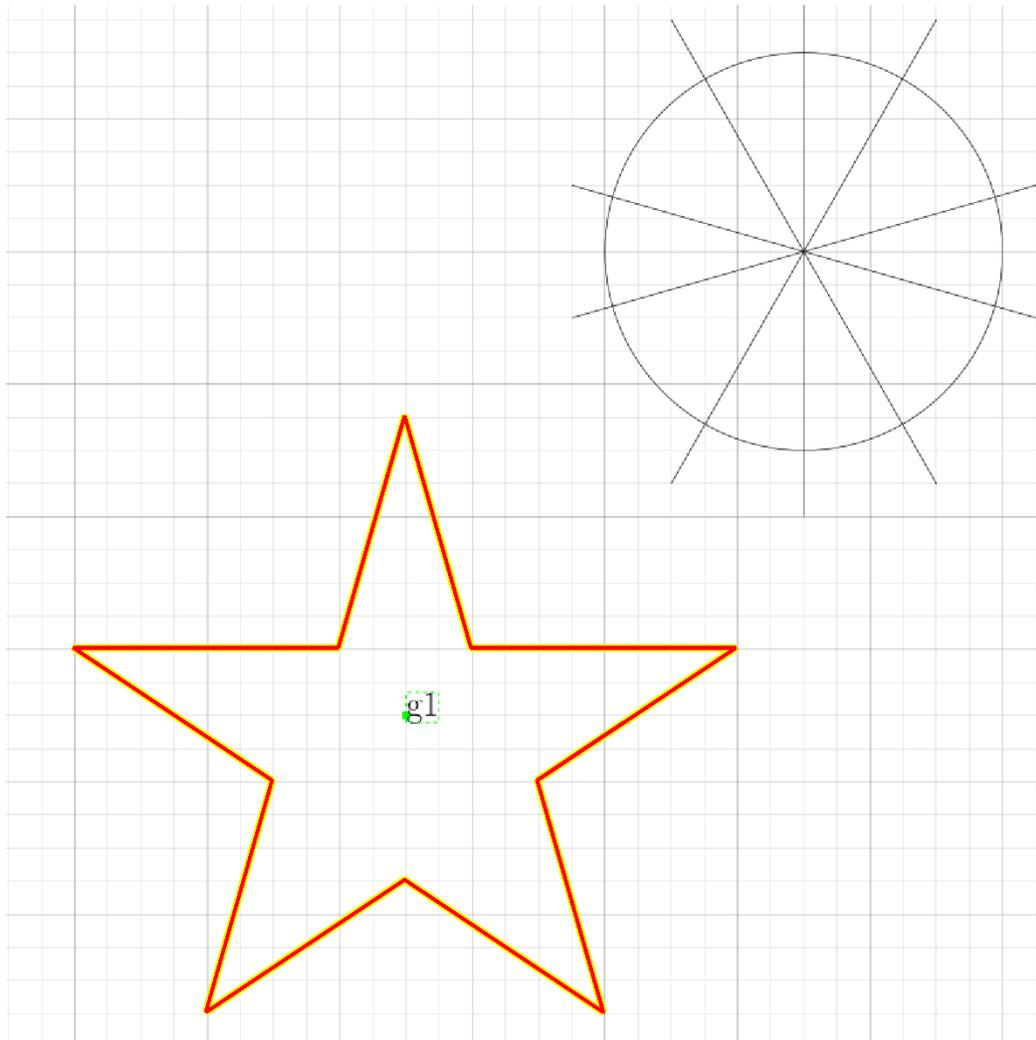


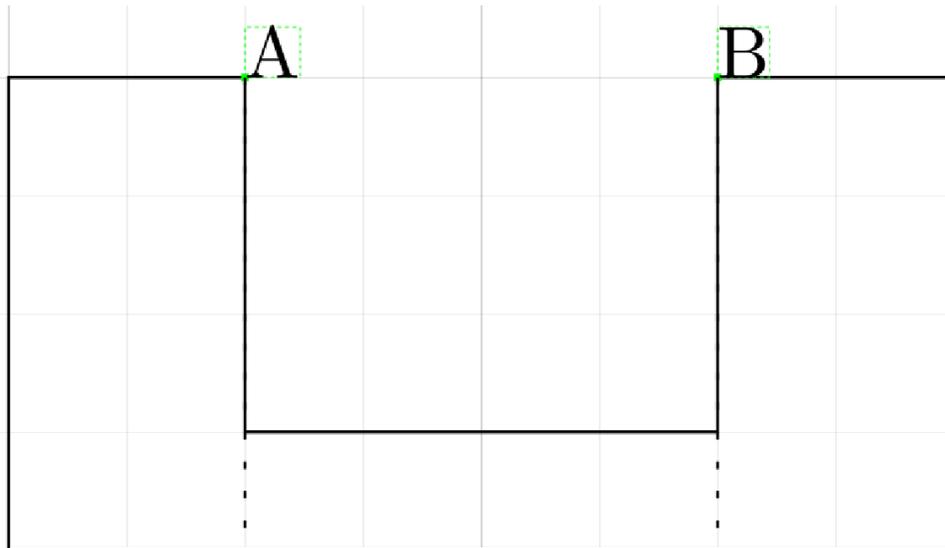
# HW4

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## Problem 1

