CS 4620 Homework 6: The Graphics Pipeline

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Problem 1: Perspective Divide (*Shirley and Marschner (3rd ed.)*, Ch.8, Question 1)

Suppose that in the perspective transform we have $n = 1$ and $f = 2$. Under what circumstances will we have a "reversal" where a vertex before and after the perspective transform flips from in front of to behind the eye or vice-versa?

Problem 2: Z-Buffer Precision (*Shirley and Marschner (3rd ed.)*, Ch.8, Question 5)

Suppose you are designing an integer z-buffer for flight simulation where all of the objects are at least one meter thick, are never closer to the viewer than 4 meters, and may be as far away as 100 km.

- How many bits are needed in the z-buffer to ensure there are no visibility errors?

- Suppose that visibility errors only matter near the viewer, i.e., for distances less than 100 meters. How many bits are needed in that case?