CSE1322L - Assignment 6

Description:

In this assignment you'll implement the game Connect 4 in Java or C#.

If you've never heard of Connect 4. The following short video will help you understand the game play:
https://www.youtube.com/watch?v=ylZBRUJi3UQ

The game board has seven (7) columns and six (6) rows. There are two (2) players, Red and Yellow.

Each player takes turns dropping a token of their color into one of the columns (it falls to the bottom of the column). The goal is to get 4 of your colors in a row either horizontally, vertically or diagonally.

Tasks:

Create a custom Exception called ColumnFull.

- It should have a constructor which takes in a message and calls its parent's constructor with that message.

Create a class ConnectFour it should have:

- A two dimensional (2D) array with 6 rows and 7 columns. Each should hold a character.
- A string which keeps track of who's turn it is (Red or Yellow)
- A character which keeps track of the next token to play (R for red or Y for Yellow).
- A constructor which takes no parameters
    - Initialize all spaces in the 2D array to an empty space ' '
    - Set the turn variable to Red, set the token to R
- A method called nextTurn which takes no parameters.
    - If the current turn is Red, set the turn variable to Yellow and the token to Y, otherwise set the turn variable to Red and the token to R.
- A method called nextAvailablePosition which takes in a column number and returns an int.
    - This method should look at the column that was passed in, and find the first empty spot in the column.
    - I.e. in your 2D array start at the bottom (row 5) in that column and check if that cell is an empty space ' '. If it is, return 5, otherwise check row 4, then 3, then 2, 1 and finally 0. If cell 0 is full return -1 to indicate the column is full.
- A method called dropPiece which takes in a column and a token. It places the piece into the appropriate row of the 2D array (use nextAvailablePosition to find this). If the row is full, it should throw an exception called ColumnFull.
- Add the following override for toString/ToString so you can see the state of the board:

Java

```java
@Override
 public String toString() {
   String to_return="  0   1   2   3   4   5   6";

   for(int i=0;i<6;i++) {

to_return+="\n-----------------------------\n";
     to_return+="| ";
     for(int j=0;j<7;j++) {
       to_return+=board[i][j]+" | ";
     }
   }

to_return+="\n-----------------------------\n";
   return to_return;
 }
```

C#

```csharp
public override string ToString() {
   String to_return="  0   1   2   3   4   5   6";

   for(int i=0;i<6;i++) {

to_return+="\n-----------------------------\n";
     to_return+="| ";
     for(int j=0;j<7;j++) {
       to_return+=board[i,j]+" | ";
     }
   }

to_return+="\n-----------------------------\n";
   return to_return;
 }
}
```

- A method called saveGame which takes no parameters and returns void.
  - Prompt the user for a file name “Enter a filename:”
  - Read in the users response as a string
  - Create a new text file with that filename
  - Using loops as necessary write each cell of the array that holds your board into the file.
    - Specifically in row 0 of the array you’ll write the contents of cell 0, then a “,” then the contents of cell 1 another “,” the contents of cell 2 …until you write the contents of cell 7. Write the content of the cell whether it’s a space a R or a Y.
    - Do this for each row of the array
  - Close the file
  - Deal with any exceptions you may encounter during this operation.
- A method called loadGame which takes no parameters and returns void
  - Prompt the user for a file name “Enter a filename:”
  - Read in the users response as a string
  - Open the named text file for reading.
  - Read in each line, split it into an array of strings using a , as a separator.
  - Convert each string to a character (charAt(0) likely helps) and store it in the appropriate part of the board’s array.
  - Close out the file
  - Remember to deal with all exceptions during this process including files that can’t be opened, and files that are formatted incorrectly.

In your driver class's main method:

- Instantiate a Connect4 object
- Using a loop keep prompting the user until they enter 9 to exit
    - Print "Which column would Red like to go in (7 to save, 8 to load, 9 to quit)"
    - Read in their answer.
    - If they give you a value between 0 and 6:
        - Call the dropPiece method in your Connect4 object
        - Call the nextTurn method in your Connect4 object
        - Check to ensure you didn't hit an exception, if you did, let the user know the column is full, and let the SAME user go again.
    - If they enter 7 call saveGame() on your Connect4 object
    - If they enter 8 call loadGame() on your Connect4 object
    - If they enter 9, exit the loop

Note: This version will not notice if you won or not, it's up to the users to keep track of who won. You are not required to determine who won, just allow people to play the game as specified above.

