TicTacToe game for Przemysław Raczyński

Criterion A: Planning

Defining the problem

The **client**, Mr Przemysław Raczyński is a computer science teacher in III High School in Katowice. His credentials reach far beyond information technology, including molecular physics and chemistry. In order to maintain intellectual abilities, even during free time Mr Raczyński needs to practice problem solving skills.

Currently he achieves it by playing a popular pen and paper game TicTacToe. Mr Raczyński outlines a 3x3 board, on which he later plays with his friends. The board is constructed with four lines of the same length, pairwise parallel and perpendicular. There is potential for extensibility, as more lines can simply be drawn.

The solution space, however, is shallow for a 3x3 grid. Mr Raczyński **needs** a more sophisticated game environment (and presumably adequately sophisticated opponents.) The advancement should also include a virtual user interface, as otherwise players would need to waste scarce resources of pen ink and paper in order to play an individual game.

Mr Raczyński has previously considered multiple alternative solutions to his problem. Available TicTacToe games online do not exhibit necessary levels of computational complexity and thus had to be discarded by Mr Raczyński. In some particular cases, where user friendly interface was apparent and gameplay experience was above average, Mr Raczyński simply hasn't been fond of how the overall software seemed to work.

215 words

Justification for the proposed product

Careful consideration led me to conclude a desktop version of TicTacToe fits best Mr Raczyński's needs. His computer programming experience directly indicates a console version would suit many hours spent in the command line, running shell scripts. Selection of the next move is also going to be performed in the classical manner - that is, manually entering coordinates of the player's sign. What is going to be manually entered is also the names of players - who starts first should be randomly selected, as Mr Raczyński said that is the most fair method.

The bigger issue is computational complexity, as that is the exact reason why project is being developed in the first place. I decided that size of the playing board is going to be entered by the user, with the constraint of being between 3 and 10 inclusive. Here, the sophistication grows as fast as the factorial function does. The minimax algorithm was therefore chosen to play against the user. The notion of traversing is going to be simplified, as I found it is hard, if not impossible, to heuristically estimate the winning state.

184 words

Stating success criteria

1. The program needs to be visually pleasant,
2. have two modes to choose from:
    2.1. player versus player,
    2.2. player versus computer,
3. grid size is available from 3 to 10 inclusive,
4. when grid size is over 4, the number of signs in line to win is 4, otherwise 3,
5. it has to differentiate between players names',
6. signs need to be randomly selected,
7. if a player picks an invalid move he loses his turn,
8. needs to work on Linux.