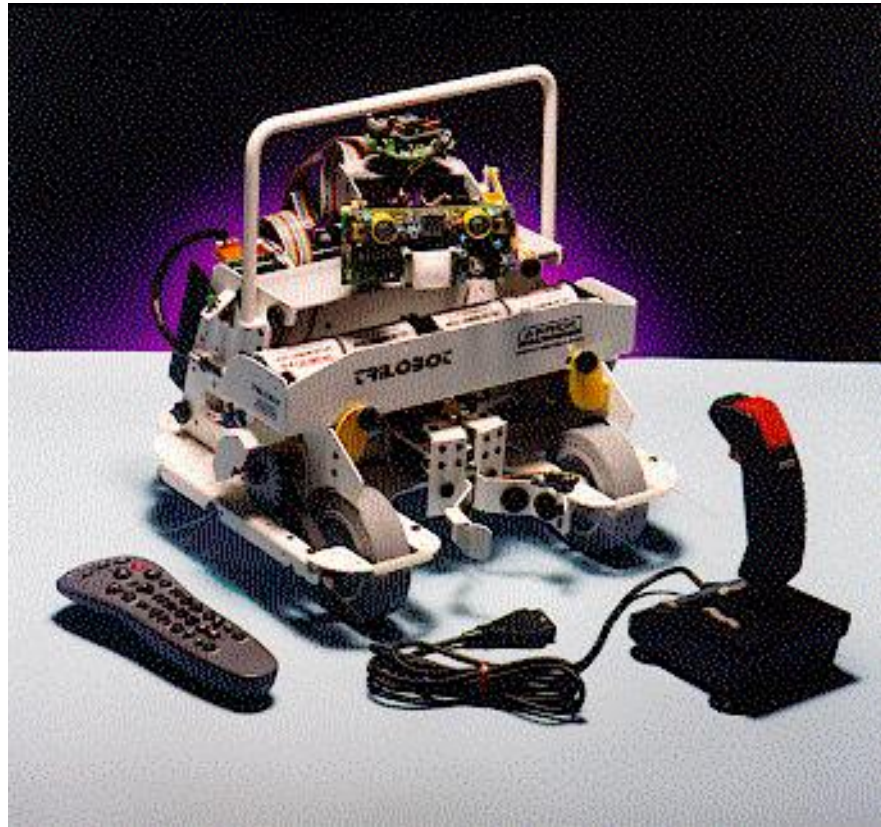


HW2: Robot Path Planning

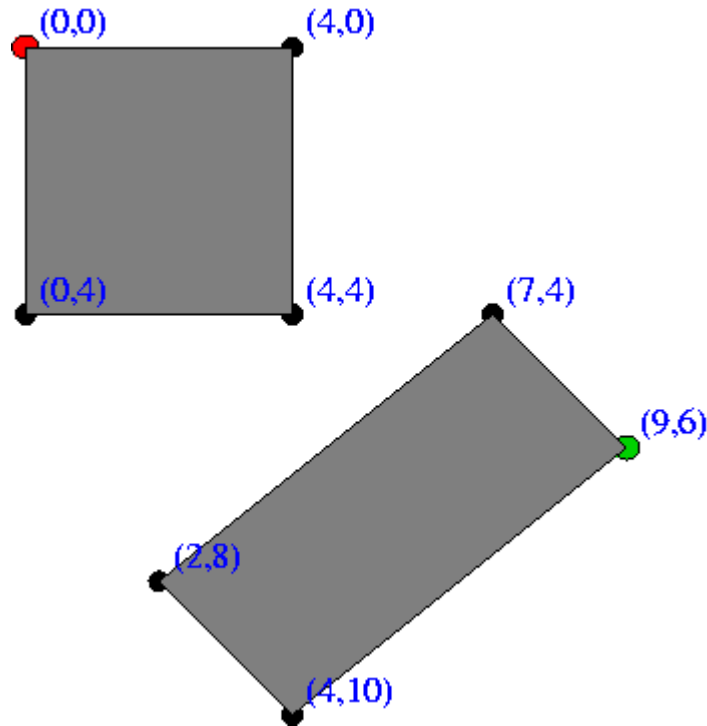


Assignment

- Program an A* heuristic search to allow an agent to compute the shortest path from a start point to a goal point that goes around **rectangular obstacles**.
- States: coordinates of corners of rectangles
- Legal move: from one corner to another without going through a rectangle.
- Going along the outside is fine and common.

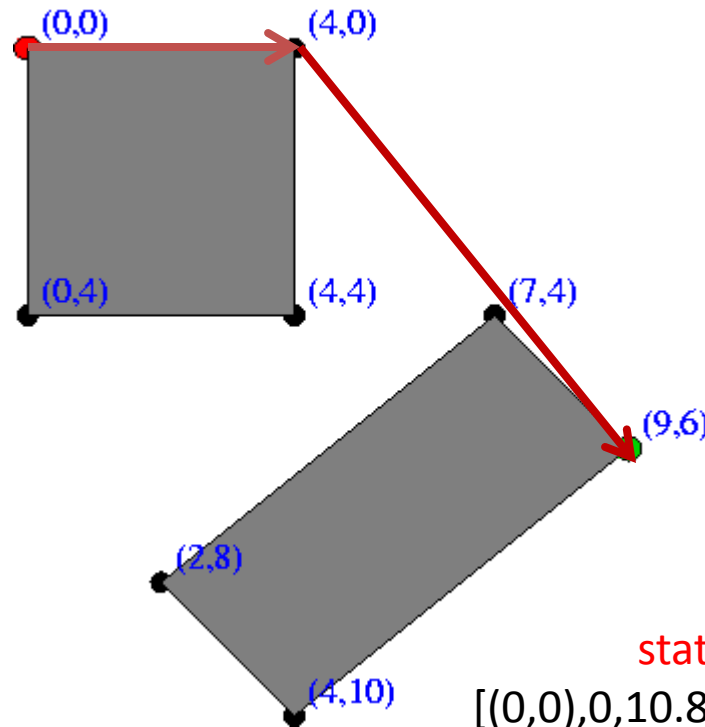
Data Set 1

What's the shortest path from (0,0) to (9,6)?