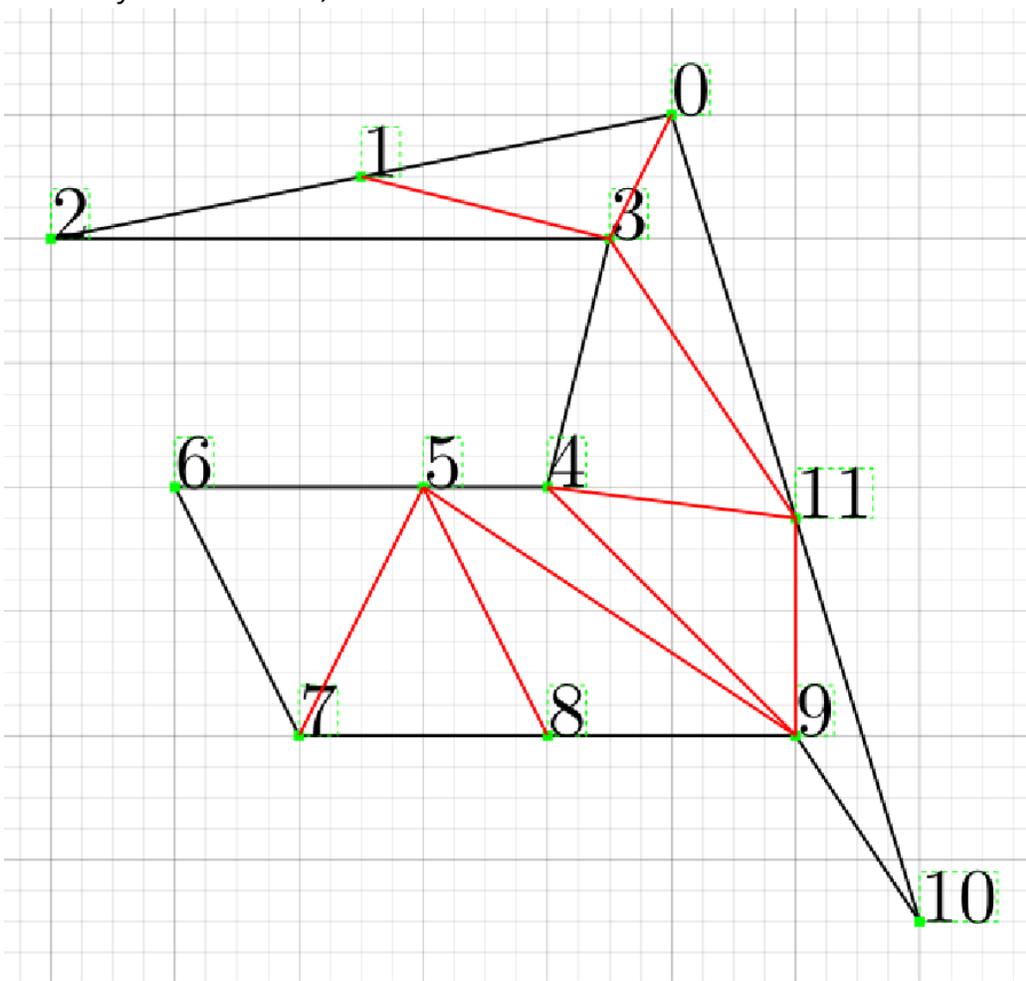


- 1. A star is an example.  $P(g_1)$  can see all of  $P$ , but on all direction of the circle, it is not monotone.
- 2. Same as 3. 3 is a subset of 2.



