CS3345.005 Programing Assignment 3 (10%)

Due 11:59pm, November 29, 2022

A. (**100%**) We have described the generating of mazes in the class (see Section 8.7 of the textbook). Suppose we want to output the path in the maze. Assume that the maze is represented as an *n* x *m* matrix *M;* each cell in the matrix stores information about what walls are present (or absent). The starting point of a path is *M*[0, 0] and the ending point is *M*[*n-1, m-1*]

    a) Write a program to generate a *n* x *m* maze with input of *n* and *m*.

    b) Write a program to output a path in the maze. Give output in the form SEN... (representing go south, then east, then north, etc.).

    c) Write a program that draws the maze and, at the press of a button, draws the path.

B. (**Extra 15%**) Suppose that walls in the maze can be knocked down, with a penalty of *P* (> 0). *P* is specified as a parameter to the algorithm. Because walls may be knocked down, you are guaranteed that a path exists. Write a program to output the path in the maze with minimum total penalty and the walls being knocked down along the path. What is the running time of your algorithm?

Programming assignments grading:

    Code Development 30% (compile w/o error)
    Program Execution 20% (run successfully)
    Program Design 25% (conform to spec)
    Documentation 15% (program, comments)
    Coding Style 10% (clear, efficient)

SUBMISSION:

1. A copy of the final working source code with comments and documentation
2. Copies of maze files that are used to demonstrate your program
3. Screenshot copies showing the maze and the path
4. For extra question, provide running time analysis in addition to the output of maze, path, and the walls being knocked down

5. Submit your answers, clearly marked with your name, through eLearning by the due date
6. No copying of project answers found on the Internet
7. **No late homework or assignment will be accepted**!

Yi Zhao