# Programming Project 3
## Connect 4!!!

NAME:_____ SECTION:_____

DUE DATE: 4/16/2012                          DEMO DATE:_____

### Connect 4: A basic description

Connect 4 is a two-player game in which the players take turns in dropping alternating colored discs into a 7-column, 6-row vertically suspended grid.  The object of the game is to connect four singly-colored discs vertically, horizontally, or diagonally before your opponent.  Connect 4 is a game of skill and maneuvering and will involve using 2-D arrays and incorporating computer AI.  The player or computer alternately chooses a column to place a token into and the token slides down the column to the last empty spot. You can play the game at http://www.mathsisfun.com/games/connect4.html.

### Project Objective

You are to write a C program (named project3.c) to play the game of CONNECT 4 against the computer.  The basic idea of the game is to be the first player to place 4 tokens together vertically, horizontally or diagonally.  You MUST use the Code Blocks IDE to develop and debug this game. The IDE will be demonstrated in class.

**Program flow description: Here are the steps that you must follow for a letter grade of a "C":**
1. Explain the game to the user. **(Allow the user to exit or proceed at this point)**.
2. Display the grid with all blanks. Display the computer's token and the user's token. Choose separate characters to distinguish user tokens from computer tokens.
3. Ask the user who should go first – computer or user.
4. The first player chooses a column and the player's token will slide down to the first empty row in that column.
5. After each play you must display the updated grid.
6. After each play you must check to see if either player has 4 tokens together in the same row, column or diagonal.
7. For the C grade your computer decisions may be random.
8. A winner will be declared after all he/she has 4 of their tokens in order vertically, horizontally, or diagonally.
9. Ask the user if he/she wants to play again and if needed go back to **step 1**.
10. Track and display the number of times the computer and user have won in this session (not historic).
11. Make sure the flow of the game is visible to the user.  The program should pause and update so as to allow the user to follow the action.

To receive a grade of a "B" for this project you must include **all** of the above and the following 2 requirements:

B1. Keep track of the previous wins for the computer and the users.  Therefore, when the game starts the number of HISTORIC wins are displayed from previous executions.

B2. Figure out a way so a user can quit at any time in the game and re-start that game in the same position as before.  At the start of a new session, ask the user if he/she wants to start a new game or restart a previously saved game.  In the first case a new blank Connect 4 grid is created for the user and the computer. In the second case, load the saved Connect 4 grid. The game must remember whose turn it is.

To receive a grade of an "A" for this project you must include **all** of the above (including steps B1 and B2) and the following requirements:

A1. Incorporate AI into the computer's playing – so no random decisions by the computer. The computer must make choices based on the user's previous moves. The computer must act to block the user and try and get a connect 4 of its own. Be creative for this requirement.

**Extra credit (5 points)**: If you demo by April 11, you will receive 5 extra credit points

## Deliverables (please staple and don't forget your name):
♦ Printout of this assignment description
♦ Printout of the source code

**Rubric**:

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|---|---|
| **Steps 1-10** | 50 pts |
| **Step B1** | 5 pts |
| **Step B2** | 10 pts |
| **Step A1** | 15 pts |
| **General**<br>  **Good commenting of code.**<br>  **Good variable names.**<br>  **Proper formatting of code**<br>  **Design of your program.** | 20 pts |