CISC 235 Assignment #3

Instructions

This assignment is due at 4:30 p.m. on **Monday, March 21st (extended)**. Please email your submission to the Teaching Assistant assigned to your lab section.

Lab A (Monday): 8jjl1@queensu.ca

Lab B (Friday): zi@acm.org

The labs provide an opportunity for you to work on assignments with the supervision of our Teaching Assistants.

Introduction

In this assignment you will implement the game of Connect Four (http://en.wikipedia.org/wiki/Connect_Four). In Part 1, you will create the methods required to manipulate the board state and test whether one of the players has won the game. In Part 2, you will implement Minimax so that the computer can play the game automatically. The computer will play against itself. You are not required to create methods to allow humans to play (either with one another or against the computer).

Part 1 (5 Marks): Connect Four

Write the logic methods necessary to implement the game of Connect Four. These methods will need to support the following operations:

- Create a new (blank) Connect Four board
  (Note: you will likely want to create a Connect Four board class)
- Update a board to reflect a player's move
- Determine if the game is over
- Display the current state of a board

Part 2 (15 Marks): Minimax with Alpha-Beta Pruning

Write the methods necessary for the computer to play a game of Connect Four against itself, using the Minimax algorithm with Alpha-beta pruning to select the next move to make. These methods will include:

- An evaluation method (to evaluate board states)
- Minimax with Alpha-beta pruning
  - Method(s) to update the board state

  (Note: depending on your design decisions, these could be implemented within your Minimax method)

Include comments in your source code that justify your evaluation algorithm.

When executed, your program should play a single game of Connect Four. The board state must be displayed after each move and a message to indicate which of the two (computer) players has won the game (e.g. Player 1 or Player 2) must be displayed.

Note: You are allowed to submit one java program that fulfills the requirements for both Part 1 and Part 2.