VIETNAM NATIONAL UNIVERSITY

UNIVERSITY OF SCIENCE

FACULTY OF INFORMATION TECHNOLOGY

PROJECT 02

MEMBERS

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Subject: Artificial Intelligence

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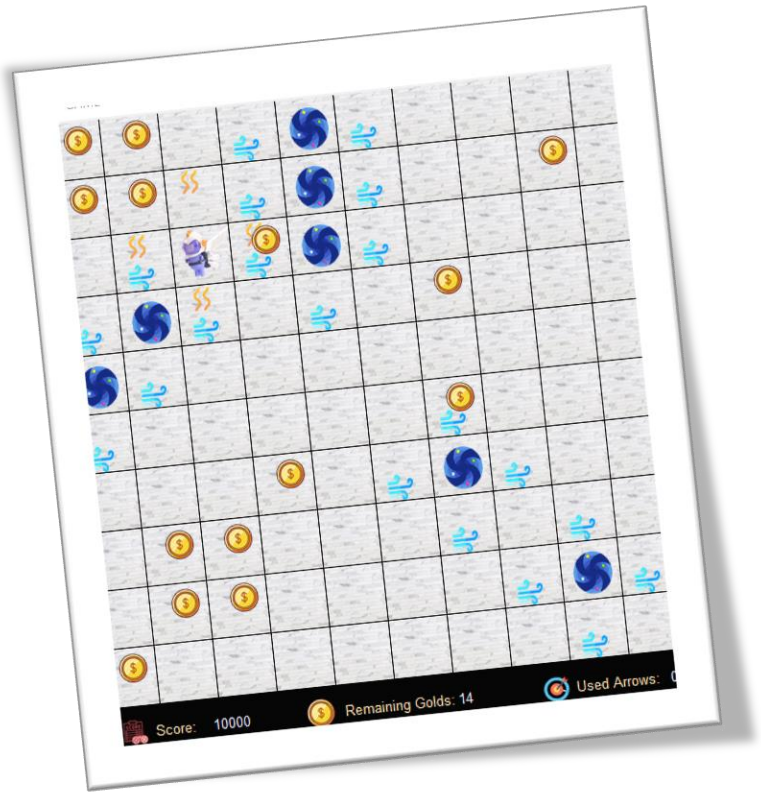
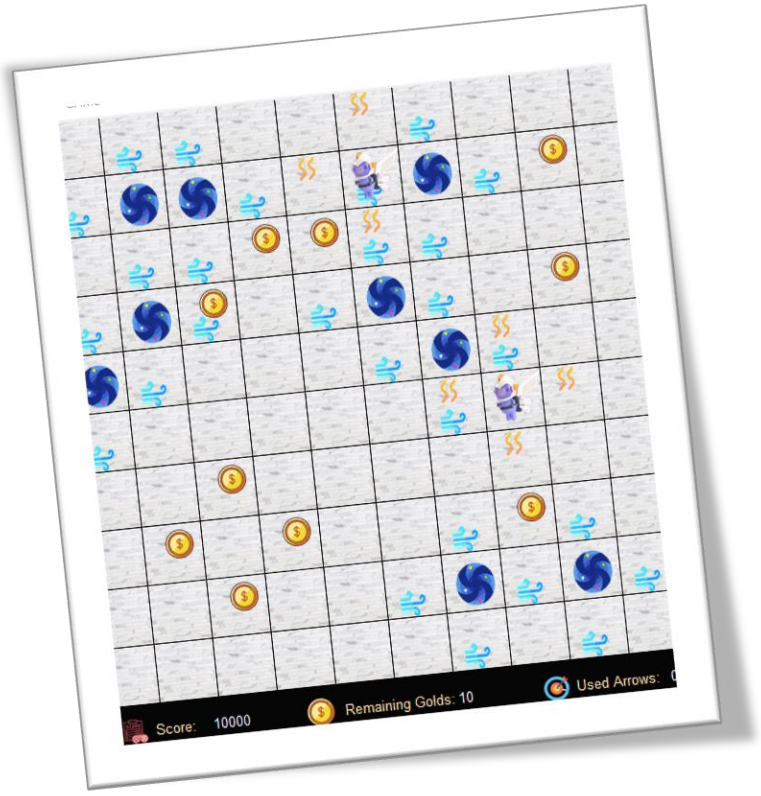
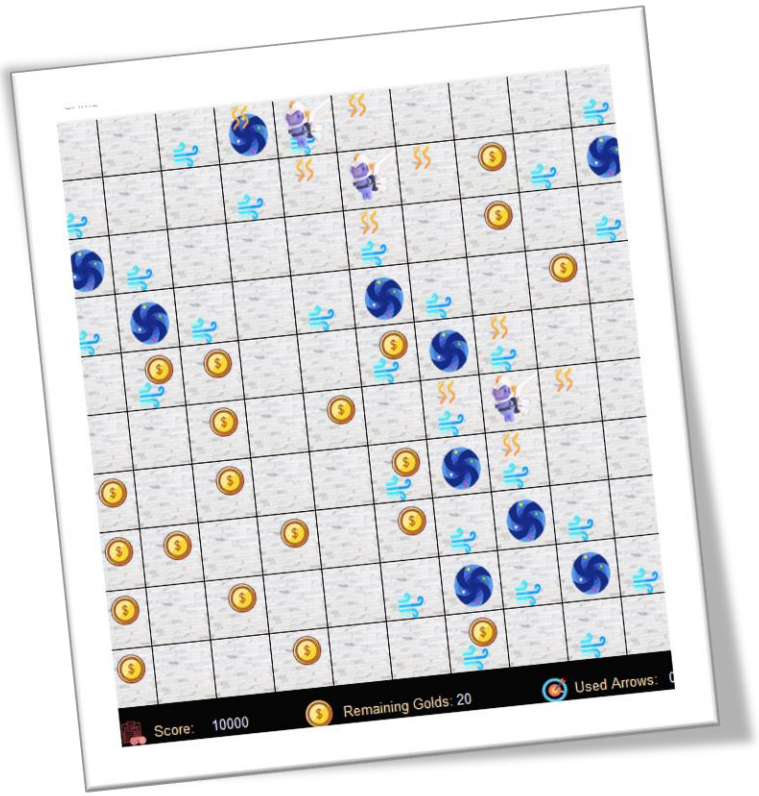
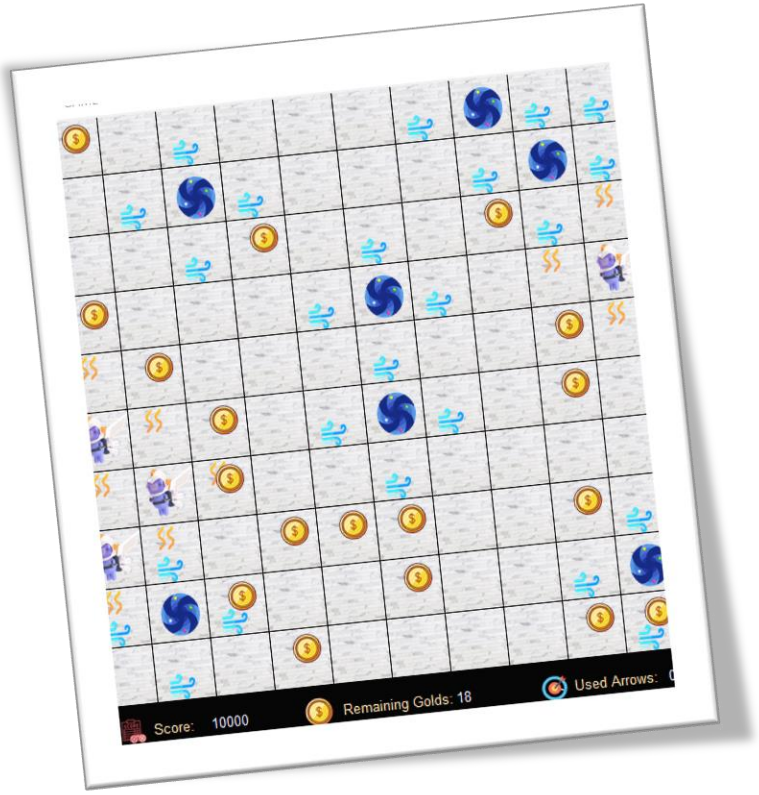
INTRODUCTION