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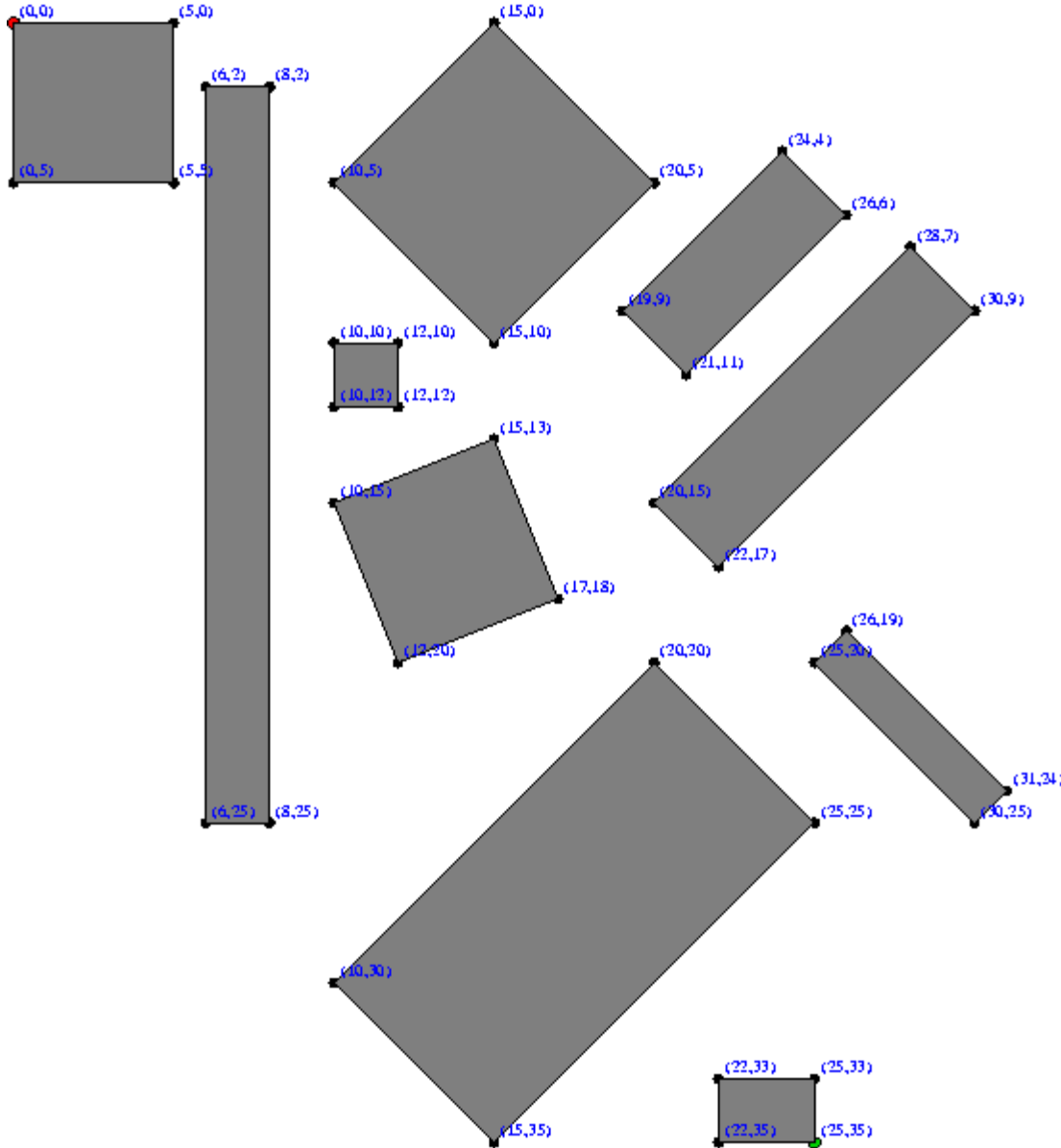


states $((x,y),g,h,f)$

```
[(0,0),0,10.8166538264,10.8166538264]  
[(4,0),4.0,7.81024967591,11.8102496759]  
[(9,6),11.8102496759,0.0,11.8102496759]
```

heuristic: straight line distance from
a point to the goal.

Data Set 2

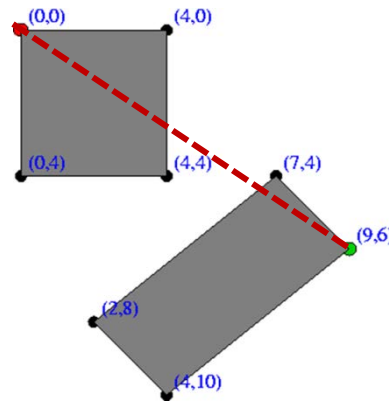


State Data Structure

- coordinates
- g-value
- h-value
- f-value
- successor list
- parent

Heuristic Function

- The heuristic function h should use the **straight line distance** from the current vertex to the goal vertex, which can never overestimate the true distance.



We will give you

- The two data sets and directions for reading
- Starter code including
 - line intersection code
 - skeleton of the A* algorithm you are to program