19125102
Phan Đàm Tùng Lâm

The following is my checklist for lab work of Artificial Intelligence course

1. The code is written in Python 3
2. Files are structured properly as required

```
--- 19125102 |___INPUT_____input.txt
              |                                        |__input_2.txt
              |                                        |__input_3.txt
              |                                        |__rj.png
              |___OUTPUT_____results_console.pdf
              |___SOURCE_____main.py
              |                                        |___main_gui.py
              |___DOCUMENT_____Description.pdf
```

3. In INPUT directory, I put here 3 txt input file for 3 maze 6x6, 7x7, 8x8
4. I implemented 4 searching algorithm including Uninformed Cost Search, Iterative Deepening Search, Graph-search Greedy Best First Search, Graph-search A* star
5. For GBFS and A* search, I used Manhattan distance as heuristics
6. I used priority queue for frontier
7. I processed neighbors of each node in ascending order
8. For each algorithm, I printed out the required result:
    -   Expanded cost
    -   Time to escape by traversing expanded nodes
    -   Correct Path
    -   Total cost

Main functions :
Beside implementing algorithm and printing it out on console, I implemented a simple GUI application by running ***python [path to main_gui.py]***
GUI is build based on Tkinter library of Python
In example below, it's a 7x7 maze with starting point 0 and ending point 41
-   Uninformed cost search button
-   Iterative deepening search button
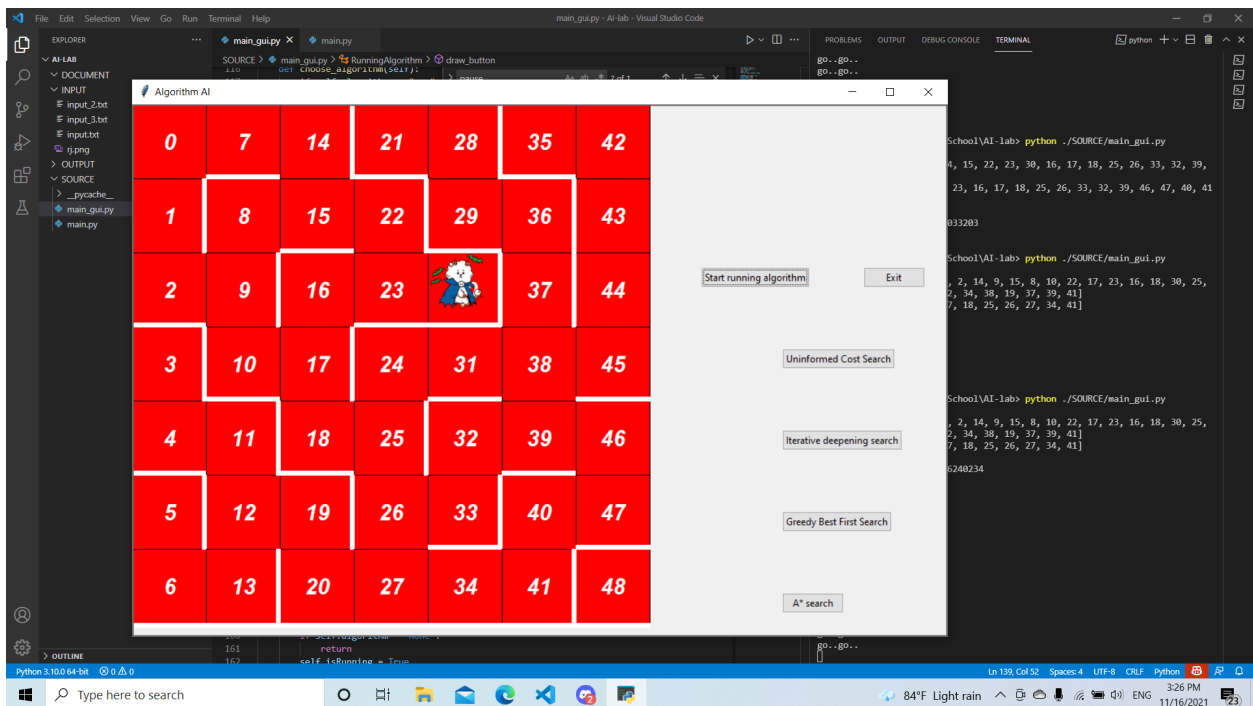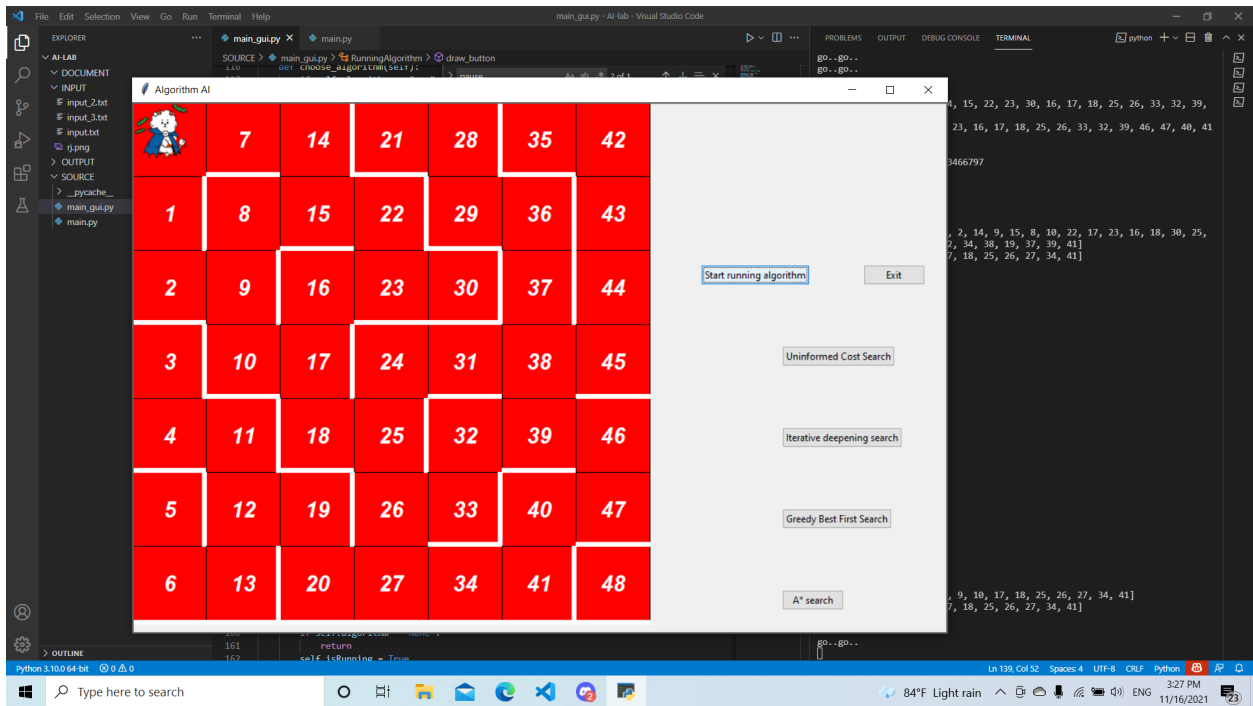-   Greedy best first search button
-   A* search button
    For each of the above buttons, it sets which algorithm to run and print out the result in the console. After pressing one of them, we got expanded nodes, correct paths, cost and time. Press it before pressing "Starting running algorithm" button
-   Starting running algorithm button :
    By pressing this button, the character (that white bear) will move by exploring expanded nodes until it reaches the end node.
-   Exit button :
    Program is destroyed

