CSE 604: Artificial Intelligence

Project 2

Deadline: Monday, 14 July, 2025

Mid-project eval: 7 July

Overview

This project consists of developing and implementing a computer program that can simulate the navigation of a logical agent in a given environment. The project will help you understand logical representation and logical inference.

Wumpus World Description

The **Wumpus world** is a cave consisting of rooms connected by passageways. Lurking somewhere in the cave is the terrible Wumpus, a beast that eats anyone who enters its room. The Wumpus can be shot by an agent, but the agent has only one arrow. Some rooms contain bottomless pits that will trap anyone who wanders into these rooms. The only mitigating feature of this bleak environment is the possibility of finding a heap of gold. The full PEAS description of the Wumpus world is given in **Section 7.2 of Russell and Norvig's AI textbook**.

For this project, you will use the exact same specifications as the one given in the book, with **one exception**: instead of a small grid, you'll be using a larger **10 X 10 grid**.

Project Requirements

- Your AI agent must be able to navigate the Wumpus world using **either Propositional or First Order Logic (or both)**.
- Your program must be able to **load different environments** where the position and numbers of pit, gold, Wumpus can vary. You should have provisions for **randomly generated environments** and **pre-specified environments** (a sample file format is provided)
- The program must have the following components
    - A proper **representation** of the environment and knowledge base
    - Correct use of **logic** (Propositional or FOL)
    - Use of **logical inference** (resolution, forward and backward chaining)
    - You may use **probabilistic reasoning** as well
    - A **loop detection and avoidance** mechanism to make sure that the agent doesn't fall into an infinite loop.
    - An **interface** that shows all the activities as well as the state of the **agent's "mind"** (i.e., its knowledge base and logical thought process)

Grades distribution

Representation of the environment and knowledge base	15%
Ability to load different environments	15%
Proper use of logic, and logical inference	30%
Loop detection and avoidance	10%
Functionality of user interface (i.e. what info is being provided)	20%
Aesthetics of user interface (i.e. how good it looks)	10%

There will be a **mid-project evaluation** where 25% of the marks of the project will be assigned. The remaining 75% will be assigned on the final project evaluation.

Deadline

The project demonstration will be checked during class time on **14 July, 2025**. No submissions after the deadline will be accepted. Absolutely **no exceptions** will be made. You will send me the links to your GitHub pages. Mid-project evaluation will be done on 7 July and through GitHub activity monitoring.

Academic Integrity Policy

The code of the project **must be your own.** Any libraries or code snippets that you use from other sources must me mentioned explicitly. Any kind of academic dishonesty will result in you getting a zero for this project, and possibly further repercussions.