2), 1/sqrt(2), 0), (0, 1, 0) and (-1/sqrt(2), 1/sqrt(2), 0).

As can be seen, the entire scene rotates linearly with the direction of up vector i.e. as up vector rotates clockwise entire image rotates clockwise at the same angle.

Effect of field of view on rendered image

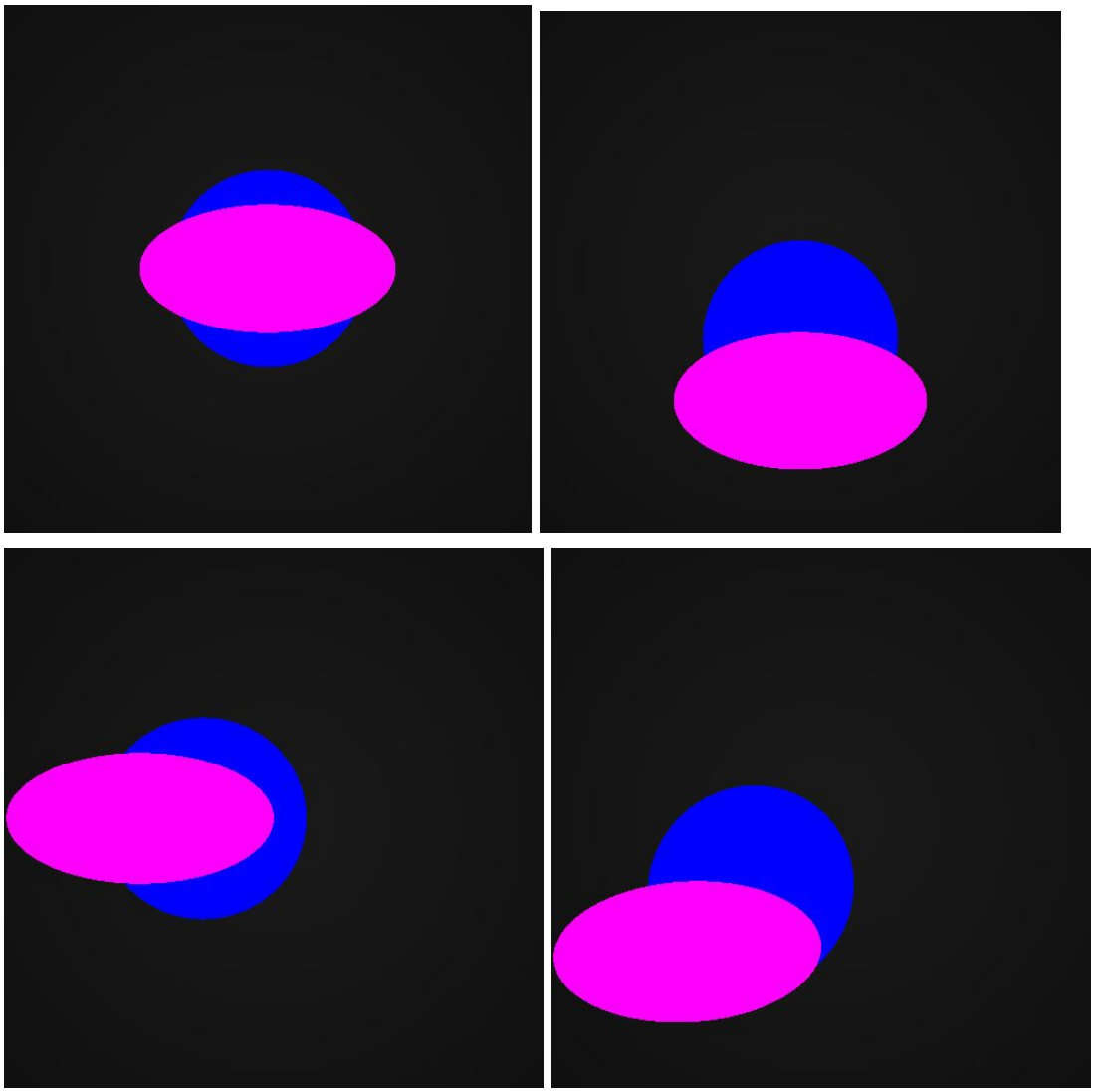


Above shown are images rendered by varying the field of view. From top to bottom, left to right are images with 60, 70, 80 and 90 deg of FOV (both vertical and horizontal) respectively.

As we can see by decreasing the field of view the image concentrates on the objects directly in front of it i.e. making less angle with view direction. But it also throws out objects far from view dir out of the rendered image.

We can also observe a decrease in the level of distortion as we keep on decreasing field of view

Effect of camera position on distortion of image



Above show images are rendered by varying the position of the camera and keeping everything else the same. From top to bottom left to right the camera is placed at (0, 0), (2, 0), (0, 2) and (2, 2) respectively. The objects in the scene are a blue sphere and a pink ellipsoid.

The least distorted image is when camera is placed such that the objects are on/nearest to the view direction.

Therefore to reduce distortion one can decrease the field of view and place camera such that objects of consideration are closest to the view direction and vice-versa.