Assignment-1

Artificial Intelligence-2

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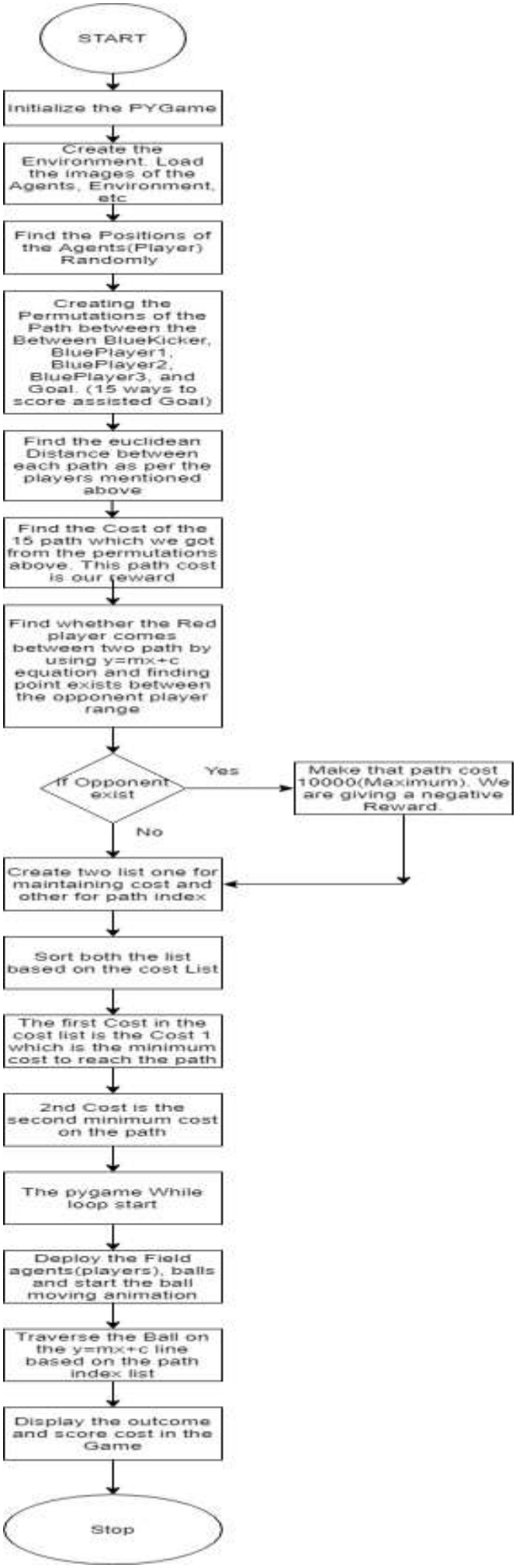
Question-1

Below is the Flow chart for the steps involved in the game. In each step it is explained how the Agent and environment behaves.


START
Initialize the PYGame
Create the Environment. Load the images of the Agents, Environment, etc
Find the Positions of the Agents(Player) Randomly
Creating the Permutations of the Path between the Between BlueKicker, BluePlayer1, BluePlayer2, BluePlayer3, and Goal. (15 ways to score assisted Goal)
Find the euclidean Distance between each path as per the players mentioned above
Find the Cost of the 15 path which we got from the permutations above. This path cost is our reward
Find whether the Red player comes between two path by using y=mx+c equation and finding point exists between the opponent player range
If Opponent exist
Yes
Make that path cost 10000(Maximum). We are giving a negative Reward.
No
Create two list one for maintaining cost and other for path index
Sort both the list based on the cost List
The first Cost in the cost list is the Cost 1 which is the minimum cost to reach the path
2nd Cost is the second minimum cost on the path
The pygame While loop start
Deploy the Field agents(players), balls and start the ball moving animation
Traverse the Ball on the y=mx+c line based on the path index list
Display the outcome and score cost in the Game
Stop

Condition-1

In Centre circle position there is the Ball and the blue team player who is kicking the ball, the kicker will pass the ball to its blue player.

Condition-2

One player from Red team and one player from Blue team are present in the Red Team Goal Box

Condition-3

Apart from Kicker all the 3 players from Red Team area and 3 player from Blue Team are present in Team Read Area

Condition-4

It is taking the shortest path to reach the Goal, also it is an assisted goal, the kicker cannot score directly into the goal post.

Condition-5

The position of the players is changing randomly with every Run, Below are two Run examples screen shot for the same

Run-1

Run-2

Case-1

All the Paths have Red in Between and the Red player can’t score the Goal.


