

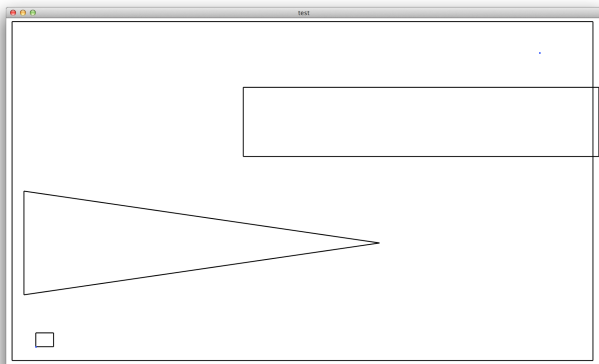
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Problem set #1  
6.S078

#### Approach:

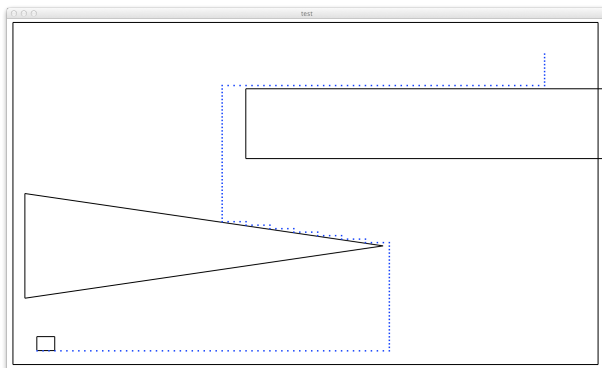
I tried to develop the software to be as modular as possible which lead me to focus on object oriented programming. The code is divided among three files: geometry, Problem1, and util.

- geometry : develops the geometric hierarchy: point, segment, polygon. This allowed me to easily represent the robot and the obstacles. Initially the obstacles were meant to have constant velocity but due to time constraints I did not get to use this functionality. Segments have a method to detect intersections. The polygon class uses this method to detect collision among polygons by iterating through all the combinations.
- utils: includes the different types of queues that I used to represent the different search algorithms and some utility function to help the drawing process.
- Problem1 : contains the search algorithms I implemented. The heuristic function being used is the manhattan distance from the point to the goal.

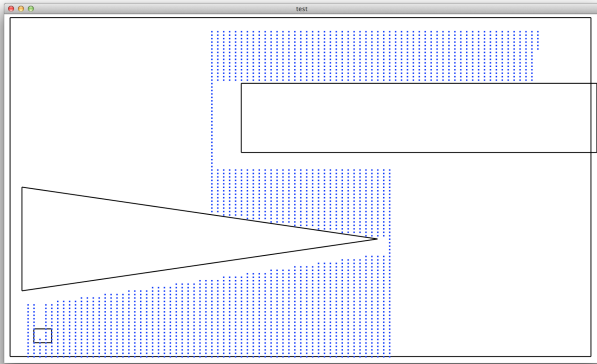
#### Initial environment:



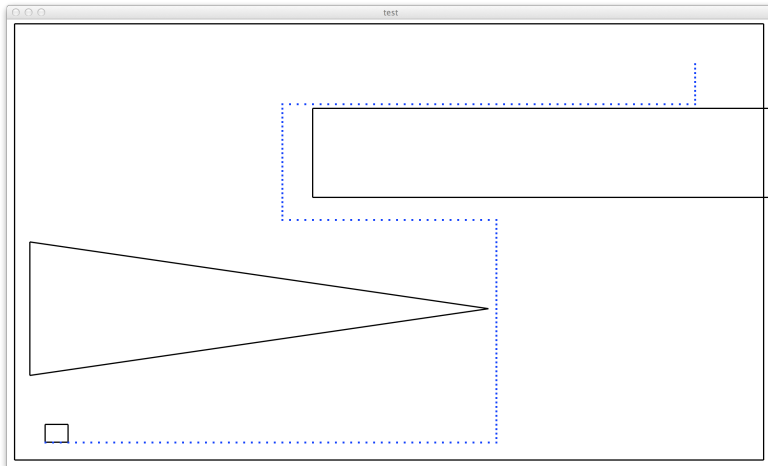
Breadth First Search: 6303 nodes expanded, 226 length of path



Depth First Search: 4525 nodes expanded, 2798 length of path



A\* with Admissible Heuristic: 4290 nodes expanded, 227 length of path(difference of one is a bug):



A\* with Admissible Heuristic: 2497 nodes expanded, 279 length of path(difference of one is a bug):

(same as last one)