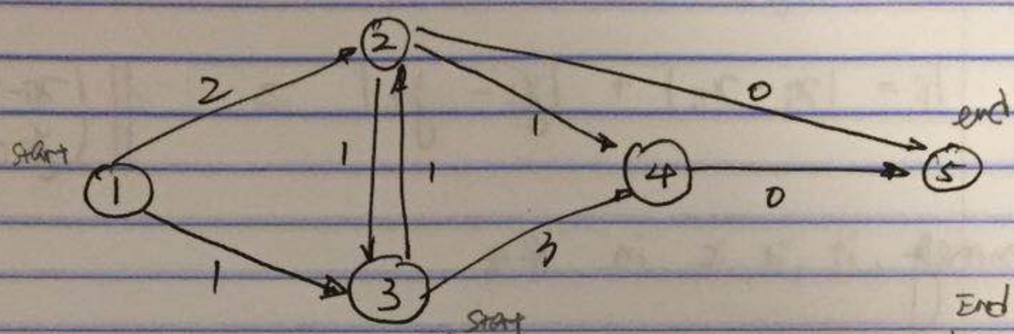
Homework#2

Due Feb/20/2018

problem#1



start

End

Iteration	Remove	open	d_1	d_2	d_3	d_4	d_5
0	–	1	0	∞	∞	∞	∞
1	1	2,3	0	2	1	∞	∞
2	2	4,5,3	0	2	1	3	2
3	4	5,3	0	2	1	3	2
4	5	3	0	2	1	3	2
5	3	2,4	0	2	1	3	2
6	$\boxed{2}$	has already tested					
7	$\boxed{4}$						

path is 1, 2, 5 with $d_5 = 2$

2. [5 pts] Suppose a triangular robot is operating in a 2D workspace. The robot can translate in any direction but cannot rotate. The configuration of the robot is specified by the position of the leftmost vertex of the triangle (marked by a circle in Fig. 1). The workspace has three polygonal obstacles. Our goal is to find the shortest path from the initial configuration (0, 0) of the robot (marked in red) to the goal configuration (10, 10) (marked in green) while avoiding the obstacles. We will do it by hand.

   (a) Draw the configuration space for this problem (either by hand or by writing a program to do so). Make sure to mark the start and goal configurations as well as the inflated workspace obstacles.

   (b) Find the minimum length path from the starting configuration to the goal configuration while avoiding the C-space obstacles (either by hand or by writing a program to do so).

Make sure your submission includes a plot of the C-space obstacles and the shortest path.

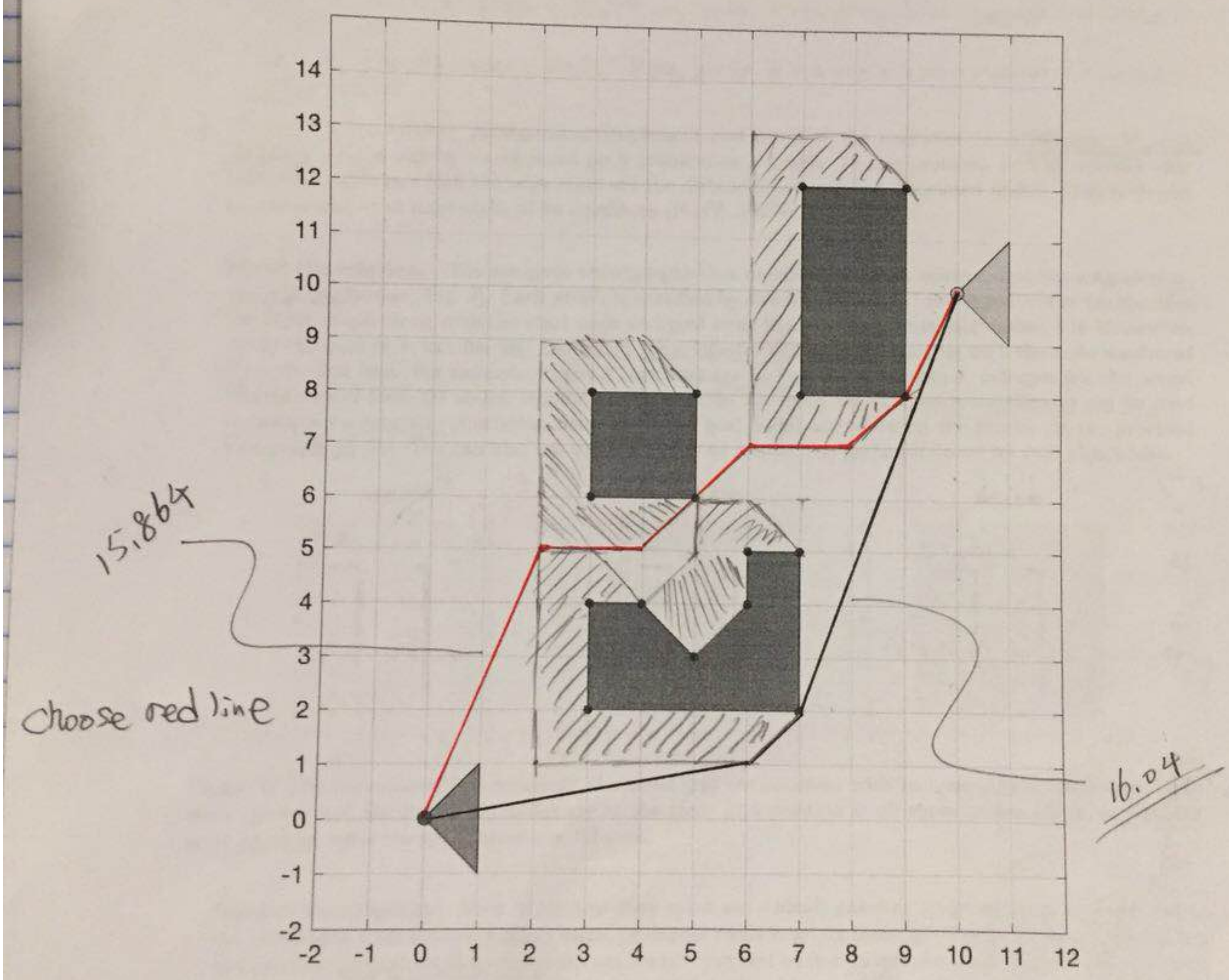


Figure 1: Workspace for a translating triangular robot. The start position is shown in red and the goal position is shown in green. The three workspace obstacles are shown in blue.

Problem #3

Basically the admissible means $h_i < J_i^*$

Additionally $|x_i - x_\tau| + |y_i - y_\tau| \geq \| (x_i - x_\tau, y_i - y_\tau) \|_2$

triangle inequlibrium

(a) in $G4$

with out obstacle $J_i^* = |x_i - x_\tau| + |y_i - y_\tau|$

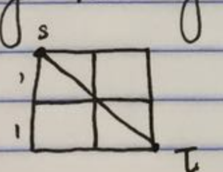
with obstacle $J_i^* > |x_i - x_\tau| + |y_i - y_\tau|$

$\Rightarrow J_i^* \geq |x_i - x_\tau| + |y_i - y_\tau| = h_i$

Therefore, it is heuristic in $G4$ condition

(b) in $G8$

considering following condition



$J_i^* = 2\sqrt{2}$, however $h_i = 4 \Rightarrow h_i > J_i^*$

Therefore it is not heuristic in $G8$ condition