Tecnología de la Programación - Curso 2014/2015
Grado en Ingeniería Informática, Doble grado en Matemáticas-Informática
Examen de septiembre - Parte práctica - Duration: 2 hours.

Exam

The exam has two independent parts that you should implement on top of Assignment 5:

- In the first 3 parts you are asked to implement a new game, called *Pegity*, which is an instance of the Connect-N family that allows 3 players (white, black and red) and in which the objective is to place 5 consecutive counters of the same color in a row, column or a diagonal.

- In the last part you are asked to modify the console mode such that the user can play several consecutive games (without exiting), and, at the end, when the user provide the EXIT command, print a summary that describes how many games each player has won, etc.

[3 points] Part A

Implement (and modify if necessary) all necessary classes in the model for playing the new game *Pegity*, according to the following:

- In this game there are 3 player that alternate in the following order: **white**, **black**, and **red**. After **red**, the turn goes back to **white**.

- The size of the board should be configurable at the beginning of the game in a similar way to what you have done for *Gravity*. The default board size is 16×16, but it should be possible to indicate other size to be used as well (as in *Gravity*).

- The counters are placed as in *Gravity*, indicating the row and column of the positions. However, unlike *Gravity*, the counter should be placed in that exact position and not moved to the sides, etc.

- The winner is the one who first succeeds to place 5 consecutive counters (of the same color) in a row, column, or a diagonal.

[2 points] Part B

Modify the application to allow specifying the new game from a command-line using the parameter -g pg or --game pg.

Modigy the implementation of the command PLAY (in the console mode) to allow switching to *Pegity* using the command PLAY pg 10 8.

For printing the red counter in the console mode use, for example, the symbol '*'. You should also allow changing the type of the **red** player using PLAYER red <mode> where <mode> is either human or random.

[3 points] Part C

Make all necessary modifications to allow playing *Pegity* in the window mode. You should allow introducing the size of the board as well in a similar way to what you have done for *Gravity*.

Recall that the functionality of Assignment 5 should remain the same for all other games. In particular, you should allow playing the other games (with 2 players). You should also allow the automatic mode for 3 players in the case of *Pegity*.

[2 points] Part D

Extend the console mode to allow playing several consecutive games (without exiting), i.e., when one game terminates, we print the result then a new game of the same type is started automatically. You should not worry if you still have a message like "Restarting game" when starting a new game.

```
[...]
White plays
Please enter a command: move
Introduce column: 2
|       |
|       |
| O     |
| OX    |
| OX    |
| OX    |
+-------+
 1234567

White Win!!
Restarting game.
|       |
|       |
|       |
|       |
|       |
|       |
+-------+
 1234567

White plays
Please enter a command: move
```

The only way to exit the application is by using the EXIT command. When this command is executed you should print statistics that include the number of wins for each player:

```
[...]
Please enter a command: exit

Winning Statistics:
      White wins: 1
      Black wins: 3
      Red wins  : 0
      Total     : 4
```