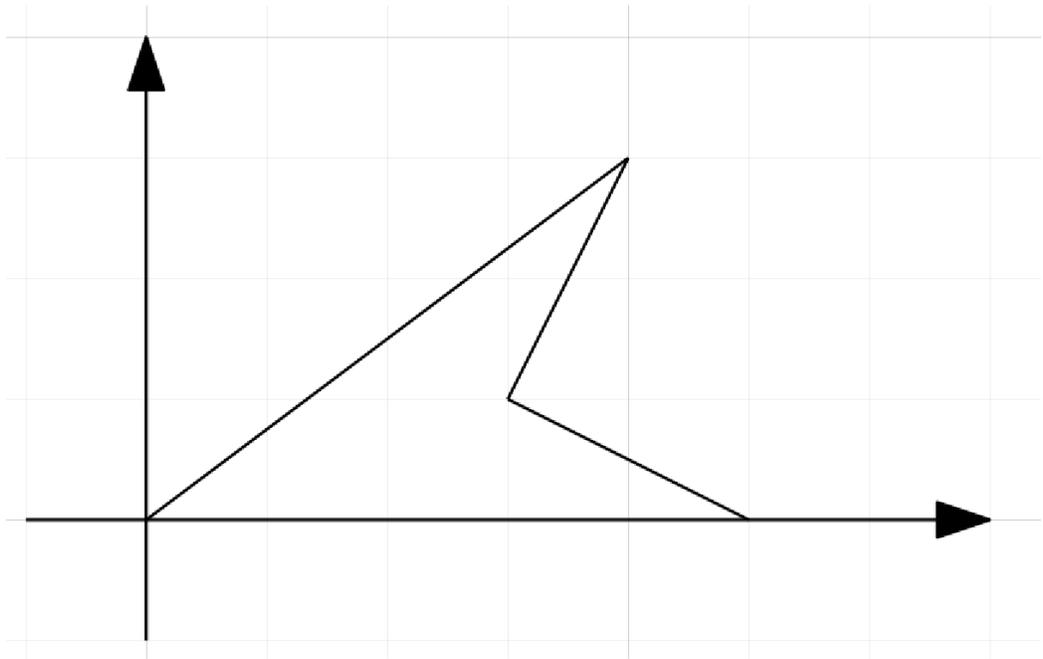
• 3.

This is an example. It is an orthogonal simple polygon, and it is monotone on X direction, but it is not guardable (two witness points do not share any common view).



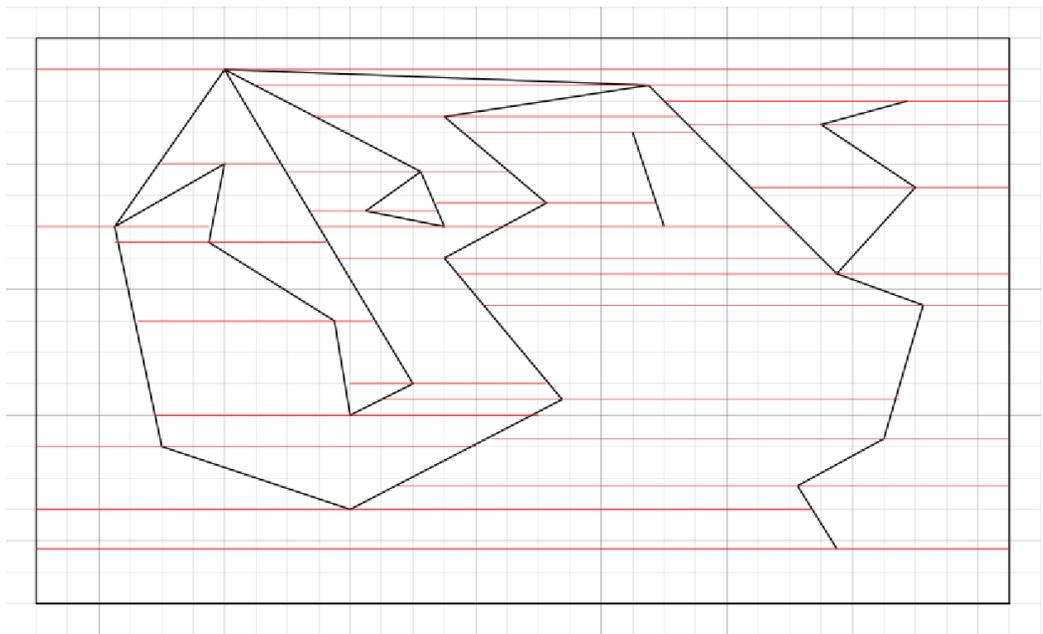
• 4.

