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ASEN 5519 Algorithmic Motion Planning
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Homework 2 Solutions

Exercise 1

Handwritten and attached below.

Exercise 2

- a) Plot the paths generated by Bug 1 and Bug 2 algorithm.

Below in Figure 1 and Figure 2, the red circle is the start, and the green is the goal. I used blue circles to indicate points on the path. The turquoise rectangles represent the obstacles.

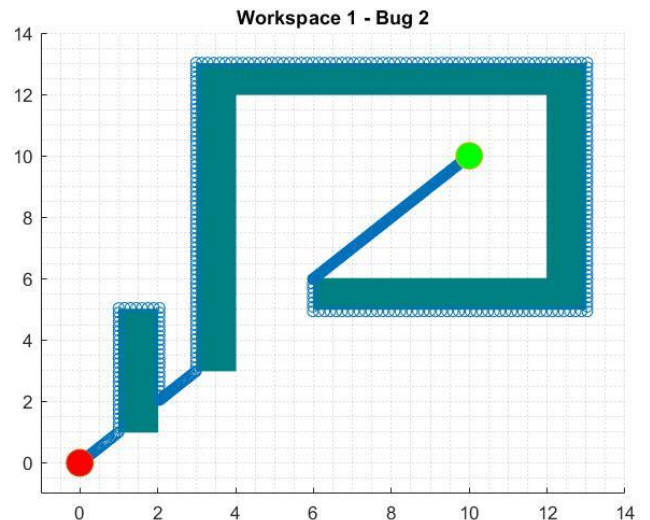
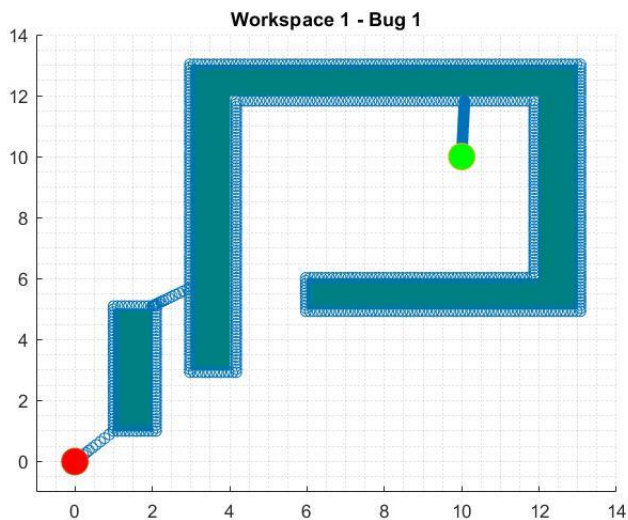


Figure 1: Left turning Bug 1 and Bug 2 algorithms in Workspace 1

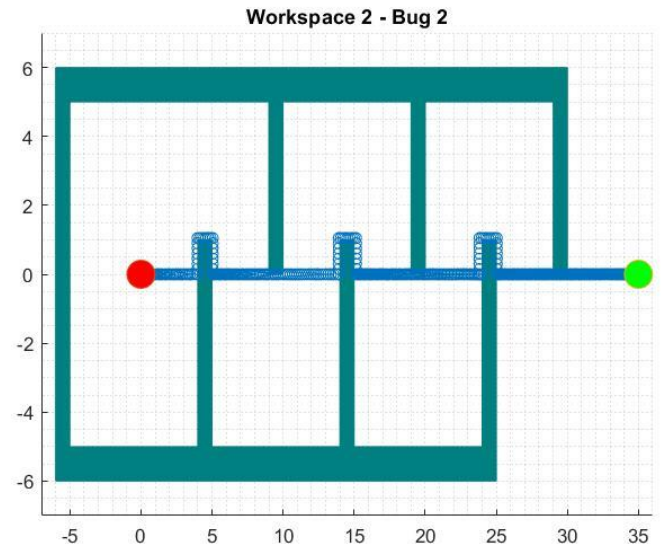
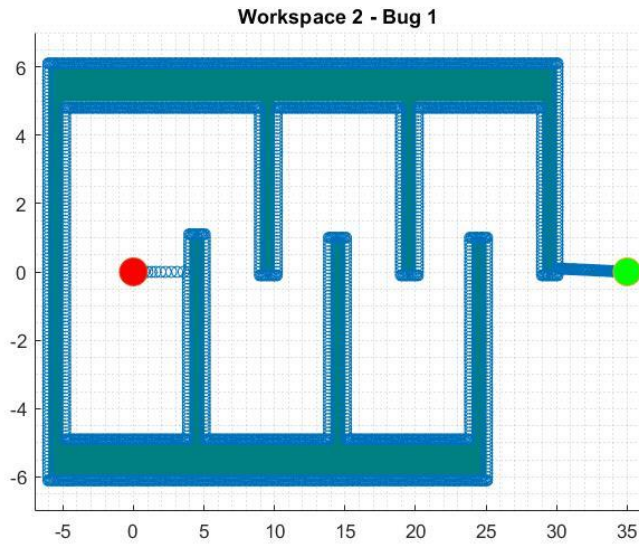