Sample Output:

```
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------

Which column would Red like to go in (7 to save, 8 to load, 9 to quit)
2
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   | R |   |   |   |   |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
3
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   | R | Y |   |   |   |
-----------------------------
```

```
Which column would Red like to go in (7 to save, 8 to load, 9 to quit)
2
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   | R |   |   |   |   |
-----------------------------
|   |   | R | Y |   |   |   |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
2
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   | Y |   |   |   |   |
-----------------------------
|   |   | R |   |   |   |   |
-----------------------------
|   |   | R | Y |   |   |   |
-----------------------------

Which column would Red like to go in (7 to save, 8 to load, 9 to quit)
3
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   | Y |   |   |   |   |
-----------------------------
|   |   | R | R |   |   |   |
-----------------------------
|   |   | R | Y |   |   |   |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
4
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   | Y |   |   |   |   |
-----------------------------
|   |   | R | R |   |   |   |
-----------------------------
|   |   | R | Y | Y |   |   |
-----------------------------

Which column would Red like to go in (7 to save, 8 to load, 9 to quit)
4
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   | Y |   |   |   |   |
-----------------------------
|   |   | R | R | R |   |   |
-----------------------------
|   |   | R | Y | Y |   |   |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
6
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   | Y |   |   |   |   |
-----------------------------
|   |   | R | R | R |   |   |
-----------------------------
```

```
|   |   | R | Y | Y |   | Y |
-----------------------------

Which column would Red like to go in (7 to save, 8 to load, 9 to quit)
6
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   | Y |   |   |   |   |
-----------------------------
|   |   | R | R | R |   | R |
-----------------------------
|   |   | R | Y | Y |   | Y |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
6
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   | Y |   |   |   | Y |
-----------------------------
|   |   | R | R | R |   | R |
-----------------------------
|   |   | R | Y | Y |   | Y |
-----------------------------

Which column would Red like to go in (7 to save, 8 to load, 9 to quit)
6
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   | Y |   |   |   | Y |
-----------------------------
|   |   | R | R | R |   | R |
-----------------------------
|   |   | R | Y | Y |   | Y |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
6
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   |   |
-----------------------------
|   |   |   |   |   |   | Y |
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   | Y |   |   |   | Y |
-----------------------------
|   |   | R | R | R |   | R |
-----------------------------
|   |   | R | Y | Y |   | Y |
-----------------------------

Which column would Red like to go in (7 to save, 8 to load, 9 to quit)
6
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   |   |   |   |   | Y |
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   | Y |   |   |   | Y |
-----------------------------
|   |   | R | R | R |   | R |
-----------------------------
|   |   | R | Y | Y |   | Y |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
6
That column is full try again
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   |   |   |   |   | Y |
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   | Y |   |   |   | Y |
-----------------------------
|   |   | R | R | R |   | R |
-----------------------------
|   |   | R | Y | Y |   | Y |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
7
Enter a file name
mygame.txt
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   |   |   |   |   | Y |
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   | Y |   |   |   | Y |
-----------------------------
|   |   | R | R | R |   | R |
-----------------------------
|   |   | R | Y | Y |   | Y |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
5
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   |   |   |   |   | Y |
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   | Y |   |   |   | Y |
-----------------------------
|   |   | R | R | R |   | R |
-----------------------------
|   |   | R | Y | Y | Y | Y |
-----------------------------

Which column would Red like to go in (7 to save, 8 to load, 9 to quit)
5
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   |   |   |   |   | Y |
-----------------------------
```

```
|   |   |   |   |   |   | R |
-----------------------------
|   |   | Y |   |   |   | Y |
-----------------------------
|   |   | R | R | R | R | R |
-----------------------------
|   |   | R | Y | Y | Y | Y |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
8
Enter a file name
mygame
Unable to read that file
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   |   |   |   |   | Y |
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   | Y |   |   |   | Y |
-----------------------------
|   |   | R | R | R | R | R |
-----------------------------
|   |   | R | Y | Y | Y | Y |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
8
Enter a file name
mygame.txt
  0   1   2   3   4   5   6
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   |   |   |   |   | Y |
-----------------------------
|   |   |   |   |   |   | R |
-----------------------------
|   |   | Y |   |   |   | Y |
-----------------------------
|   |   | R | R | R |   | R |
-----------------------------
|   |   | R | Y | Y |   | Y |
-----------------------------

Which column would Yellow like to go in (7 to save, 8 to load, 9 to quit)
9
```

Submission Guidelines:

Submit your final code.

Please follow the posted submission guidelines here:
https://ccse.kennesaw.edu/fye/submissionguidelines.php

Ensure you submit before the deadline listed on the lab schedule for CSE1322L here:
https://ccse.kennesaw.edu/fye/courseschedules.php