• 5. True. Simple 4-gon with exactly 3 convex vertices must be a fox. If we rotate it and put its nose on origin and one of its ear on positive x-axis, it will look something like this:

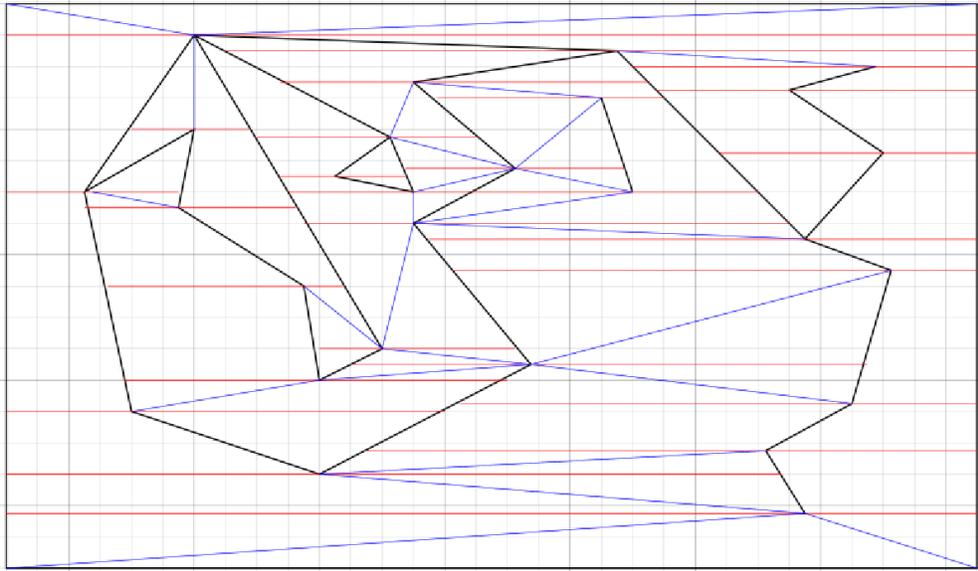


Note that if we go through  $y$  direction, the nose must be  $t$  because its at  $(0,0)$  which is the lowest  $y$  coordinate. Also the ear that is not on the  $x$ -axis must be  $b$  because it has highest  $y$  coordinate or otherwise this polygon won't be a fox. Besides, other than the line at  $y = 0$ , no more than two points will share the same  $y$  value. Thus we have  $t$  and  $b$  join the same line so this must be mountain monotone on some direction  $d$ .

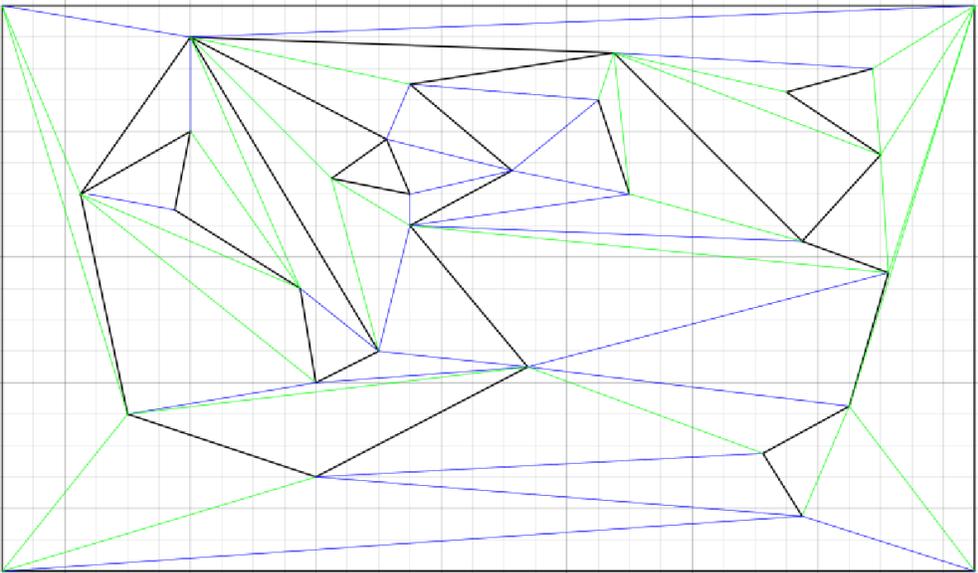
## Problem 2



- 1.



- 2.



- 3.