CSE108 **HW05**

Part 1 100pts

In this homework you will write a game called “minesweeper” that player is going to open cells until the game will be terminated by “**win**” and returns the number of moves is made until win when the player finds every “un-mined” cells or by “**loose**” when they hits a mine.

The player will choose a cell either to open or to flag it until the game is terminated. Every time the player made a move the program should print whole grid with current moves, ask the player their next move and get their choice.

If a **closed** cell is chosen; it can be either opened or flagged.

If a **closed_empty** cell is chosen to open; it will be open, its 8 neighbor will be checked for emptiness and **empty neighbors** are also opened.

If a **closed_mined** cell is chosen to open; the game will be terminated by a loose message.

If a **flagged** cell is chosen; it can only be un-flagged.

If **all empty** cells are found; the game will be terminated by a win message.

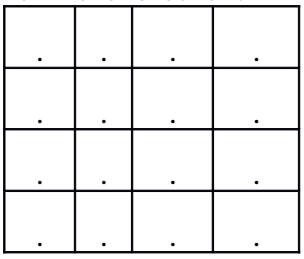
You will print the grid with 'e' for empty cells; 'f' for flagged cells; '.' for closed cells.

In your code you will use an enumerated data type called “**cell**” as following

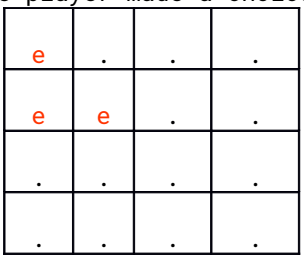
```
typedef enum {mined,
              empty,
              flaggedMined,
              flaggedEmpty,
              closedEmpty,
              closedMined,
              }cell;
```

The grid will be a GRIDSIZE x GRIDSIZE multi-dim array of **cell.**

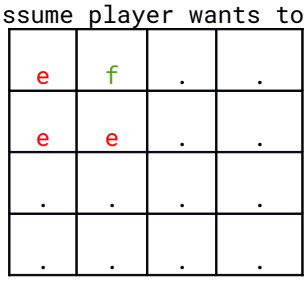
Example : Assume we have a grid as below **(Initial Grid)**, each move and its effect on the grid is colored by a different color.



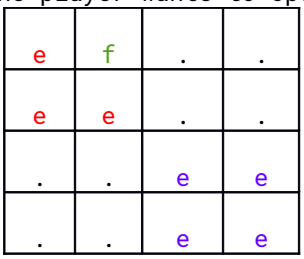
Assume player made a choice to open the location of **(0,0)**(**1st Move**)



Now assume player wants to flag the location of **(0,1)** (**2nd Move**)

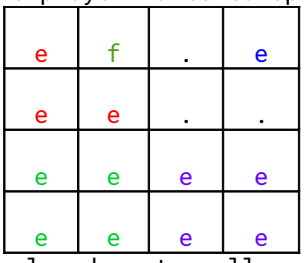


Now the player wants to open the location of **(3,3)** (**3rd Move**)



Now the player wants to open the location of **(0,3)** (**4th Move**)

Now the player wants to open **(3,0)** (**5th Move**)



Every closed-empty cells are open (number of moves : 5)
A message will be printed “Congratulations! You win the game with 5 moves”
(Here three closed-mined and one flagged-mined cells was not opened.)

Signature

```
void printGrid (cell grid[][GRIDSIZE]);

int openCell(cell grid[][GRIDSIZE], int x, int y); // return value int result = -2 when the cell is not opened with the case of illegal location; or flagged cell.

void flagCell(cell grid[][GRIDSIZE], int x, int y); // if a cell is wanted to be flagged; check if it is empty or mined: if it is empty, flag as flagged-empty; if it is mined, flag as flagged-mined

int isCellEmpty(cell grid[][GRIDSIZE], int x, int y); //return value int result=0 if the cell is not an empty cell and result=1 the cell is an empty cell.

int isLocationLegal(int x, int y); //return value int result=0 if the location is illegal and result=1 if the location is legal(in the grid).

int asMain(); // copy your main function into this function. Use the function to to take player's choice, to count their moves, and to call functions according to the player's wish.

void initGrid(cell grid[][GRIDSIZE]);
```

HINT

initGrid (); is a function to initialize your matrix as an arbitrary initial game board with closed-empty and closed-mined cells.

Good luck!