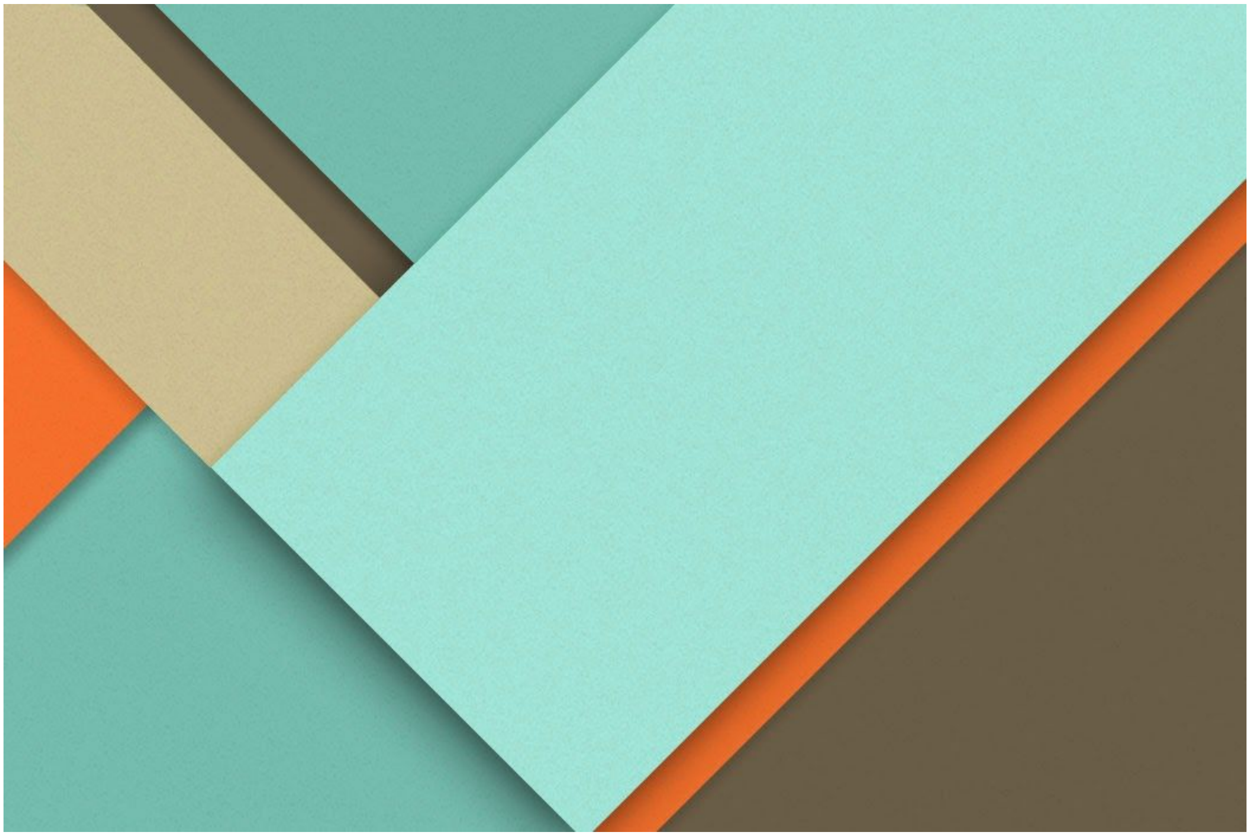

# Assignment 5 : Part 2

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## Answers are as follows:

**Answer 1 :**

Okay , so we know that the agent is in (1,1) and that the target is not in the 1-neighbourhood of the agent. ( which means situation o6 ) . This means that the agent can only be in the 4 corners of the square (0,0) (0,2) (2,0)(2,2) . And calls can be either on or off.

Therefore the possible states would be :

- ( [0,0], [1,1], Off)
- ( [0,0], [1,1], On)
- ( [0,2], [1,1], Off)
- ( [0,2], [1,1], On)
- ( [2,0], [1,1], Off)
- ( [2,0], [1,1], Off)
- ( [2,2], [1,1], Off)
- ( [2,2], [1,1], On)

These states are known to be equiprobable, each of them has the same probability of existence in the belief.
Hence P(state) = ⅛ = 0.125 . All the other states have probability equal to 0 .

**Answer 2 :**

Assumption: If the target is in the one neighbourhood of the agent  the case where the target and the agent are in the same cell is also included in that.

We know that the agent is in (0,1)  and the target is in the 1-neighborhood of the agent and the target is not making the call.
So, the possible states are :

- ( [0,1], [0,0], 0ff)
- ( [0,1], [0,2], 0ff)
- ( [0,1], [1,1], 0ff)
- ( [0,1], [0,1], 0ff)

Since all these states are equally probable, Therefore, P(each state) = ¼ = 0.25. All other states will have a probability equal to 0.

**Answer 3:**

Assumption : SimLen is 100 and SimNum is 1000

The utilities are as follows:

Question 1 = (9.58403 + 9.58502)/2 = 9.584525

Question 2 = (17.9723 + 17.9733 ) /2 = 17.9728

**Answer 4 :**

We are given that the agent is at (0, 1) with the probability 0.6, and (2, 1) with probability 0.4 and the target is in one of the corner cells of the square.

We can calculate the most probable observation by calculating the probabilities of each of the observations.

The given possible agent positions are (0,1) and (2,1) and for each of them, the given possible target positions are (0,0) (0,2) (2,0) (2,2) .

The probabilities are as follows:

For Agent Position ( 0,1) :

P ( 0,0 : o3 ) = 0.25 * 0.6 = 0.15

P ( 0,2 : o5 ) = 0.25 * 0.6 = 0.15

P ( 2,0 : o6 ) = 0.25 * 0.6 = 0.15

P ( 2,2 : o6 ) = 0.25 * 0.6 = 0.15

For Agent Position ( 2,1 ):

P ( 0,0 : o6 ) = 0.25 * 0.4 = 0.1

P ( 0,2 : o6 ) = 0.25 * 0.4 = 0.1

P ( 2,0 : o3 ) = 0.25 * 0.4 = 0.1

P ( 2,2 : o5 ) = 0.25 * 0.4 = 0.1

From here , we can see that :

P( 03 ) = 0.15 + 0.1 = 0.25

P( 05 ) = 0.15 + 0.1 = 0.25

P( 06 ) = 0.15 + 0.15 + 0.1 + 0.1 = 0.5

From here we can see that O2, O4 , O1 are having probabilities of 0. From here, we can see that O6 is the most probable observation with probability of 0.5

**Answer 5:**

Assumption : That we are continuing from question 4.

We know that the number of trees is equal to $|A|^N \ where\ N = 1 + |O| + |O|^2 + |O|^3 + ... + |O|^{T-1}$ . This problem is an infinite horizon problem because Time Horizon T can't be calculated. Therefore we can't calculate the number of policy trees possible.