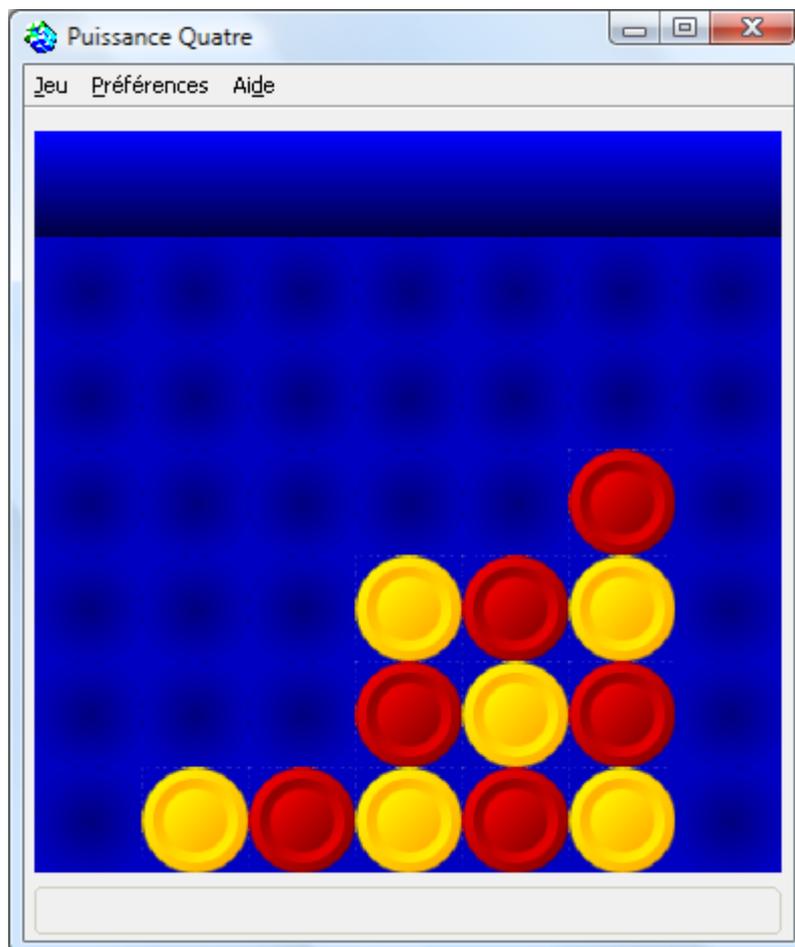


# Puissance Quatre

(Connect Four)

*ESUG 2009 – Innovation Technology Awards*

Puissance Quatre, also called Connect Four, is a game, developed in Visualworks Smalltalk, in which two players drop tokens into a grid, each trying to connect four tokens in a row.



*The main window: red win!*

## 1. Goal of the game

The objective of Puissance Quatre is to build a line of four of your marbles while trying to stop your opponent (human or computer) building a line of his or her own. A line can be horizontal, vertical or diagonal.

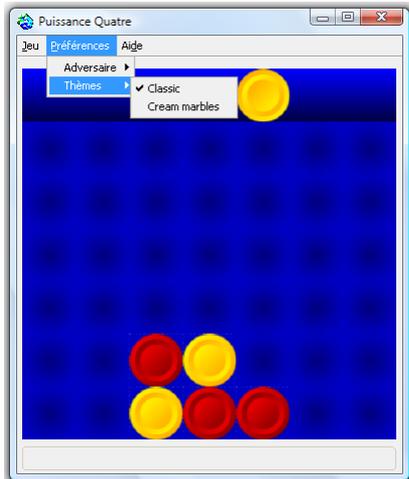
## 2. User Interface

### – The board

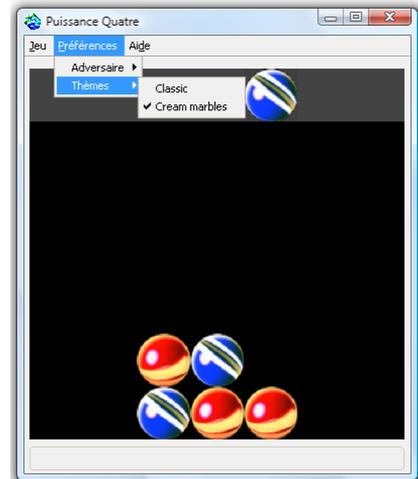
The board is a seven-column by six-row grid. Each player drop one token by clicking on the column or by using the keyboard's arrows to move the token above the grid. This token indicates the current player's colour.

### – Skin and colours

There are two main themes, that can be switched with the “settings” menu.



“Classic”



“Cream marbles”

### – Playing the game

If you hesitate between several places to play, you can ask the computer to give you some help: a marble is dropped in the best column possible. A cancel button gives you the possibility to remove one or several tokens, if you want. You can save the game at any time; the board and the score will be restored by loading the file. The score of the two players is available from the “game” menu.

## 3. Playing against the computer

There are three levels. The first level play randomly, without considering your strategy. This is quite easy to win! The second level inspects the whole grid, and try to stop you when you build a line of three marbles. Otherwise, the computer try to add a token in a line which has two or more tokens yet. The third level calculates all the possibilities to fill the grid, and all the possibilities for the opponent to play the next step, up to six moves. It uses an algorithm, named Minimax, which selects the best move, considering your response. This is a bit stronger!

## 4. Smalltalk code

This application is written in Visualworks Smalltalk. It uses the Model-View-Controller architecture. The code has been produced by two students, Coralie Morel and Pierre-Yves Lucas, as a project included in their studies, to discover the MVC-architecture in Smalltalk.

*Puisseance Quatre is available for download at <http://stockage.univ-brest.fr/~e20301845/esug>*