AI Assignment 2

Part B

Team 25

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Overview of Implementation:

The implementation is pretty straightforward, with value iteration algorithm being applied to solve the problem.

The outputs of the various inputs:
board = [[2.5, 0.0, 0.0, 25.0], [0.1, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, -5.0, 0.0]]
rows, cols = 4 4
world = [[2.5, 0.0, 0.0, 25.0], [0.1, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, -5.0, 0.0]]
no of end states = 3
end states = [(0, 0), (0, 3), (3, 2)]
no of walls = 2
walls = 2
start state = ('3', '0')

1a) Step Cost = -2.5, Discount Factor = 0.1

Influence of Parameters:

-ve step cost implies that agent wants to move to terminal state.

Lower discounting factor means that agent gives more importance to current scenario and doesn't look much into future.

Policy:

Goal	None	E	Goal
N	W	E	N
N	N	None	N
N	W	Bad	E

Explanation:

(2,0) goes N as goal state(3,0) is near than (3,3) goal state. At other positions also when the robot is near to (3,0) goal state it makes moves to go to (3,0).

1b) Step Cost = -2.5, Discount Factor = 0.99

Influence of Parameters:

-ve step cost implies that agent wants to move to terminal state.

Higher discounting factor means that robot gives more importance to future states and looks much ahead into future.

Policy:

Goal	None	E	Goal
E	E	E	N
E	N	None	N
N	N	Bad	N

Explanation:

At every state robot wishes to go to (3,3) goal state as it has highest reward.

2a) Step Cost = 25, Discount Factor = 0.99

Influence of Parameters:

Higher discounting factor means that robot gives more importance to future states and looks much ahead into future.

+ve step cost means that the agent wants to stay in the environment and doesn't want to leave it.

Policy:

Goal	None	W	Goal
S	S	W	S
E	W	None	N
N	W	Bad	E

Explanation:

Since the agent wants to stay in the environment, as soon as it reaches near a terminal state; it moves away from it

2b) Step Cost = -5, Discount Factor = 0.99

Influence of Parameters:

-ve step cost implies that agent wants to move to terminal state.

Higher discounting factor means that robot gives more importance to future states and looks much ahead into future.

Policy:

Goal	None	E	Goal
E	E	E	N
N	N	None	N
N	N	Bad	N

Explanation:

Since the step cost is not much -ve agent can afford to make moves to reach (3,3) goal state as the reward for that state is way too high.

2c) Step Cost = -6.25, Discount Factor = 0.99

Influence of Parameters:

-ve step cost implies that agent wants to move to terminal state.

Higher discounting factor means that robot gives more importance to future states and looks much ahead into future.

Policy:

Goal	None	E	Goal
N	E	E	N
N	N	None	N
N	E	Bad	N

Explanation:

Here the step cost has become more -ve than the previous case and agent doesn't want to spend much in the environment so makes some moves to reduce total number of steps.

2d) Step Cost = -25, Discount Factor = 0.99

Influence of Parameters:

-ve step cost implies that agent wants to move to terminal state.

Higher discounting factor means that robot gives more importance to future states and looks much ahead into future.

Policy:

Goal	None	E	Goal
N	W	E	N
N	S	None	N
E	E	Bad	W

Explanation:

Here step cost is highly -ve so agent always strives to move to a terminal state.