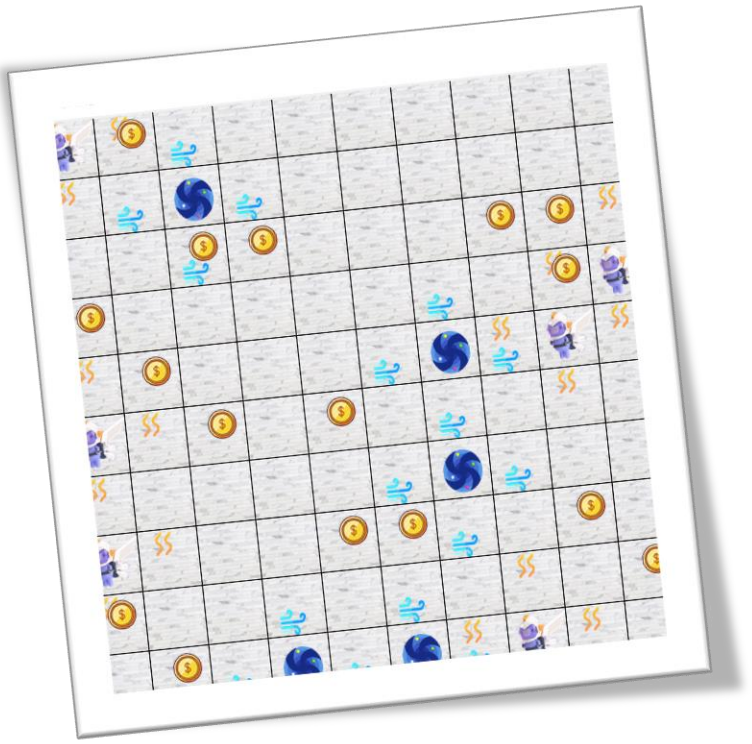
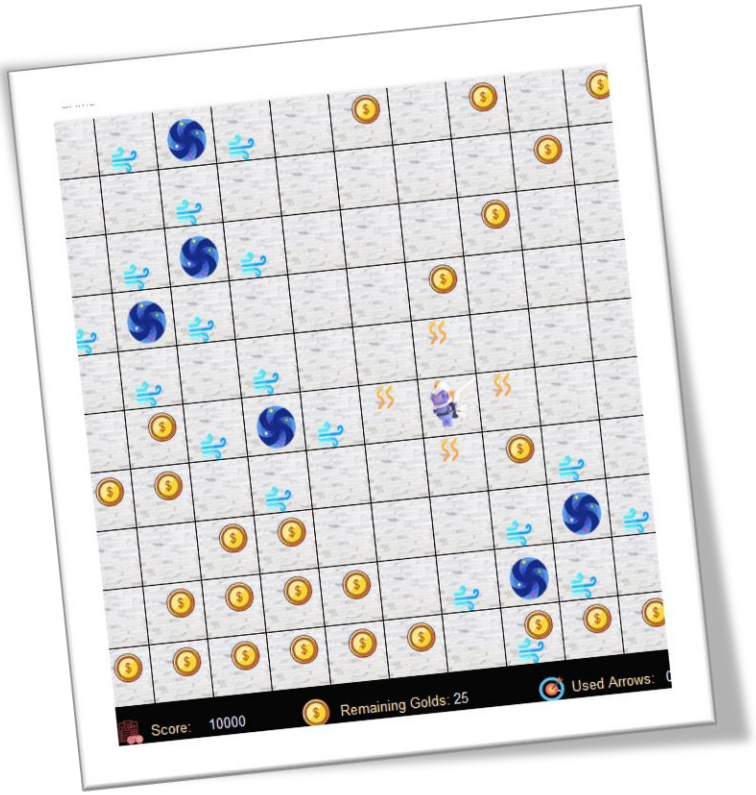
- ☆ **Game description:** Entertainment.
- ☆ **Supports:** macOS, Linux and Windows.
- ☆ **Language:** English.
- ☆ **Characters:**

