CS250 Assignment Two

Tic-Tac-Toe

Date Assigned: Monday, February 24, 2005

Date Due: Friday, March 4, 2005

Points: 35

For this assignment you are to use the principles of object oriented programming to program the game of Tic-Tac-Toe. You should set up the program so that a human can play against your program, or the program can play against itself.

Your program doesn't need to be smart, but it should at least do the following:

1. If there is a winning move then your program should select it

2. If there is a move to block the opponent's move then your program should take it

Since this is the first object-oriented program that you will write, I am going to give you the specifics about the classes you need.

GameBoard class

This class represents the current state of the gameboard. You can represent the board however you like, but the values of the board items should be integers (0 for empty, 1 for player one, 2 for player two). Your class can contain any functions that you need, but you must at least provide the following:

Function	Description
GameBoard()	Constructor. Initializes the board to an empty game.
void printBoard()	Displays the game board onto the screen. You should use X and O for the output, not 1 and 2.
int getVal(int r, int c)	Returns the value of the board at a given row and column. The row and column values range from 1 - 3, and if either the row or column is invalid, the function should return -1.
bool setVal(int r, int c, int v)	Sets the value of the board at a given row and column to the given value. If the row or column is invalid the function should return false. It should return true otherwise.

Player class

The player class is used to store player information. For each player you will need to store their name and their id (1 for player one, 2 for player two). The player class must at least provide the following functions:

Function	Description
Player(char * n, int id)	Constructor. Initializes the value of the name and the id.
void displayName()	Displays the name of the player onto the screen.
void makeMove(GameBoard &b)	This function accepts a GameBoard object and uses it to select the player's next move.
bool hasWon(GameBoard b)	Returns true if the player has won the game, false otherwise.
bool hasLost(GameBoard b)	Returns true if the player has lost the game, false otherwise.

Main program

The main program should create objects from the above classes to provide the user with two ways of playing tic-tac-toe. You should display a menu to the user asking them to select one of two options:

1. Play a human against the program

2. Play the program against itself

For option 1, you should then ask for the name of the human player and what move they would like to make. You are then to display the state of the game board after each move, asking the human player for their move whenever it's their turn. You should indicate a tie or win at the end of the game.

For option 2 there will be no interaction with the user. The game board should be displayed after each move, and you sould display a win or tie at the end.

Other details

You should create 5 files for this assignment. A header and source file for the GameBoard class, a header and source file for the Player class, and a source file for the main.

You must follow the coding standards.

You must use the function names that I have given you.

How to submit

- Submit a hard copy of the code by 9am on the day the assignment is due.

- Place the complete project folder in the CS250 drop folder on Turing by 9am on the day the assignment is due.