

# Assignment 3

## Implementing Value Iteration for MDP

	Reward: 1	Penalty: -1
	Wall	
Start		

1. Write a code in Python implementing Value iteration for a grid world given in the image above

Values you will require:

1. The reward for reaching the goal state = 1
2. The penalty for reaching the red state = -1
3. Step cost = -0.04
4. Probability of going in the direction of the action = 0.7
5. Probability of going in a direction perpendicular to the action = 0.15

Print the utility value of each cell in the grid after each iteration until the values converge. (Assume the values converge when the difference between the utilities for each cell is  $\leq 0.0001$ )

Note: The agent does not change its state if it hits a wall or the boundaries

2. Implement the same algorithm by hand for two iterations. See if your values match the output from your code.

**Distribution of marks:**

50 Marks for the correct implementation of value iteration in code

50 Marks for correct implementation of value iteration by hand

***Bonus***

*10 Marks for printing the policy for each cell after the algorithm converges*

Note: The marks obtained will be out of 100 only

**Submission Format:**

Submit a zipped file <roll\_no>.zip

It should contain a **<roll\_no>.py** containing the implementation in python and a **<roll\_no>.pdf** containing the handwritten submission.

**General instructions:**

The deadline for this assignment is April 22, 2023 at 11:59 PM

Please start the assignment early to prevent clash with endsem preparation

Plagiarism is strictly prohibited and a straight 0 will be awarded in such cases

Cheers,

MDL TAs