M.Sc. in High-Performance Computing
5613 - C programming
Assignment 6

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Rules

To submit, make a single tar-ball with all your code and a pdf of any written part you want to include. Submit this via `msc.tchpc.tcd.ie` by the end of **Wednesday November 30th**. Attempt all parts. Marks will be given for the efficiency of your implementation. Late submissions without prior arrangement or a valid explanation will result in reduced marks.

Question

Write a program to solve a maze linking a two dimensional $N \times N, N \leq 20$ grid read from file. An example input file represented with ASCII characters would be:

```
S#####
....##
#.####
#.####
...#.G
##...#
```

where the start cell is denoted as 'S', goal cell is denoted with 'G', '#' denote the walls that prevent your movement, while '.' denote the fileds you can freely move through. Starting and goal cells could be placed anywhere in the $N \times N$ grid and moving in all four directions (north,east,south,west) is allowed. Your program should search for a path from the starting position to the goal position until it finds a solution path, or until it exhausts all possibilities.

Your program should print each attempt of your backtracking solution of the maze to the terminal using characters '+' to denote the path you are moving through. The first printouts for the example input would be:

```
S#####
+...##
#.####
#.####
...#.G
##...#

S#####
++..##
#.####
#.####
...#.G
##...#

S#####
+++.##
#.####
#.####
...#.G
##...#

S#####
++++##
#.####
#.####
...#.G
##...#

S#####
+++.##
#.####
#.####
...#.G
##...#

S#####
++..##
#.####
#.####
...#.G
##...#

S#####
++..##
#+####
#.####
...#.G
##...#
```

etc.

An example output file with a solution for the example 5×5 grid would be:

```
S#####
++..##
#+####
#+####
.++#+G
##+++#
```

In order to clear screen for each print of the backtracking solution, you may, for example, use:

```
system("clear");
print( ... ); //function printing an intermediate maze configuration
sleep(1);
```