CS 5335: Robotic Science and Systems (Spring 2023)

HW 2: Motion Planning in Cspace

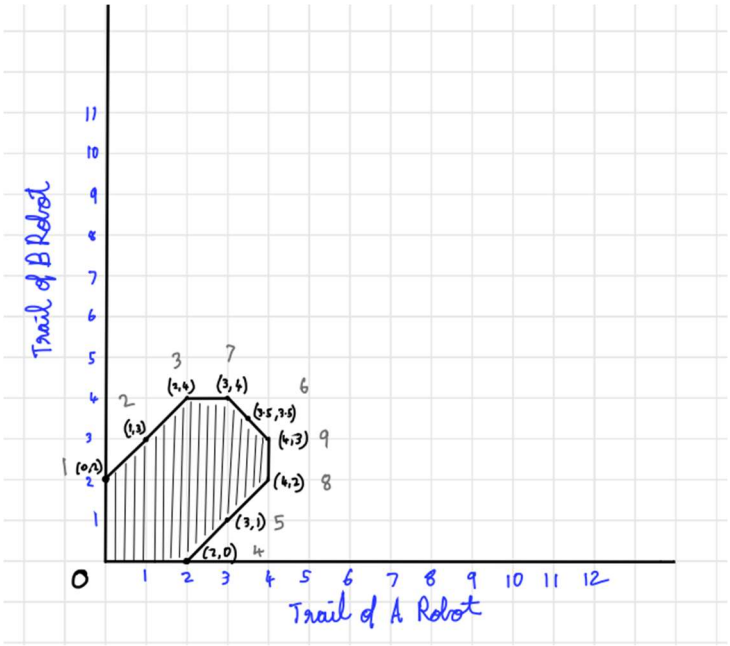
Report by: Francis Jacob Kalliath

C0)

a)

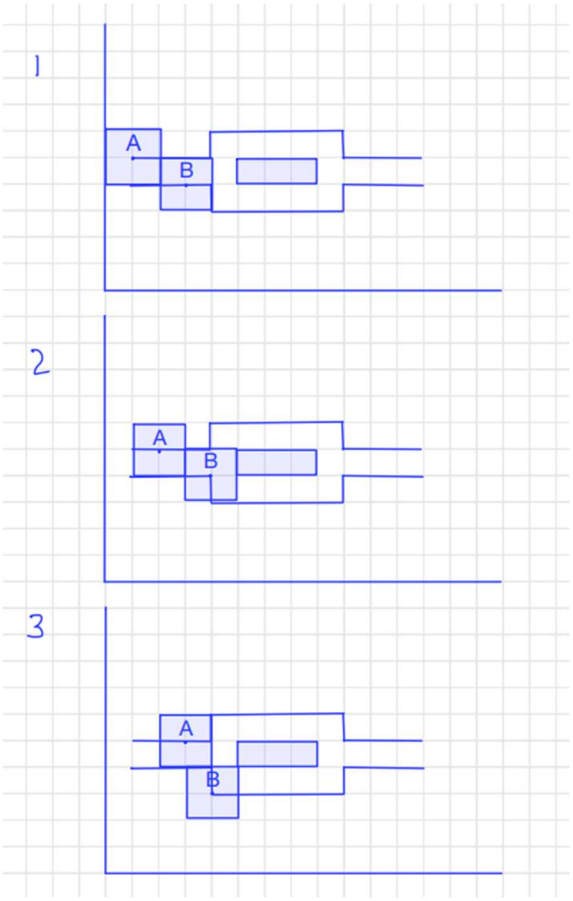
- The axis of our configuration space corresponds to distance moved by the robot.
- The axis limits are 13 units on both axes.
- The configuration of the diagram mentioned in the question paper is 5.5 for robot A and 3.5 for robot B

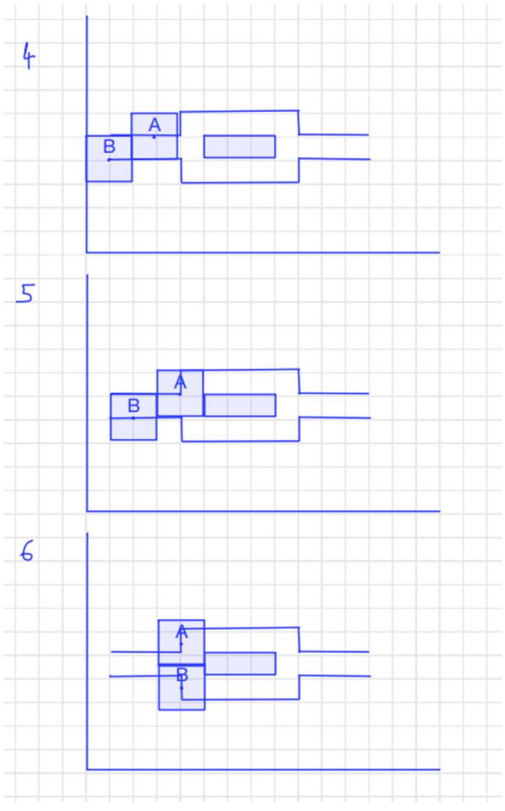
b)

