Homework 04
Due 10/13/2023 by 11:55PM
Pothole Driving

Objective:
Write a game where you are a car, represented by the character 'X', trying to avoid pots holes in order to get home. As visibility is very low, the car can only move one space at a time, and if the space is a pothole, then the player loses, and the game is over. However, if they manage to reach home, the player won, and the game is over.

Requirements:
- Functionality. (80pts)
    - No Syntax, Major Run-Time, or Major Logic Errors. (80pts*)
        - *Code that cannot be compiled due to syntax errors is nonfunctional code and will receive no points for this entire section.
        - *Code that cannot be executed or tested due to major run-time or logic errors is nonfunctional code and will receive no points for this entire section.
        - *Only 2D Arrays can be used to solve this problem. If any other data structure such as a Linked List, Array List, etc. are used then no points will be awarded for this entire section.
    - Create the 2D Environment. (10pts)
        - The environment must be represented by a Matrix (2D Array) whose size is 10x10.
            - *Any other kind of data structure, such as a Linked List, Array List, etc., used to solve this problem will result in an automatic 80pt deduction.
        - The program must then randomly select and assign exactly 5 unique cells in the matrix for the "potholes".
            - Unique meaning that if program randomly selects a cell in the matrix that already has a pothole, then the program must keep selecting new cells <u>while</u> it has not found an empty cell (alternatively <u>until</u> an empty cell is selected).
        - The program must then assign the car (player) to the top left cell represented by the indices [0][0] and home to the bottom right cell represented by the indices [9][9].
        - All must apply for full credit.
    - Display the Game (20pts)
        - Before prompting the user, the program must show the environment, where the player is clearly indicated by the character 'X' and the home space is clearly indicated by the character '^'.
        - The display must hide all the potholes from the user's view, and only show the player as an 'X' and the home space as a '^'.
        - All must apply for full credit.
    - User Input and Display (20pts)

- - - The program must clearly indicate to the player how to move their car.
    - The player must be able to move the car in 8 directions,
      - N, S W, E, NW, NE, SW, SE
    - The player may only move one space at a time (one cell at a time).
    - Once the player has input the directions, the program must validate the input and move the player to a space only if it is within the bounds of the environment.
      - Make sure to check for valid indices from 0 to 9.
    - If the input entered is invalid, then the program must indicate this to the player and the player's car does not move.
    - All must apply for full credit.
  - Win or Lose. (20pts)
    - The program must determine if the player has either won or lost, and clearly display this to the player.
    - The player wins whenever they successfully reach the home space without encountering a pothole.
    - The player automatically loses if they land on a space with the pothole.
    - All must apply for full credit.
  - Replay the Game. (10pts)
    - When the player has either won or lost, then the program must ask if they would like to play again.
    - If the user answers yes, then the game is reset and they start over.
    - Otherwise, the program must terminate.
    - All must apply for full credit.
- Coding Style. (10pts)
  - Readable Code
    - Meaningful identifiers for data and methods.
    - Proper indentation that clearly identifies statements within the body of a class, a method, a branching statement, a loop statement, etc.
    - All the above must apply for full credit.
- Comments. (10pts)
  - Your name in the file. (5pts)
  - At least 5 meaningful comments in addition to your name. These must describe the function of the code it is near. (5pts)

Example Dialog:
Welcome to Pothole Driving! Get home while
avoiding potholes!
X_____

_____
_____
_____

```
_____
_____
_____
_____
_____  ^
_____
```
Enter either a -1, 0, or 1 in the X or 9 to quit
1
Enter either a -1,0, or 1 in the Y
1

```
_____
_X_____
_____
_____
_____
_____
_____
_____
_____  ^
_____
```
Enter either a -1, 0, or 1 in the X or 9 to quit
0
Enter either a -1,0, or 1 in the Y
1

```
_____
_____
_X_____
_____
_____
_____
_____
_____  ^
_____
```

```
Enter either a -1, 0, or 1 in the X or 9 to
quit
-1
Enter either a -1,0, or 1 in the Y
1
OH NO! POTHOLE!
Would you like to play again?
No
Goodbye!
```

Finally:
Upload the solution's source file (.JAVA extension) to the CSCE Dropbox