AGENT	
WUMPUS	
GOLD	
PIT	
STENCH	
BREEZE	
CAVE	

☆ Maps:

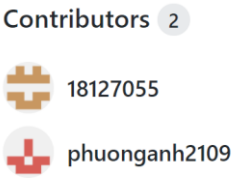
	MAP
1	 Score: 10000 Remaining Golds: 14 Used Arrows:
2	 Score: 10000 Remaining Golds: 10 Used Arrows:

3	 Score: 10000 Remaining Golds: 20 Used Arrows:
4	 Score: 10000 Remaining Golds: 18 Used Arrows:

5	
6	

ENVIRONMENT

- IDE: Visual Studio Code 
- Programming Language: Python 
- GUI Programming toolkit for Python: Tkinter 

- Communication: GitHub 

CHECK LIST

No.	Specifications	Completion Level (%)
1	Finish problem successfully.	95
2	Graphical demonstration of each step of the running process. You can demo in console screen or use any other graphical library.	100
3	Generate at least 5 maps with difference structures such as position and number of Pit, Gold and Wumpus.	100
4	Report your algorithm, experiment with some reflection or comments.	100

ASSIGNMENT PLAN

No.	ID	Name	Job	Time	Completion Level(%)
1	18127039	Lâm Ngọc Phương Anh	Finish problem successfully.	22/08-31/08	95
			Writing report.	31/08	100
2	18127055	Hoàng Nguyên Trúc	Graphical demonstration.	22/08-29/08	100
			Generate maps.	28/08	100
			Writing report.	28/08-31/08	100

ALGORITHM COMMENTS

- **Idea: Implemented in class Agent.**
  1) Agent starting ‘s position is picked randomly from the OK positions of the original map.
  2) Agent will walk step by step to the room marked safe - movable. When agent arrives new room, it will update information about that room (signs of Stench, Breeze or Gold) (`def getPercept`).
  3) From the obtained information and links to the previous steps, Agent will mark its adjacency rooms (If the received sign is Stench, the rooms that are not checked OK will be updated to WUMPUS sign and the same to Breeze) (`def checkIfBSO`).
  4) With the updated information, Agent will filter out rooms that are movable from 4 agent adjacency rooms, prioritizes the rooms which have not been gone through before, if all the Agent adjacency rooms have been gone through → Agent will use A* to find the way to the nearest movable room.(`def agent_path`)
  5) After choosing the path → Agent will choose its action, the priority for actions is: (`def action`)

     + Die when go to room that has Wumpus or Pit.

     + Grab gold if that room has gold.

     + Shoot Wumpus in adjacency room if adjacency room having Wumpus sign which is greater or equal to 2.

     + Climb out of the cave when there is no movable room and agent’s position is cave’s position.

     + Move to others room(next movable room’s location is taken from the path in step 3).

