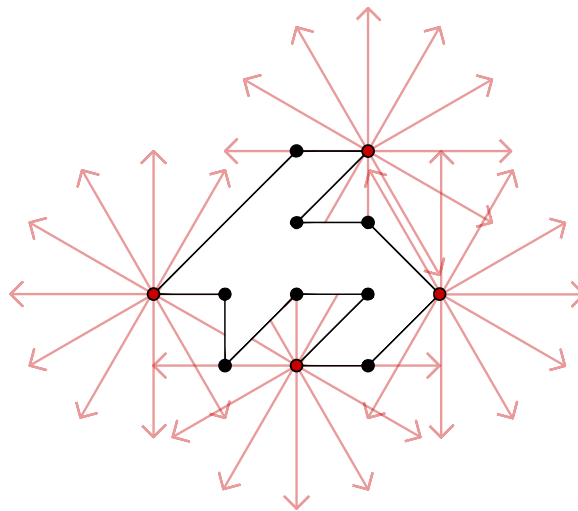


Homework 4: The Art Gallery Problem

*Due Tuesday, week 5, at the start of class**UCSB 2014*

1. Take a polygon P with n sides. Consider the following task: we want to station observers at the vertices of P , such that they can guard the entire “outside” of P . In this situation, we assume that the guards cannot “see through” P ’s walls, and can only look out from their positions. For example, here is a polygon P being guarded by four guards:



A polygon with observers guarding its outside. Observers are denoted by red vertices; sample sight lines are drawn in pale red.

- (a) Suppose that P is an arbitrary polygon with n vertices. What is the maximum number of guards needed to guard the exterior of P ?
- (b) Again, suppose that P is an arbitrary polygon with n vertices. What is the minimum number of guards needed to guard the exterior of P ?