Fall 2015 **COSC 3P71 Introduction to Artificial Intelligence: project**

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This project has two options, and you need to choose only one.

Option I: Implementing a Chess program, with a game tree-based AI (**Due: Wednesday January 6th, 2016)**

Your TASK
Working alone or in a group of two (recall the restrictions with students taking cosc 3p98), implement a chess-playing program whose system requirements are as follows:

- The program should respect the rules of chess, for example,
  - the movement of pieces (including castling and *en passant*),
  - piece promotion, check
  - checkmate
  - stalemate

  Please obtain a book on chess to verify your understanding of the game!

- You can implement your system on any platform and language you want as long as it is available in our labs. You may have to show me/TA it working in the case of some platforms.

- The program must use a game tree search scheme with alpha-beta pruning. Furthermore, the program should permit user-supplied control parameters, for example, the depth of search.

- *Put effort towards designing an effective board evaluation function.* You should research the literature on computer chess to find strategies used by other systems. You can borrow ideas from the literature (properly acknowledged in your report). I also encourage you to try your own ideas!

- The program should interact with a human player. Moves should be given via board coordinates. At the minimum, the program should dump out the current board as an ASCII table (e.g., upper case = black, lower case = white, space = "-",). Although a graphical user interface is not required, an effective GUI will be positively considered during evaluation.

- Your program should permit any board setup to be used initially. (This is good for testing purposes)

- An option is that your program should dump out the game in terms of a standard chess output text file.

Hand in printouts of all your code, an executable version of the program, and a 6-8 page clearly typed document describing the use and design of your system. Also make an electronic submission for MOSS purpose. Include any references you used during your research.

Note: If there is interest, we could set up a 3P71 Chess Tournament for all the programs implemented. Prizes for the winner!

Option II: Term paper (**Due: Wednesday December 15th, 2015**)

Length: 8-10 pages (1.5 line spacing, 12 pt, Word processed, "reasonable margins")

Topic: You are to write a critical essay on a topic in Artificial Intelligence. AI is a wide area, so pick a topic that is fairly focused. Please discuss your topic with me before you begin writing your paper **(I must approve your topic by the last day of class for you to choose this option)**. Some possible areas include:

A commercial AI tool.
Languages and environments for AI
An industrial application of AI that has solved some problem.
The use of AI in the entertainment industry (i.e. computer games).
A discussion paper on philosophical aspects of AI.
An overview and detailed critique of some contemporary approach in AI research.

Essays should have the following general structure:

- Title page with Abstract (1 paragraph summarizing your essay)
- Section 1: Introduction
- Section 2: Main discussion: descriptions, criticisms, analysis …(Discussion of counter-arguments/support, as well as your own ideas/suggestions (Depending on your topic, Section 2 may vary)
- Section 3: Conclusion
- Bibliography

Marks will be based on:

The clarity of your paper: how well you express your points/views.
The accuracy of your arguments (philosophy topic), or the descriptive clarity of the system you describe.

- Spelling, grammar, formatting
- The clarity of your paper: how well do you make your points?
- The use of additional references. You should use at least 4 references in your Bibliography appropriately cited within your text. Web-based references (online Pages, Wikipedia) are not to be used *unless* the page is an electronic journal paper.
- Layer-out: the general flow and concluding remarks
- Please keep text quotations and extracts from other references to a minimum, and

include citations for any quotations you make.