

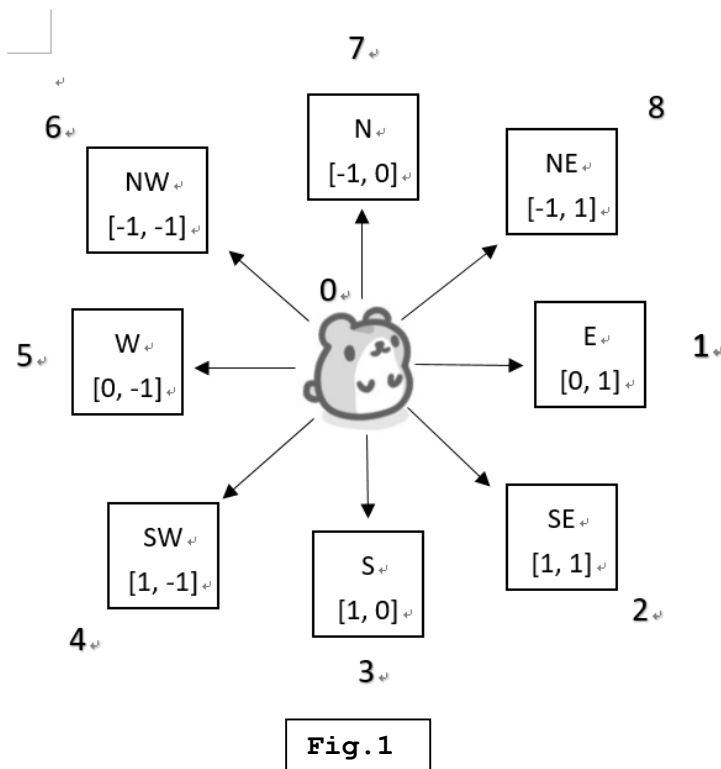
Assignment #2

Data Structures Deadline - 2022/10/28

Upload your assignment to Moodle before 11:59pm.
Please consult with TA if you have any questions.
TA's e-mail: p76111393@gs.ncku.edu.tw

Problem:

Given a 17*17 matrix as a maze. Zeros represent the open path and ones are barriers. The rat would start its journey from the top left (representing [1,0]) and end at bottom right (representing [15, 16]). There are only nine directions to move as shown in Fig.1, and you **must follow the clockwise order to find the possible path, or it will be no scores for not following the order**. The order starts from 0 to 8 (0 representing stand still). Finally, output the journey of the rat and whether it escapes the maze or not.



Input file description:

We will enter file name of the maze (xxx.txt), and the program needs to load the corresponding file and print the loaded maze to the screen as shown in Fig.2.

```
enter filename : maze.txt
1111111111111111
00000000000101001
10100111111001101
10101100001010101
10111010100000001
10000011011111001
11111000010001001
10110010000100101
10110100101110111
10000111000100001
10110011000100101
10110010000011101
10111001111110101
10110010000010001
10010111111010111
10010000000000000
1111111111111111
```

Fig.2

Output file description:

Output the path of the rat visited step by step and check if the rat can reach the exit or not, as shown in Fig.3. Additionally, you must write it out to a file named `output.txt`.

```
0:1,0
1:1,1
2:1,2
3:1,3
4:1,4
5:1,5
6:1,6
7:1,7
8:1,8
9:1,9
10:1,10
. . .
24:10,15
25:11,15
26:12,15
27:13,15
28:13,14
29:13,13
30:14,12
31:15,13
32:15,14
33:15,15
34:15,16
successfully escaped!!
```

Fig.3

- Full output information is in the `sample_output.txt`

Sample Input:

```
enter filename : maze1.txt
1111111111111111
00000000000101001
10100111111001101
10101100001010101
10111010100000001
10000011011111001
11111000010001001
10110010000100101
10110100101110111
10000111000100001
10110011000100101
10110010000011101
10111001111110101
10110010000010001
10010111110101111
10010000000000010
1111111111111111
```

Sample Output:

```
0:1,0
1:1,1
2:1,2
3:1,3
4:1,4
5:1,5
6:1,6
7:1,7
8:1,8
9:1,9
10:1,10
. . .
258:2,4
259:3,3
260:2,3
261:3,3
262:2,4
263:1,5
264:1,4
265:1,3
266:1,2
267:1,1
268:1,0
Failed to escape.
```

- Full output information is in the sample_output1.txt

Note:

You shall follow the pseudo code provided in the pseudo_code.pdf to solve the mazing problem and write out the results with the same format as the sample output.

You are only allowed to use **C++** language for this homework assignment.

Besides, you need to explain what each function does and how to call it properly (i.e. what arguments should be passed) in the **Readme.txt**. Make sure your program can be executed in **Dev c++** and write code comments.

Please compress all the files and name the compressed file as **HW2_yourstudentID.rar** (or in .zip file) (e.g., **HW2_P76111111.rar**). Then upload the compressed file to the Moodle in time. Also, you shall print out the output in the output.txt after executing the program

- The file structure should be like following figure:
 - | -HW2_P76*****.rar (.zip)
 - | | -HW2_P76***** (Folder)
 - | | | -main.cpp
 - | | | -maze.txt (same as the sample input named maze.txt)
 - | | | -output.txt
 - | | | -Readme.txt

Don't cheating, or you will get 0 for this assignment. If you can't finish the assignment before deadline, just hand in your unfinished code and report.