ASSIGNMENT -1 WUMPUS WORLD

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AIM: We are aiming for grade B. Q-Learning Algorithm based agent to play Wumpus World game.

APPROACH:

- As we are aiming for grade B, we have implemented the Q-Learning algorithm that returns an action that has the highest reward value in its previous game.
- A Location(x,y) based approach is used to kill the WUMPUS.
- A greedy implementation of the Q-Learning Algorithm is used, i.e the updating of the Q-table is made purely based on the reward given to the agent's action as shown in equation 1.

$$q[state][action] = q[state][action]+reward \quad (1)$$

IMPLEMENTATION DETAILS:

- Two new buttons are added to the GUI. They are :
    1. Run New Map Simulation : To run a predefined number of simulations of the current map .
    2. Refresh Memory : To initialize the statistical values i.e q table and n table, so that the values of the old map are removed and the agent would be ready to be trained on a new map.
- The number of simulations that are run behind the scenes are presented in the below table

Map Number	1	2	3	4	5	6	7
Number of Simulations	50	75	60	40	35	50	50

Execution Instructions :

- When running on a new map , the execution must be handled in the following steps.
  Step 1: Press **NEW GAME**
  Step 2: Press **REFRESH MEMORY**
  Step 3: Press **RUN NEW MAP SIMULATION**
  Step 4: Press **NEW GAME**
  Step 5: Press **RUN SOLVING AGENT**

RESULTS:

Table presented below explains the results obtained.

Map Number	No of Simulations	Score After simulation
1	50	984
2	75	972
3	60	954
4	40	978
5	35	-36
6	50	982
7	50	975