a. A square maze (as shown in the below picture) consists of a number of square cells out of which a specific cell is designated as source and another specific cell is designated as destination and another specific cell is designated as key cell. User starting from source can move in any of the following directions (Left:L, Right:R, Up:U, Down:D, North East:NE, North West:NW, South West:SW, South East:SE). However, few cells are blocked and user cannot go through those cells (grey cell with value 0). User can move through movable cell (blue cell with value 1) and key cell (yellow cell with value 2). The key which is kept in key cell must be collected before a user reach destination. Your job is to develop an algorithm to find out a path from source to destination. Take input size of the maze from user; consider each cell and randomly decide if that call is blocked or movable. Take user input for key position and modify the cell nature of that cell. (Write code in C)
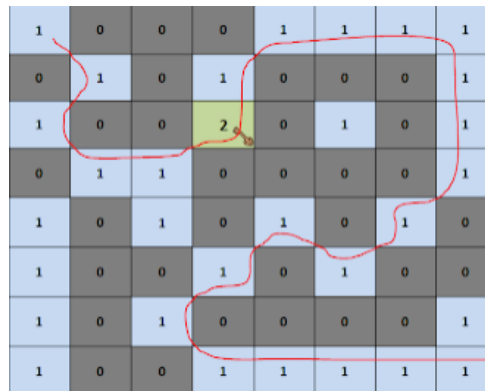
Example:
Enter the number of rows= 8
Enter Source = (0,7)
Enter destination = (7,0)
Enter Key cell = (5,3)
(**Assume that random selection of blocked cell and movable cell results in following maze**)
Output: Directions are: SE, SW, SE, R, NE, U, NE, R, R, R, D, D, D, SW, SW, NW, SW, SW, SE, R,R,R, R, R

Upload Ass7a.c

b. Given a directed graph, find out all strongly connected components.
First line of input contains, two integers n and e, where n is the total no of nodes (1,2,..,n) and e is the total no of edges. Next e line will contain two integers u and v meaning that there is an edge from node u to node v. Output: m (number of connected components) then next m lines: SCC_i- all vertices belongs to SCC_i (i varies from 1 to n)

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c. Given the roll number (5 digits) of a group of students in a class. Make a graph, where students are the nodes of the graph and there is an edge between them, only if their roll numbers have at least 3 digits in common. Given a set of roll numbers, write a C program that creates a graph representing friendship among students. By t-coverage of a node say X, we mean total number of nodes that can be reached (excluding X) starting from node X by travelling at most t-hops. There are two types of queries 1: finding number of nodes that can be reached starting from a specific node. 2: Given two roll number, you have to say how intimate their friendship is. Intimacy is defined by the shortest path distance between two nodes.

Input:
N: number of students
Next N line: Roll number of N students
M: Number of queries
Next M line queries:
Format of query: 1(query type), Rollnumber, t (t is an integer)/ 2(query type), roll1, roll2

Output Format:

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