Work on project. Stage 3/5: What's up on the field?

Project: <u>Simple Tic-Tac-Toe</u>

📶 Hard   🕐 1 hour ❓

Description

In this stage, we're going to analyze the game state to determine if either of the players has already won the game or it is still ongoing, if the game is a draw, or if the user has entered an impossible game state (two winners, or with one player having made too many moves).

Objectives

In this stage, your program should:

1. Take a string entered by the user and print the game grid as in the previous stage.
2. Analyze the game state and print the result. Possible states:

- `Game not finished` when neither side has three in a row but the grid still has empty cells.
- `Draw` when no side has a three in a row and the grid has no empty cells.
- `X wins` when the grid has three X's in a row.
- `O wins` when the grid has three O's in a row.
- `Impossible` when the grid has three X's in a row as well as three O's in a row, or there are a lot more X's than O's or vice versa (the difference should be 1 or 0; if the difference is 2 or more, then the game state is impossible).

In this stage, we will assume that either X or O can start the game.

You can choose whether to use a space ⬜ or underscore ⎵ to print empty cells.

13 / 13 Prerequisites

- ✓ <u>Boolean and logical operations</u> `In project` `14 🛠` ⌄
- ✓ <u>Relational operators</u> `In project` `14 🛠` ⌄
- ✓ <u>Conditional statement</u> `In project` `14 🛠` ⌄
- ✓ <u>Ternary operator</u> `In project` `13 🛠` ⌄
- ✓ <u>The for-loop</u> `In project` `13 🛠` ⌄

`Show all`

<u>Join a study group for the project Simple Tic-Tac-Toe</u>

Discuss your current project with fellow learners and help each other.

Examples

The examples below show outputs and analysis results for different game states. Your program should work in the same way.

Notice that after `Enter cells:` comes the user input.

Example 1:

```
Enter cells: XXXOO__O_
---------
| X X X |
| O O _ |
| _ O _ |
---------
X wins
```

Example 2:

```
Enter cells: XOXOXOXXO
---------
| X O X |
| O X O |
| X X O |
---------
X wins
```

Example 3:

```
Enter cells: XOOOXOXXO
---------
| X O O |
| O X O |
| X X O |
---------
O wins
```

Example 4:

```
Enter cells: XOXOOXXXO
---------
| X O X |
| O O X |
| X X O |
---------
Draw
```

Example 5:

```
Enter cells: XO_OOX_X_
---------
| X O   |
| O O X |
|   X   |
---------
Game not finished
```

Example 6:

```
Enter cells: XO_XO_XOX
---------
| X O _ |
| X O _ |
| X O X |
---------
Impossible
```

Example 7:

```
Enter cells: _O_X__X_X
---------
|   O   |
| X     |
| X   X |
---------
Impossible
```

Example 8:

```
Enter cells: _OOO_X_X
---------
|   O O |
| O O   |
| X   X |
---------
Impossible
```

⚡ See hint

⌐ Write a program

Code Editor   IDE

Java

```java
1  package tictactoe;
2  import java.util.Scanner;
3  public class Main {
4      public static void main(String[] args) {
5          Scanner sc = new Scanner(System.in);
6          String temp = sc.next();
7          int k = 0;
8          char[][] array = new char[3][3];
9          for(int i = 0; i < 3; i++){
10             for(int j = 0; j < 3; j++){
11                 array[i][j] = temp.charAt(k);
12                 k++;
13             }
14         }
15         System.out.println("---------");
16         for(int i = 0; i < 3; i++){
17             System.out.print("| ");
18             for(int j = 0; j < 3; j++){
```

```java
18          for(int j = 0; j < 3; j++){
19              System.out.print(array[i][j] + " ");
20          }
21          System.out.println("| ");
22      }
23      System.out.println("---------");
24
25      if(count(array)){
26          System.out.println("Impossible");
27      }
28      else if(TwoWin(array)){
29          System.out.println("Impossible");
30      }
31      else if(win(array, 'X')){
32          System.out.println("X wins");
33      }
34      else if(win(array, 'O')){
35          System.out.println("O wins");
36      }
37      else if(draw(array)){
38          System.out.println("Draw");
39      }
40      else{
41          System.out.println("Game not finished");
42      }
43  }
44
45  public static boolean count(char[][] array){
46      int countX=0,countY=0;
47      for(int i = 0; i < array.length; i++){
48          for(int j = 0; j < array[i].length; j++){
49              if(array[i][j] == 'X')
50                  countX++;
51              if(array[i][j] == 'O'){
52                  countY++;
53              }
54          }
55      }
56      if(Math.abs(countX - countY) > 1)
57          return true;
58      return false;
59  }
60
61  public static boolean draw(char[][] array){
62      int count = 0;
63      for(int i = 0; i < array.length; i++){
64          for(int j = 0; j < array[i].length; j++){
65              if(array[i][j] == 'X' || array[i][j] == 'O'){
66                  count++;
67              }
68          }
69      }
70      if(count == array.length * array[0].length)
71          return true;
72      return false;
73  }
74
75  public static boolean win(char[][] array, char ch){
76      boolean flag;
77      for(int i = 0; i < array.length; i++){
78          flag = true;
79          for(int j = 0; j < array[i].length; j++){
80              if(array[i][j] != ch){
81                  flag = false;
82                  break;
83              }
84          }
85          if(flag == true)
86              return flag;
87      }
88
89      for(int i = 0; i < array.length; i++){
90          flag = true;
91          for(int j = 0; j < array[i].length; j++){
92              if(array[j][i] != ch){
93                  flag = false;
94                  break;
95              }
96          }
97          if(flag == true)
98              return flag;
99      }
100     flag = true;
101     for(int i = 0; i < array.length; i++){
102         if(array[i][i] != ch){
103             flag = false;
```

```
104            break;
105        }
106    }
107    if(flag == true)
108        return flag;
109
110    flag = true;
111    for(int i = 0; i < array.length; i++){
112        if(array[i][array.length - 1 -i] != ch){
113            flag = false;
114            break;
115        }
116    }
117    if(flag == true)
118        return flag;
119    return false;
120    }
121
122    public static boolean TwoWin(char[][] array){
123        if(win(array,'X') == true && (win(array,'O') == true)){
124            return true;
125        }
126        return false;
127    }
128 }
```

✓ **Correct.**

Practice makes perfect. Good for you for not giving up easily!

490 users liked this problem. **29** didn't like it. **What about you?**

😍 🙂 😐 🙁 😡

Continue   Solve again   Solutions (901)

Comments (241)   Hints (35)   Useful links (5)   Solutions (901)   Show discussion