Can't Score, Game Over
Cost1: 100000 Cost2: 100000

Case-2

Question-3

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Assignment-1

Question-3

Probability of finding the time for both the events = 0.4
Cost of single ticket : Rs 2000/-
Cost of Combined ticket : Rs 3000/-
Value of Going to the movie : Rs 2000/-

Let us have two cases P & Q such that
For case P, buy the movie ticket
For case Q, buy the concert ticket
$\bar{P}$, don't buy movie ticket
$\bar{Q}$, don't buy concert ticket

$P(P) = P(Q) = 0.4$
$P(\bar{P}) = P(\bar{Q}) = 0.6$

Below are some of the cases:

1) P & Q are individual
we have,
cost = 2000 + 2000 = 4000
value = 2000 + 2000 = 4000
Their differences = 0 & prob = 0.4 * 0.4 = 0.16

2) P & Q are combined
We have,
cost = 3000
value = 2000 + 2000 = 4000
Their differences = 1000 & prob = 0.4 * 0.4 = 0.16

3) P & $\bar{Q}$ are combined
We have,
cost = 3000
value = 2000
Their differences = -1000 & prob = 0.4 * 0.6 = 0.24

4) P & $\bar{Q}$ are individual
We have,
cost = 2000
value = 2000
Their differences = 0 & prob = 0.4 * 0.6 = 0.24

5) $\bar{P}$ & Q are individual
cost = 2000
value = 2000
Their differences = 0 & prob = 0.6 * 0.4 = 0.24

6) $\bar{P}$ & Q are combined
We have,
cost = 3000
value = 2000
Their differences = -1000 & prob = 0.6 * 0.4 = 0.24

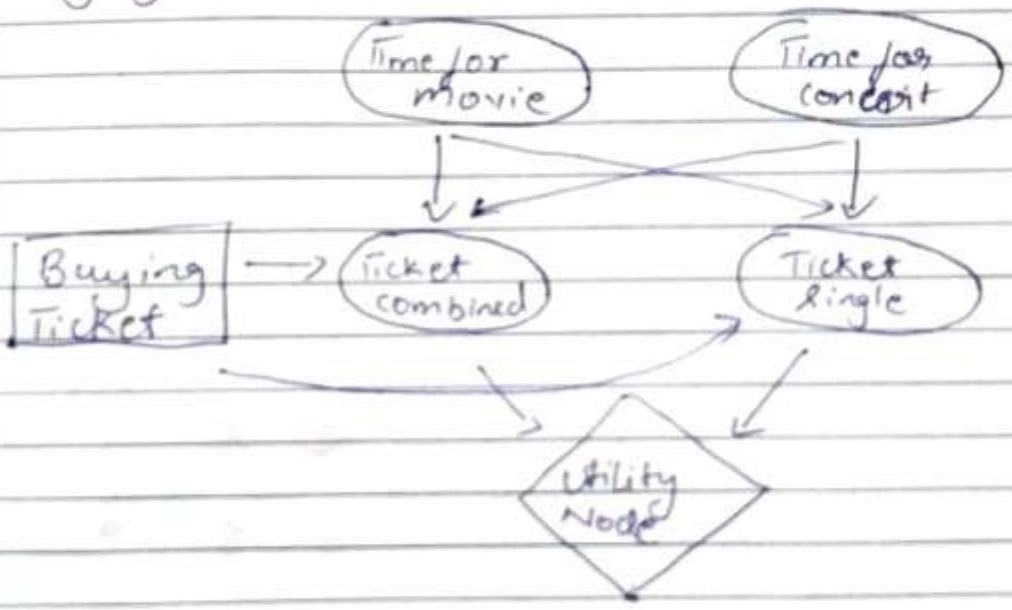
7) $\bar{P}$ & $\bar{Q}$ are individual
We have,
cost = 0
value = 0
Their difference = 0 & prob = 0.6 * 0.6 = 0.36

8) $\bar{P}$ & $\bar{Q}$ are combined
We have,
cost = 3000
value = 0
Their differences = 3000 & prob = 0.6 * 0.6 = 0.36

Let Now calculate Expected Value for buying a combined ticket.

$$E.V(CT) = (0.16 * 1000) + (0.24 * -1000) + (0.24 * -1000) + (0.36 * -3000)$$
$$= -1400$$

Below is the Decision Network for buying the tickets.



Below is Decision Tree for Buying Tickets