In-class Activity

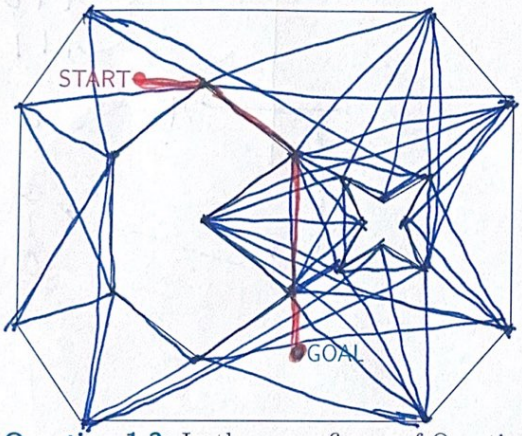
ME 570 - Prof. Tron

2023-11-07

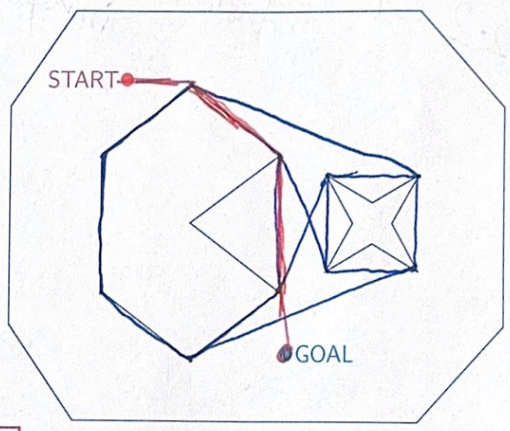
For questions tagged with the label **scan**, answer all the questions in the space provided; to submit, scan your work and submit to Gradescope. To scan your work, you can use the flatbed scanner in the ME department office, or an app on your phone such as Adobe Scan or Dropbox, available for both iOS and Android. Please make sure to upload the pages in the correct order, and that the scans have good contrast. If needed, you can download and print this document from Blackboard.

Problem 1: Visibility map in "Pac-Man world"

Question 1.1. Draw a visibility roadmap in the following polygonal environment.



Question 1.2. Draw the reduced visibility roadmap in the same polygonal environment.



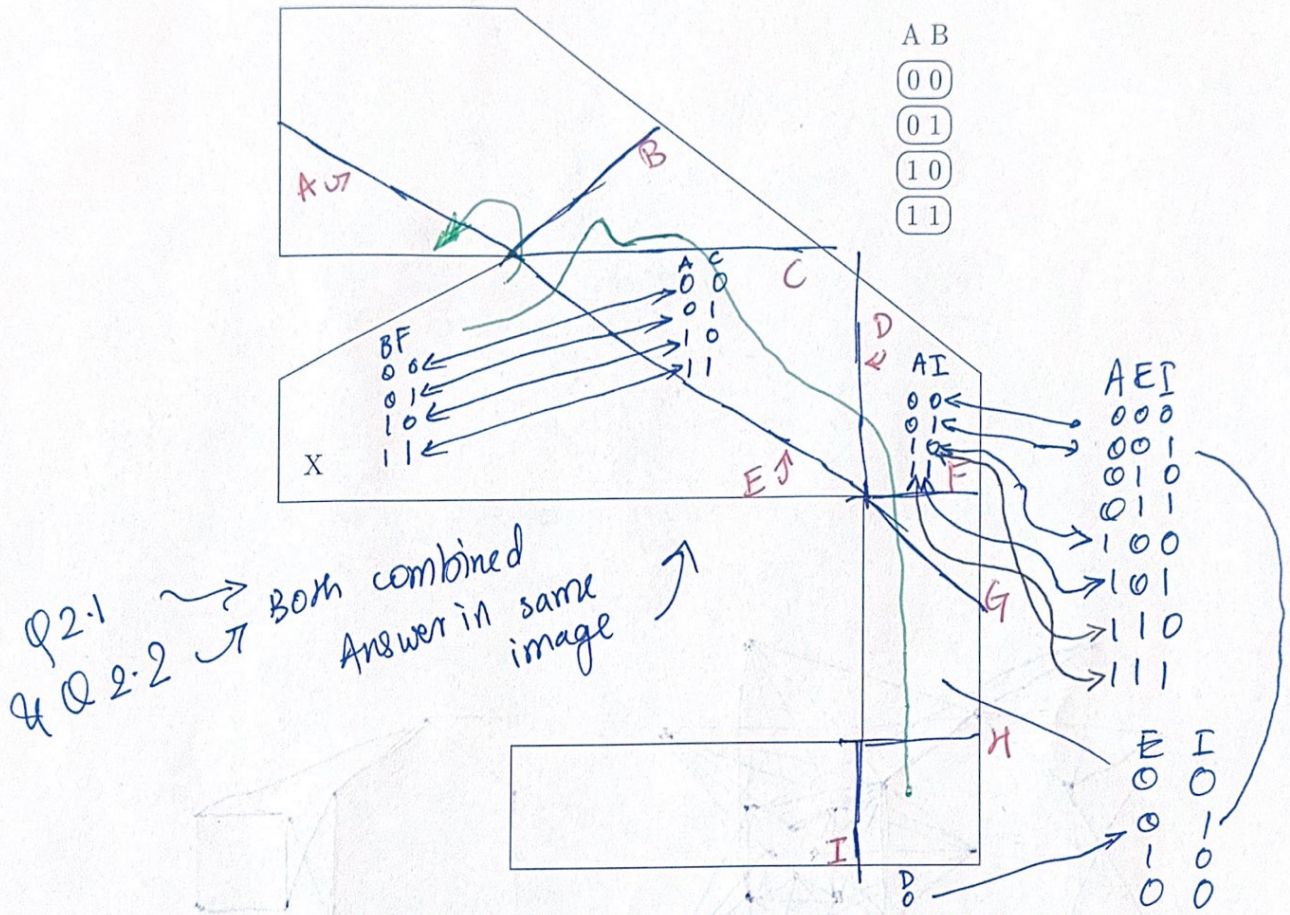
Question 1.3. In the same figure of Question 1.2 use a different color/line thickness to draw a path from start to goal using the roadmap.

The path is drawn in Red.

0 = clean
1 = contaminated.

Problem 2: Visibility-Based Decomposition for Pursuit-Evasion

Consider the following polygonal environment.



Question 2.1. Draw the visibility-based decomposition, and mark each distinct cell boundary with a letter.

Question 2.2. Add the information graph, indicating the boundary for each bit in the vector $B(x)$ (see example above). For the purpose of this activity, complete all the vertices, but it is fine if you limit yourself to edges that cross boundaries A and B (shown in class), and the edges used by the path below.

Question 2.3. Mark a path $\gamma(t)$, starting from the location marked as "X", that clears the entire environment.