# Homework 04
# 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, **with the same randomly generated map as before**, 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