Hamza Bakhadda
Teammates:
Fahd El Mamoun
Jamal Khalil
CSC 4301 01

Report of Project 2: Wumpus World Game

Introduction:

The wumpus universe is a series of interconnected chambers connected by tunnels. The terrifying wumpus, a creature that devours anybody who enters its chamber, is hiding somewhere in the cave. An agent can shoot the wumpus, however the agent only has one arrow and can only fire from a adjacent room. There are some rooms that have bottomless pits that will capture anyone who enters them . The environment is a 4x4 grid, and the only thing that makes it enjoyable is the chance of discovering gold while attempting to avoid or eliminate The Wumpus.

Key Predicates, and the meaning of the Variables

| Predicate	Use
Dynamic	Introduces variables Breeze, Stench, WumpusLocation, pitLocation, goldLocation, and agentLocation. Limits the world to a 4x4 grid.
Safe([X,Y])	Checks if room with coordinates X and Y is safe or not.
Pit([X,Y])	Checks if room with coordinates X and Y contains a pit or not.
Wumpus([X,Y])	Checks if room with coordinates X and Y contains the Wumpus or not.
Breeze([X,Y])	Checks if there is a breeze in the room with coordinates X and Y.
isAdjacent([X,Y])	Checks if Room A is adjacent to Room B.
Stench([X,Y])	Checks if there is a stench in the room with coordinates X and Y.

First Scenario

Stench	**Wumpus**	Stench	Breeze
	Stench	**Gold** Breeze	Pit
	Breeze		Breeze
Agent (Start) Breeze	Pit	Breeze	

Snapshots of 1ˢᵗ Scenario

⚙ start, *safe*([1,1]). ⊕ ━ ⊗

true   1

⚙ start, *pit*([2,1]). ⊕ ━ ⊗

Breeze in [3,1]
Breeze in [1,1]
Breeze in [2,2]
Pit found.
true   1

⚙ start, *wumpus*([2,4]). ⊕ ━ ⊗

Stench in [3,4]
Stench in [1,4]
Stench in [2,3]
true   1

⚙ start, *breeze*([4,2]). ⊕ ━ ⊗

Breeze in [4,2]
true   1

⚙ start, *wumpus*([4,2]). ⊕ ━ ⊗

No Stench in [3,2]
No Stench in [4,3]

?- start, wumpus([4,2]).

⚙ start, *gold*([1,2]). ⊕ ━ ⊗

No Gold found
true   1

?- start, gold([1,2]).

Second Scenario

Stench	Wumpus	Stench Breeze	
	Stench Pit Breeze	Pit Breeze	Breeze Gold
	Stench Breeze	Breeze	Breeze
Agent (Start) Breeze	Pit	Breeze	Pit

Snapshots of 2ⁿᵈ Scenario

start, *gold*([4,3]).

```
Gold found
true                                                    1
```

start, *breeze*([2,3]).

```
Breeze in [2,3]
true                                                    1
```

start, *pit*([2,2]).

```
Breeze in [3,2]
No Breeze in [1,2]
Breeze in [2,3]
No Breeze in [2,1]
false
```

start, *safe*([1,3]).

```
true                                                    1
```

start, *stench*([4,3]).

```
No Stench in [4,3]
true                                                    1
```

```
?-  start, stench([4,3]).
```

Third Scenario

Stench			Breeze
Wumpus	Stench	Breeze	Pit
Pit Stench	Breeze		Breeze
Agent (Start) Breeze	**Gold**	Breeze	Pit

Snapshots of 3rd Scenario

```
start, gold([2,1]).
Gold found
true                                          1
```

```
start, pit([4,1]).
Breeze in [3,1]
Breeze in [4,2]
Pit found.
true                                          1
```

```
start, pit([2,1]).
Breeze in [3,1]
Breeze in [1,1]
Breeze in [2,2]
false
```

```
start, wumpus([1,3]).
Stench in [2,3]
Stench in [1,4]
Stench in [1,2]
true                                          1
```

```
?- start, wumpus([1,3]).
```

```
     start, gold([2,1]).                              ⊕ ━ ⊗
Gold found
 true                                                          1
     start, pit([4,1]).                               ⊕ ━ ⊗
Breeze in [3,1]
Breeze in [4,2]
Pit found.
 true                                                          1
     start, pit([2,1]).                               ⊕ ━ ⊗
Breeze in [3,1]
Breeze in [1,1]
Breeze in [2,2]
false
     start, wumpus([1,3]).                            ⊕ ━ ⊗
Stench in [2,3]
Stench in [1,4]
Stench in [1,2]
 true                                                          1

?-  start, wumpus([1,3]).
```

Limitations and remedies:

We did three experiments in this world. we only succeeded to win the game twice out of three times as shown in the screenshots above.
We couldn't succeed each time since this agent is too human-dependent, so a step in the wrong path would only lead to a defeat.
To remedy this kind of problem in the future, this logical agent should have the ability to take the best decision without relying on the human.