1 Connect-4

Connect-4 is a 2-player board-game with rather straight-forward rules: The board has 7 columns and 6 rows (figure 1). Players have chips with opposite ‘colors’ (black and white). The board is under the influence of gravity so the chips will always fall to the lowest possible row of a column. Starting with white, the players take turns placing one chip at a time into a board-column. The goal is to play the chips so they build a connected line of 4 chips, horizontally, vertically or diagonally.

2 Assignment

In this assignment you shall build a version of this game where a person plays white and the computer plays black. An input parameter to the program will specify a maximum depth cutoff for black’s mini-max game tree search. For example if you run the game with a depth cut-off of 4, black may only build the game tree 4-ply deep. We recommend that you implement alpha-beta pruning. You may use a programming language of your own choice (LISP, JAVA, C, etc.).

The game will proceed by printing the state of the board, letting the person (white) play a chip, letting the computer (black) decide and play its chip, printing the state of
the board, letting the person decide, etc. The game ends when either player wins or the board fills up and the players tie.

3 Extra Credit (30 points)

Make the game interruptible – that is, be able to demand an immediate play from black during black’s deliberation. To do this you must base black’s game tree search upon iterative deepening. We shall hold a tournament at the end of the term to determine the smartest interruptible connect-4 system. The ultimate winner shall get an additional 20 points of extra credit and several peanut-chocolate cookies.

4 What to hand in

You should hand in a complete and well-written report in the red box marked ‘C/D’ on the fourth floor of MIT-Huset before 11:59 pm on the due date. Please consult http://www.cs.umu.se/information/rapportguide.html for guidelines on how to write this report.

Your report may be brief, but please be extra careful to turn in a test run that shows the program beating a reasonable human opponent. Please place your code in ~/edu/ai/lab1/ of one of the members of your group and identify this group member in your report.

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1To participate in the tournament, your system must be able to let either the computer or the person take the first move.