1. (20pts) In the robot-door example from class, we calculated the predicted belief assuming that, after initial state, the robot pushed the door. Now, repeat the prediction calculations assuming that the robot did nothing. Can you tell what the predicted belief will be without doing any calculations? Explain.

2. (40pts) Assume that the robot has the following action policy:
    a. If the belief that the door is open is less than 0.9, the robot pushes the door and then measures.
    b. If the belief that the door is open is greater or equal to 0.9, the robot only measures, without pushing the door.
    c. If the belief that the door is open is greater than 0.99 the robot proceeds through the door.

    Calculate predicted and updated beliefs for each step assuming that each time the robot measures it senses that the door is open. Show all calculations for each step and present the results by completing the table below (the first row is the calculation we did in class). How many times does the robot push the door and how many measurements it needs to do before it can proceed through the door?

step	$bel(open)$	$bel(clsd)$	action	$\overline{bel}(open)$	$\overline{bel}(clsd)$	$bel^+(open)$	$bel^+(clsd)$
0	0.5	0.5	push	0.8	0.2	0.878	0.122
1	0.878	0.122					
...							
	?	?	go!				

3. (40pts) Extend the program from class to calculate belief progression assuming that the robot is repetitively pushing the door and reading the same measurement sequence that we used in class: open, open, open, open, open, closed, open, open.
    a. Submit the code.
    b. Plot the results on top of the graph shown in class

Notes:

To submit the code you can either upload a file to Canvas or, if your code is on Github or any other public Git repository, provide the URL that points to the *specific commit* that contains your solution. The date associated with the commit must be on or before the submission deadline (any commits that contain file modifications dated after the submission deadline will not be considered for grading). On Github the URL typically looks like this:

`https://github.com/`*<username>*`/`*<repository_name>*`/commits/`*<sha_1_signature>*

For plotting the data, you can use any tool such as Matlab, Python (with matplotlib), Excel, hand-sketch, or whatever is convenient for you. There is no need to submit the plotting code (it will not be graded).