  6) The value return from this step is the (‘d’, ‘g’, ‘s’, ‘c’, ‘m’) and rooms which are correspondent to actions.
  7) Update signs in map related to the room which has action.
  8) All the steps will be repeated until the signs in step 4 is one of these: ‘c’, ‘d’, ‘o’ (‘o’: when agent shoots all Wumpus + grabs all) (`def Play` – is called to execute in class Wumpus_game).
- **Maze archiving structures:**
  - Each room in maze is an 7-element array to store signs.

```
['P', 'B', 'W', 'S', 'G', 'OK', 'V']
```

INSTRUCTIONS

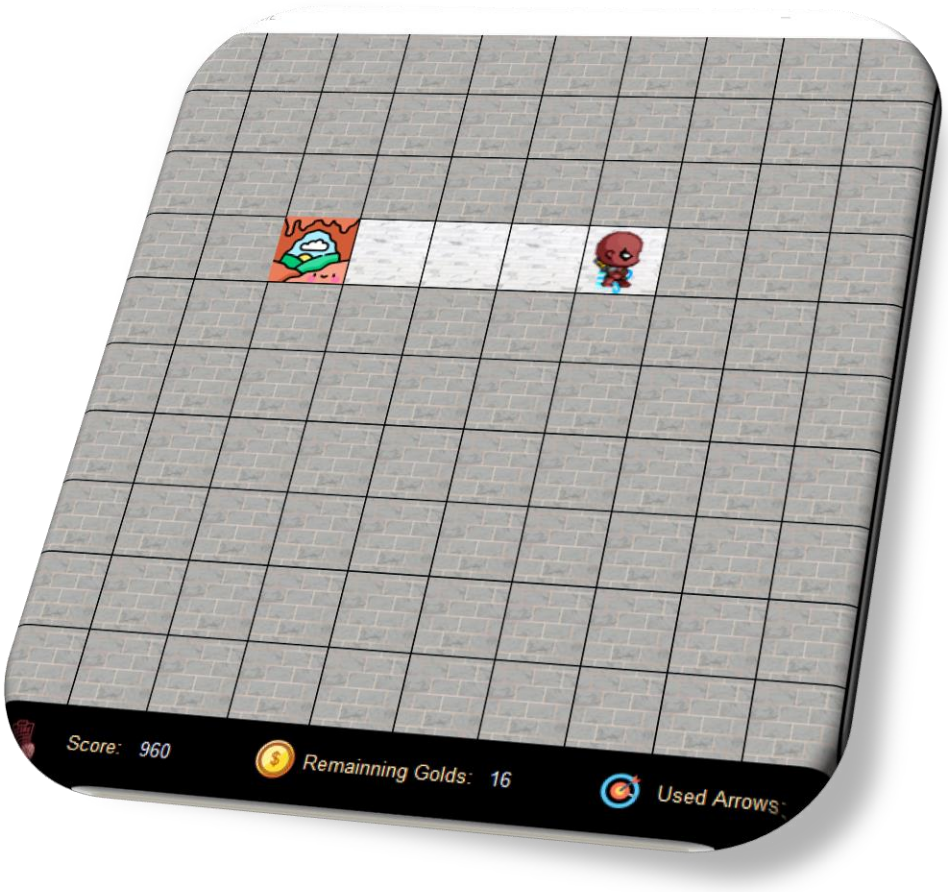
Scenario of new game:

- ☞ Type: **python main.py** and run.
- ☞ Game console will be loaded on screen.

☞ Input file path and click Enter to load game on screen.

☞ You can also click the  button to browse file from file explorer.

☞ Then the Wumpus game will start.



↳ *Scenario of exit game*:

☞ When game ends and agent does not die, the game option console will pop up.

☞ If agent dies, this game option will pop up.

☞ Click QUIT button to exit game.

☞ Click MENU button and the start menu will appear, then you can start Wumpus game again.

REFERENCE MATERIALS

- 🕮 https://wiki.python.org/moin/TkInter
- 🕮 https://www.tutorialspoint.com/python/python_gui_programming.htm
- 🕮 https://www.geeksforgeeks.org/python-gui-tkinter/
- 🕮 https://docs.python.org/3/
- 🕮 CSC14003-Project02