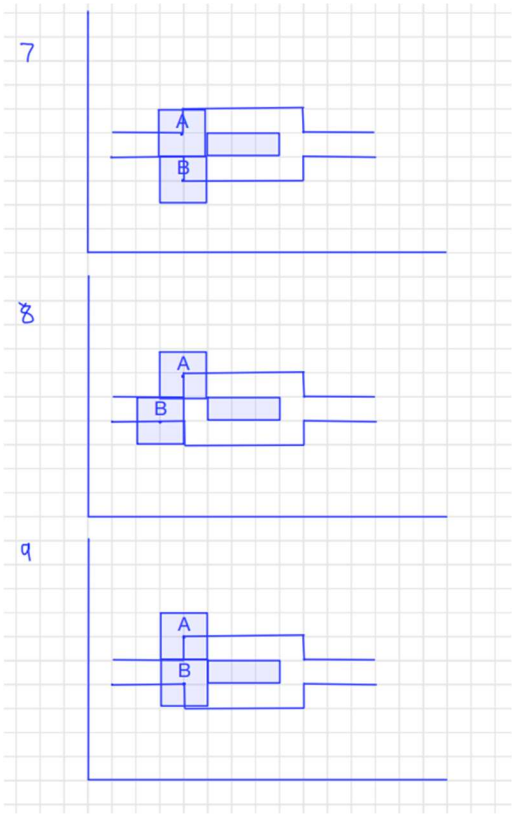


The configuration space is represented above.

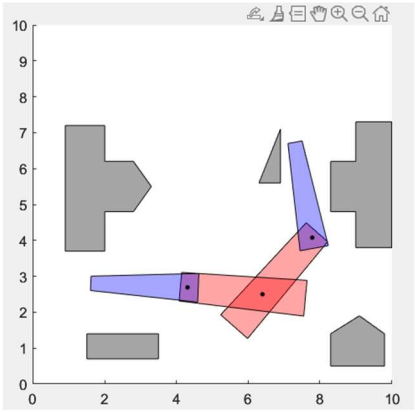
For each configuration space obstacle, the coordinate of vertices are labelled as 1, 2, 3, 4, 5, 6, 7, 8 and 9 are shown below


1
A
B
2
A
B
3
A
B


4
A
B
5
A
B
6
A
B



C1)



This above figure illustrates the start and goal position of the robot arm.

C2)

The above figure illustrates the robot in the workspace.

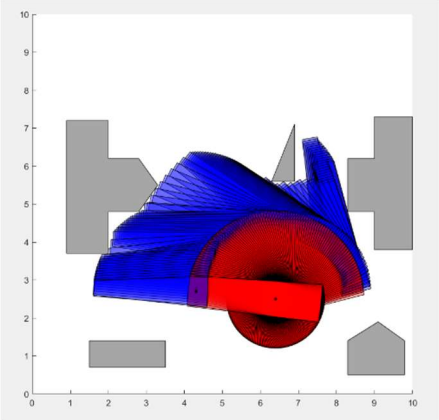
C3)

The above figure illustrates the robots distance transform from the grid point nearest to the goal.

C4)

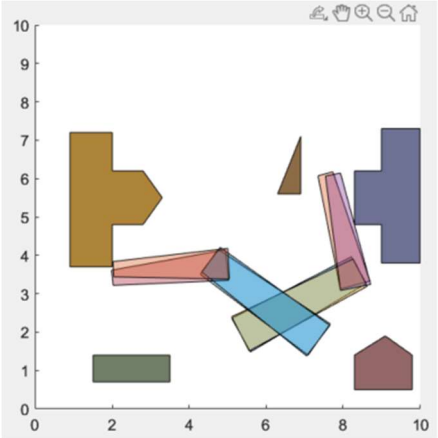
The above path illustrates the path from the specified start configuration to the goal grid.

C5)



The above figure shows the path in grid point indices into path in configuration.

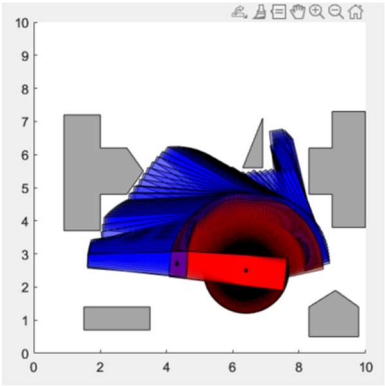
C6)



The above figure shows the points at with the robot arm encounters obstacle.

C7)

The above figure shows the path from the specified start configuration to the goal grid after padding the obstacles.



The above figure shows the path of the robot arm at various positions after padding the obstacles. Hence no collision are found in the figure below.