Art Gallery Problems
MATH 261 Computational Geometry

Suppose an art gallery has a floor plan modeled by a polygon. A guard occupies a single point and can see in straight lines in all directions to the gallery walls.

Question 1: If the polygon has n sides, what is the smallest number of guards guaranteed to protect the gallery? Try to find "bad" polygons – n-sided polygons that require "lots" of guards as a function of n.

Question 2: Suppose that a certain placement of guards can see all of the walls of a particular gallery. Can they necessarily see all of the interior?

Modification 1: Do your answers change if guards may only be stationed at vertices of the polygon?

Modification 2: Now assume that the art gallery is an *orthogonal polygon* — that is, all corners of the gallery are right angles. How does this change your answers for Questions 1 and 2?