

AP Computer Science 2007 – 2008

First Semester Final Exam Project

Zero_Gravity_Connect4

You should refer to the Tic Tac Toe game that we looked at in class. Unlike the original ConnectFour game, where the grid always starts as six rows and seven columns of “empty” elements and every entry is from row zero and “falls” to the bottom of the array, your game should have a number of rows and a number of columns that are selected by the player, beginning with four randomly positioned immovable “blocks” with entries possible from any of the four sides of the game grid. (Having a variable number of immovable “blocks”, ranging from four up to the larger of the number of rows or columns, either random or selected by the player, is an extra credit opportunity.).

Like the Tic Tac Toe game, the player should have one human “playing” against “the computer”. (Intelligent playing on the part of “the computer” is another extra credit opportunity. “The computer” choosing valid moves at random is the minimum effort.).

The rules of this game are:

The game is played on a board where a piece may be entered from any side of the board. If the location is not filled, then the new piece takes that location. If there is another playing piece in that location, that playing piece is “pushed” along the row or column it is in, pushing other pieces that it is touching. If the entire row or column is filled, then the piece on the opposite side is pushed out and off the game board.

There are four (or more) immovable blocks located on the board. These immovable blocks cannot be pushed. If a piece must push an immovable block to enter the playing board, then that move is invalid.

As soon as either player achieves four consecutive pieces along a row, column, or diagonal, that player wins. It is possible for a new piece to push pieces such that there is more than one win. If both players win by one player’s turn, then the game is a tie. Play continues until there is either a clear win, a tie (meaning that a move resulted in four-in-a-row for both the computer and the human player), or the player chooses to quit.

Your code:

The only public method should be **play()** (or play may be started via the constructor).

As with the the Tic Tac Toe game, the game dialogue should include input using the **Scanner** class.

All methods should be properly documented and all fields and methods should have meaningful and appropriate names.

Due: 9:30 a.m., Friday 25 January 2008
 Notes: After class, but before noon on Friday, no extra credit will be considered.
 Friday after noon, but before midnight is a 10% penalty and no extra credit.
 No work will be accepted after Friday 25 January 2008.

Grading:

Class and Method Documentation	50
JUnit Tests	40
Alternating Play	15
Automated Play	45
Correct Token Location and Display	15
Winner Detection and Announcement	45
Tie Game Detection and Announcement	15
Text Display of Game Grid	15
Total:	240

Extra Credit Opportunities:
 Presentation of game during the Final Exam period (on time).
 Logically automated game play (not random moves).
 User-selectable (or random) number of immovable blocks (never less than four).
 An opening splash screen.

Mr. Levy's Exam Weeks Schedule:

Friday 18 January at De Forest H.S. 2:00 – 3:30 p.m.
 Tuesday 22 January at De Forest H.S. 2:00 – 3:30 p.m.

At Oregon High School:

Wednesday 23 January – 9th Period LMC, by Appointment
 Wednesday 23 January – 8th Period LMC, by Appointment
 Wednesday 23 January – 7th Period LMC, by Appointment
 Thursday 24 January – 5th/6th Period Intro to Computer Science, Room 141
 Thursday 24 January – 4th Period Intro to Computer Science, Room 141
 Thursday 24 January – 3rd Period LMC, by Appointment
 * Friday 25 January – 2nd Period AP Computer Science,
 Distance Learning Lab?
 Friday 25 January – 1st Period LMC, by Appointment
 Friday 25 January – Makeup Period Room 141, by Appointment

Check the door of Room 148 during Exam Week for when I have agreed to be here during appointment times.
 There is a chance that I will be in Room 141, Room 148, the Distance Learning Lab, or the LMC at times not requested in advance.

* The distance learning lab class may be on a split schedule or rescheduled at an alternate location. Check with Mr. Levy.