Screenshot 1 — Algorithm AI

Grid values:
7	14	21	28	35	42
1	8	15	22	29	36	43
2	9	16	23	30	37	44
3	10	17	24	31	38	45
4	11	18	25	32	39	46
5	12	19	26	33	40	47
6	13	20	27	34	41	48

Buttons:
- Start running algorithm
- Exit
- Uninformed Cost Search
- Iterative deepening search
- Greedy Best First Search
- A* search

Screenshot 2 — Algorithm AI

Grid values:
0	7	14	21	28	35	42
1	8	15	22	29	36	43
2	9	16	23		37	44
3	10	17	24	31	38	45
4	11	18	25	32	39	46
5	12	19	26	33	40	47
6	13	20	27	34	41	48

Buttons:
- Start running algorithm
- Exit
- Uninformed Cost Search
- Iterative deepening search
- Greedy Best First Search
- A* search

File Edit Selection View Go Run Terminal Help

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL

Algorithm AI

0	7	14	21	28	35	42
1	8	15	22	29	36	43
2	9	16	23	30	37	44
3	10	17	24	31	38	45
4	11	18	25	32	39	46
5	12	19	26	33	40	47
6	13	20	27	34		48

Start running algorithm   Exit

Uninformed Cost Search

Iterative deepening search

Greedy Best First Search

A* search

```
158
159    def run(self):
160        if self.algorithm == None :
161            return
162        self.isRunning = True
```

g usc
: [0, 1, 7, 2, 14, 9, 15, 8, 10, 22, 17, 23, 16, 18, 30, 25,
, 33, 20, 32, 34, 38, 19, 37, 39, 41]
, 9, 10, 17, 18, 25, 26, 27, 34, 41]

g gbfs
: [0, 1, 2, 9, 10, 17, 18, 25, 26, 27, 34, 41]
, 9, 10, 17, 18, 25, 26, 27, 34, 41]

go..go..
go..go..
go..go..
go..go..

Python 3.10.0 64-bit   Ln 139, Col 52   Spaces: 4   UTF-8   CRLF   Python

Type here to search   84°F Light rain   ENG   3:28 PM 11/16/2021