**Report**

**CS420 - Artificial Intelligence**

**Project 2 – Logical Agent**

1. Introduction:

This is the report of our team for project 2 – Logical Agent, in course CS420 - Artificial Intelligence.

* Team members:
  + 21125007 - Phạm Vũ Minh Giang
  + 21125028 - Lê Việt
  + 21125046 - Nguyễn Tuấn Khanh

1. Work assignments:

* Table of contributions:

| Content | Contributor | Completion rate |
| --- | --- | --- |
| Agent and Game controller | Viet | 100% |
| UI | Khanh | 100% |
| Test generating | Giang | 100% |
| Demo | Khanh | 100% |
| Report | All team members | 100% |
| Discussing | All team members | 100% |

* Self-evaluation:
  + Giang: In this project, I do some side tasks and mainly support my teammates, so there’s not much to mention about my performance.
  + Việt: In this project, my role involved developing an agent tasked with discovering an optimal solution path. Although there were instances where the agent had to resort to random actions, overall, the agent demonstrated the ability to identify and pursue an optimized solution.
  + Khanh: In my role as a GUI developer on the AI project, I successfully designed and implemented an intuitive and user-friendly interface that enhances the overall user experience. I created easy-to-follow video demos for our AI project, helping users understand its features and benefits more effectively.

1. Implementation and Algorithm:

3.1 Requirements:

- Environment: Python 3.11.7

3.2 Algorithm:

* Using FOL to complete the problem.
* The agent’s logic is described as follows: The order of priority is from top to bottom.
  1. Try to explore all the safe rooms.
  2. Try to shoot the Wumpus to find out more information.
  3. If there are not any possible move, trying to move to the unknown room which is the nearest to [0, 0] (for score optimization)
* How the agent deducts the information:
  1. If a room has no concepts, then all the rooms around it are also safe.
  2. If two rooms are adjacent to a third room, and one of the two adjacent rooms emits a percept of Stench while the other does not, then the third room is not occupied by the Wumpus. Likewise, if one of the adjacent rooms exhibits a Breeze while the other does not, the third room is not a Pit.
  3. A room is safe if one of the surroundings does not contain any concept.
  4. If a room is Stench, shooting unknown surroundings:
     + Killed a Wumpus => this room is safe
     + Did not kill a Wumpus => using (2) rule

1. Experiments:

4.1. Test cases:

- In general, our agent passed 6/10 cases.

- Each case has a unique structure for 2 main reasons:

1. Finding a way to escape.
2. Finding a way with the highest score.

4.2. Video demo:

<https://drive.google.com/file/d/1hJD_B7perfANQq2kyRv3WIHvPuOUorwm/view?usp=sharing>