Wumpus-Lite v0.18a Model-Based

Dimensions: 4x4

Maximum number of steps: 50

Number of trials: 10000

Random Agent Location: false

Random number seed: 42

Output filename: wumpus_out.txt

Non-Deterministic Behavior: false

Total Score: 3556162

Average Score: 355.6162

There are no fancy conditional probabilities. This is simply building a model based on the immediate prior action as it explores.

Flags are stored in a hash map in the `Grid` class and updated by a `Utils` helper class (modified from existing work on github).

The model of the world is stored and updated in the `Model` class and is initialized as a 4 x 4 grid. All grid cells are initially marked safe for the Wumpus and Pit flags:

```
W:0,P:0 W:0,P:0 W:0,P:0 W:0,P:0

W:0,P:0 W:0,P:0 W:0,P:0 W:0,P:0

W:0,P:0 W:0,P:0 W:0,P:0 W:0,P:0

W:0,P:0 W:0,P:0 W:0,P:0 W:0,P:0
```

The initial previous action (of which there is none since we just started) is initialized as a NO_OP. This is the ONLY place NO_OP appears in the architecture. It is never actually used as a model-based decision/action rule.

The orientation of the agent is based on an `Orientation` class, which is modeled after the `Action` class. The cardinal directions North is 0, East is 1, South is 2, and West is 3. The facings Right is 0 and Left is 1. There is no diagonal orientations or operations.

All grid cells are updated as the Agent receives percepts after TURN_RIGHT or TURN_LEFT and GO_FORWARD. It marks adjacent cells as either safe or flags it as having a Pit or a Wumpus based on breeze and stench percepts. E.g.:

```
W:O,P:O W:O,P:O W:O,P:O W:X,P:O

W:O,P:O W:O,P:O W:O,P:O W:O,P:X

W:O,P:O W:O,P:X W:O,P:O W:O,P:O

W:O,P:O W:O,P:O W:O,P:O W:O,P:O
```

The key decision here is the agent only GO_FORWARD is the adjacent cell (in front of the agent in its current orientation) is still marked "safe." If there is nothing to do, instead of doing NO_OP the agent randomly 50/50 turns right or left.

If it percepts glitter it GRABS and the game ends.

If it hits a wall, like in the simple reflex case it randomly turns right or left with a 50/50 probability. If I had more time, I was going to add mapping the wall and using adjacent flags in this step. This would have improved the score.

The agent never shoots…this action lowers the average score significantly and I never got it to work. In this vein as of this version the scream percept is not really used.