ROB301H1 F

Introduction to Robotics

Problem Set III

1. Consider again the robot trying to deliver a package to Professor Robotham's office (see Notes on "The Concept of Bayesian Localization"). You are to use the map in Figure 4, the state model in Table 3 and the measurement model in Table 4. The initial position of the robot is known with certainty to be at node A. Subsequently, the actions and measurements taken are as follows:

k	u_k	z_k
0	1	—
1	1	HALLWAY
2	1	WALL
3	0	WALL
4	1	CLOSED DOOR
5	1	WALL
6	1	WALL
7	1	OPEN DOOR
8	1	WALL
9	—	CLOSED DOOR

Where is the robot? And what is its confidence level (*i.e.*, what is the probability that it is where it thinks it is)? Show the evolution of the state estimator.

2. Using the A* algorithm—write your own code—determine the shortest path from start to finish in the "world" shown below. The grid is 34×34 and motion is allowed in along the diagonals as well as the cardinal directions. Include your code as an appendix.