

HW 1. A Mazing Problem

✚ Environment:

✚ Programming Language: C++

✚ IDE: CLion 2020.2.2

✚ Requirements:

Input file and rate.cpp must be at the **same folder**. Otherwise, the program will print out error message and terminate. The maze has size of 17 * 17 and start as well as end should be 0.

✚ Key Variables:

✚ **struct** Item: x, y, direction

✚ **struct** Mark: x, y

✚ **stack** <Item> route: store the position we have been visited from start

✚ **stack** <Mark> mark: store the position we have changed of maze array (Using stack can save more space than using array)

✚ **Item** templtem: record the position and direction now

✚ **int** maze[17][17]: two dimensions array record the input data

✚ **int** step: record how many times we have changed position




✚ **bool** changeDir: check it's changing direction (true) or changing position (false)

✚ Thought:

We define direction has four values, which is 0, 1, 2 and 3 representing right, down, up, left, respectively. First, initialize changeDir as false, step as 0, templtem's position at start and templtem's direction as 0. Then, we start looping until **templtem's position at end** or **templtem's direction is -1**. If we aren't changing direction then change maze at the position

now into 1 and push position now into mark stack. Third, we check templtem's direction value and the next position is 0 or not. If it's 0, then we **push templtem into route**. Moreover, set x & y of templtem to next, templtems direction to 0, changeDir to false. If it's 1, then direction++ and changeDir is true. Be careful about the case 3 with no road we can go. We set changeDir to false. **Go back to the route's top and pop one element out**. If we are at start and no road can go, then we **change direction into -1**.

Problems:

-  The x, y position is not corresponded to maze's row and column respectively. That is, (1, 12) is not maze[1][12] but maze[12][1]. Using x, y notation is so **confused** and hard to debug
-  CLion's default folder is under **cmake-build-debug**. Therefore, we need to change the working directory.
-  Because the stack route needs to be used again and again, it is important to **clear** it. Otherwise, we will face that the answer is different but with the same input.