CS 171 – Introduction to Artificial Intelligence

Programming Assignment: Wumpus World AI

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I. Introduction

In this programming assignment, you will implement a Wumpus World AI agent, which should be able to solve a Wumpus World game. You will be given a code base and asked to edit one or more files from the shell. Your agent should be able to read percepts and act rationally. Your grade will be determined by your agent's performance measure. At the end of the quarter, your agent will compete against your classmates' agents. Extra credit will be given for high scores as described on the class website. You will also be required to write a detailed report.

Please let me know if you encounter any problems or bugs.

II. Overview

A series of steps to complete this programming assignment:

1. Prepare a UNIX-like system environment, see Section III.
2. Get and Understand Code base (shell).
3. Program AI.
4. Build your AI.
5. Test your AI.
6. Write your Project Report.
7. Pack your code for submission.
8. Submit your submission archive to the EEE dropbox.

III. Prerequisites

Our automated tools are developed in a UNIX-like system environment; therefore, you should setup a UNIX-like environment to take advantage of these tools. A UNIX-like system environment is recommended for automated compilation using Makefile. Supported UNIX-like environments are:

– Openlab
– Linux
– Mac OS X
– Microsoft Windows + Cygwin
– Microsoft Windows + MinGW

To use Openlab:

1. For Windows: Download Putty from:
   https://the.earth.li/~sgtatham/putty/latest/x86/putty.exe
   Then use putty to connect to openlab, UCI instructions available:
   http://laptops.eng.uci.edu/instructional-computing/incoming-students/using-linux/how-to-configure-xming-putty

2. For Mac: run the command 'ssh openlab.ics.uci.edu' from your command line.

Extra Information about Openlab:

- http://www.ics.uci.edu/~lab/students/#unix
- https://www.ics.uci.edu/computing/linux/hosts.php

Extra Information about UNIX:

- https://cgi.math.princeton.edu/compudocwiki/index.php?title=Documentation_and_Information:Getting_started_with_Linux

Extra Information about modules:

- https://www.ics.uci.edu/computing/linux/modules.php

You are responsible for making sure your code compiles with our scripts on OpenLab.

IV. Game Mechanic:

A. Performance Measure:

- -1 point for any action.
- Extra -10 points for shooting the arrow.
- +1000 points for climbing out with the gold.
- -1000 points for dying.

B. Environment:

- The game board will be either be 4x4, 5x5, 6x6, or 7x7.
- There will be one Wumpus.
- There will be one Gold.
- The Wumpus or the Gold will not be at (0,0).
- There can be pits.
- There is a 20% of a pit at every room besides (0,0).
- The agent will die by stepping into a pit.
- The agent will die by stepping into the room with the Wumpus.
- The agent only has one arrow.
- The arrow will go until it hits the wall or the Wumpus.
- The agent will perceive a stench in the tile containing the Wumpus.
- The agent will perceive a stench in tiles adjacent to the Wumpus.
- The agent will perceive a breeze in the tiles adjacent to a pit.
- The agent will perceive a glitter in the tile containing the gold.
- The agent will perceive a scream when the Wumpus dies.
- The agent will perceive a bump when the agent runs into a wall.
- The agent will start at (0,0) facing right.

C. Actuators:

- Turn left
- Turn right
- Grab (the gold)
- Shoot (the arrow)
- Climb (need to be at (0,0) to have an effect)

D. Sensors:

- Stench
- Breeze
- Bump
- Scream
- Glitter

V. Possible Issues

A. Setting Up the System PATH

The most common issue, especially for Microsoft Windows users, is related to setting up the system PATH. Basically it is to find your "Environment Variables" in your "System Properties" or "Advanced System Settings", and add the folders that contain the executables of your tools to the PATH variable. If you get errors like "not recognized as a command" or "command not found" on some software you already installed, it is likely that your system PATH is not configured correctly to include the path to its executable(s).

B. Fixing File Permissions

If you get a "permission denied" error running any of our scripts, please check if you have execute permissions for the .sh BASH scripts. In a UNIX-like environment, to make these scripts executable, you need to navigate to the folder that contains those scripts, and run **chmod +x *.sh**.

C. Setting Up a UNIX-like Environment in Microsoft Windows

You will need Cygwin (https://www.cygwin.com) or MinGW (http://www.mingw.org) to create a UNIX-like environment in Microsoft Windows to run BASH scripts and use the Makefile. Check their official websites for installation instructions.

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