Figure 2: Left turning Bug 1 and Bug 2 algorithms in Workspace 2

b) What are the lengths of the paths generated by Bug 1 and Bug 2 algorithms?

Workspace	Bug	Travel Distance
1	1	133.168
1	2	52.805
2	1	368.633
2	2	41.624

c) Would you expect the same path lengths if the robot were right turning?

Sometime this may be the case for a given workspace but not always. Consider the case below in Figure 3. Using Bug 2 we see that the right turning robot (in red) takes a much shorter path than the left turning robot (in yellow).

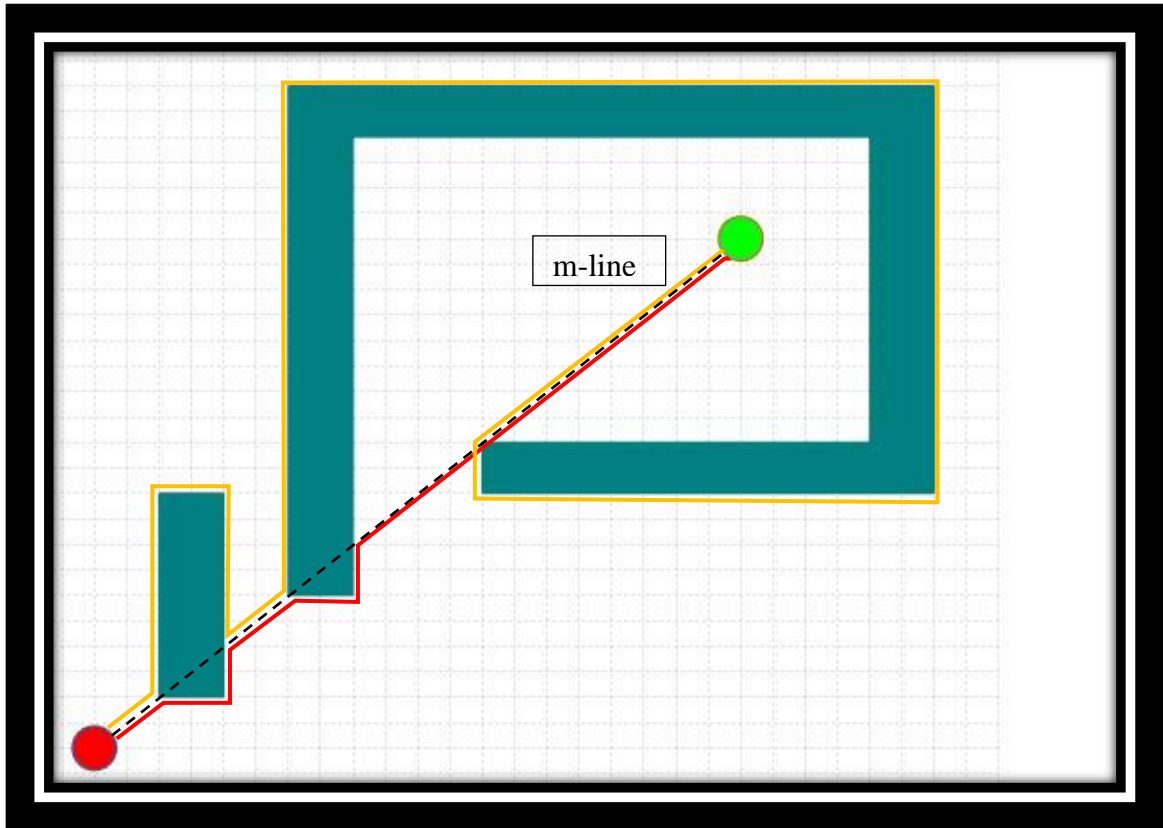


Figure 3: Left vs Right turning Bug 2 algorithm