Artificial Intelligence
Fall 2020
Lab-8

The objective of this lab is to: Implement Wumpus World Game

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Instructions

Don't share your code with anyone until evaluation.

Plagiarism will result in penalties.

Your code must run without errors.

Your code must produce a generalized solution which can solve problem of any size.

The evaluation will be based on viva. Failure to explain your own code will result in penalties.

You are required to submit a single zip file BCSF20M001.zip. Failed to follow naming format will result in no grade.

Implement a Wumpus World Agent

There is an agent who can move in $n \times n$ grid (one step at a time). Cells can have **wampus**, **pit**, **Gold**, or nothing. Smell around the wumpus and breeze around the pit. The agent will be killed if he enters the wampus cell. The agent can kill a wampus if he shoots an arrow (provided the wampus is in the adjacent cell faced by the agent). The objective of the agent is to get the Gold (not to kill wumpus). Following are the rules.

1. Let number of pit be p where $p \geq 0$ as per the setting of environment. The agent did not know the value of p.
2. Let number of wumpus be w where $w \geq 0$ as per the setting of environment. The agent did not know the value of w.
3. Let number of arrow be m where $m \geq w$ as per the setting of environment. The agent can see the value of m.

4. Agent can move in a cell adjacent to its current location (one cell only). Only horizontal and vertical movement is allowed. No diagonal movement. Any attempt to get down the $n \times n$ grid (corner moves) gives him a bump, and he remains in the same cell.
5. Cost of actions

Attempt to move up, down, left, right	-1
Shoot arrow	-10
Grab Gold	150

6. Agent is always in cell (1,1) at the beginning. No pit or wumpus in the cell (1,1)
7. Agent dies if it enters a cell of live wumpus (Game over). Dead wumpus disappears. Wampus screams after being hit by an arrow, and the same can be heard by the agent using the sensor.
8. Agent entering in pit gets stuck. This is again Game over.
9. There is **only one gold**.
10. Environment is static.
11. Agent can move using GO up/down/left/right
12. Agent can focus arrow by SHOOT up/down/left/right

Logistics

1. Code should take a file as a parameter to set the environment (say "env1.txt").

   First line specifies the size of the grid (if the grid is 25 × 25 first line is 25).

   Second line specifies the number of arrows (say 3).

   Every subsequent line specifies one pit/gold or wumpus location.

   "p 2 5" specifies a pit at (2,5) location

   "w 3 7" specifies a wumpus at (3,7) location

   "g 8 4" specifies a GOLD at (8,4) location

A valid environment file is as below:

20

5

p 5 5

w 2 2

p 4 2

p 6 2

g 10 5

w 6 3

w 9 9

p 11 3

Here agent is in 20 × 20 tile with 5 arrows. There are 4 pits and 3 wumpuses. Gold is at (10,5)

2. Code should output the moves taken by the agent.