Project #2

By

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**Introduction**

In this project we will code a logical agent for the Wumpus game.

The goal is to create a single iteration of a logical agent that, when given a starting position and ASKED about a single action (room safety, shooting, or picking up gold), will respond.

Let’s break down how does the code work:

First the cells: the cells are written in this format (Y,X) Y for the row and X for the column

**Map generation:**

we set a limitation of 5x5:

A screenshot of a computer

Description automatically generated with medium confidence

This function will limit the playground and will also check if the player/breeze/stench is inside the map

**Element generation:**

Text

Description automatically generated

Generate the element on the map with the given coordinate:

\*pos is for the start coordinates

After generation we will have a map that looks like this:

Text, calendar

Description automatically generated

This is just a particular case, we can put several pits, golds and Wumpus in one map and modify the position of the elements.

**Adjacent function:**

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Description automatically generated

Just initiate 4 variables Xminus , Xplus, Yminus , Yplus, which will help us find the adjacent cases to a certain case

**Stench function:**

Text

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A stench case is a case that is adjacent to the Wumpus that’s why we set all the cases that are adjacent to Wumpus to be stench by taking Wumpus function coordinates and add/removing 1 in X then Y.

**Breeze function:**

**Text

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Like the Stench function, A breeze case is a case that is adjacent to a pit that’s why we set all the cases that are adjacent to the pit to be breeze by taking pit function coordinates and add/removing 1 in X then Y.

**Nextsafe function:**

Safe(X,Y):

Text

Description automatically generated

Check if a given position is safe, the only two ways to be safe:

- That you are not standing on a pit, or you are not standing in the Wumpus case.

Or

-you are not standing on a pit and the Wumpus is dead.

Condition(A,B)

Text

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Condition is true if the coordinate it is inside the playground and safe thus, we print the coordinate, and he can move to the coordinate. If it is not safe or isn’t in the playground it print that he can’t go there

Nextsafe()

Text

Description automatically generated

We take the initial position, and we apply the condition to it adjacent cases by the method used in breeze and stench. It will iterate until it find all the possible adjacent positions (you can pass the position by pressing ‘;’ key and it will print false if the position isn’t valid)

**shootwumpus()**

Text

Description automatically generated

Check if the Wumpus is not dead and is the player standing in a position where he can shoot the Wumpus (is the case stench?). We didn’t take in consideration where the player is facing because it wasn’t in the requirement of the project.

**Grabgold():**

**Text

Description automatically generated**

Check is the position of the player matching with the position of the gold therefore can he grab the gold or not.

**1st Experiment:**

We will use this map with these elements:

Text

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Nextsafe() function:

Text, letter

Description automatically generated

Grabgold() function:

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Description automatically generated with medium confidence

Shootwumpus() function:

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Description automatically generated

**2nd Experiment**

**Text

Description automatically generated**

Nextsafe() function:

Text

Description automatically generated

Grabgold() function:

A picture containing text, screenshot

Description automatically generated

Shootwumpus() function:

A picture containing text

Description automatically generated

**3rd experiment:**

**Text

Description automatically generated**

Nextsafe() function:

Text, letter

Description automatically generated

Grabgold() function:

Text

Description automatically generated with low confidence

Shootwumpus() function:

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Description automatically generated

**4th experiment**

**Text

Description automatically generated**

Nextsafe() function:

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Description automatically generated with medium confidence

Grabgold() function:

A screenshot of a computer

Description automatically generated with low confidence

Shootwumpus() function:

A screenshot of a computer

Description automatically generated with low confidence

**5th Experiment**

**Text

Description automatically generated**

Nextsafe() function

Text, letter

Description automatically generated

Grabgold() function

A picture containing text, screenshot

Description automatically generated

Shootwumpus() function

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Description automatically generated

**Analysis:**

1st map:

The player can only move to (1,2) and (2,1) because other options are wall and outside the map.

They cannot grab the gold because the gold is in case (5,5). In addition, shooting the Wumpus is impossible because the player is not in an adjacent case (1,1) for the player and (5,3) for the Wumpus

2nd map:

Here the player has only one safe move (1,5). He cannot move to (2,4) because it contains a pit

and cannot move to (1,3) because the Wumpus is in there and the Wumpus is alive and finally (0,4) is outside the map.

The player cannot grab the gold as they are in separate cases (1,4) for the player and (3,2) for the gold

and finally, the player can shoot the Wumpus because the player is in an adjacent room.

3rd map:

The player has all the adjacent cases filled with pits except the (3,2) which is the only safe move here

and they can grab the gold because the player and the gold are in the same case (3,3).

Moreover, the player cannot shoot the Wumpus because it isn't in an adjacent case

4th map

The player is once again having 3 adjacent cases filled with pits and one with the Wumpus

because the Wumpus is alive therefore there is no possible moves for the player.

The player can grab the gold because he has the same coordinates as the gold.

And he can shoot the Wumpus because he is in an adjacent case.

5th map

Like the 4th map, the player is once again having 3 adjacent cases filled with pits and one with the Wumpus, but the Wumpus is dead here. Therefore the (3,2) case is safe, and the player can move there.

He can grab the gold because the player shares the same coordinates as the gold.

But he cannot shoot the Wumpus even though he is in an adjacent case because the Wumpus

is already dead.

**Restrictions**

-The first limitation that I encountred is the use of predicates “AdjecentTo” which I replaced by directly implementing it in the desired code (breez,stench,nextsafe).

-I also used direct coordinate (X,Y) in stead of R(X,Y) because it took R as an argument that didn’t want to compile

-I avoided the use of list during the function nextsafe() and directly printed the possible coordinates

-I also avoided the use of the given code by alexroque91 and leveraged another code instead: <https://github.com/Exctues/Wumpus/blob/master/wumpus.pl>

I fortunately found solution for every problem that encountered but I didn’t do enough debugging (only 5 hours) so maybe there is some error that I didn’t find. But for the requirement of the project no querry can make the code fail.

*PS: You might find the final code slightly changed in comparison of the code images in the report, but these are purely aesthetic or small and insignificant changes*