Syllabus
Weber State University
CS 4500 @ SLCC
Artificial Intelligence and Neural Networks
Spring 2015

Instructor: Larry Cousin
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ldcousin@mmm.com

Book: Artificial Intelligence in the 21st Century
By: Stephen Lucci and Danny Kopec
We will go through selected sections of the book.

Class Time:
5:30 – 7:20pm  M, W

Class Location:
SLCC Redwood Campus: 4600 S Redwood Road, Salt Lake City, UT  84130
Room: Business Building 320?

Class Dates:
Jan 12 – April 27, 2015

Published Prerequisites:
CS 2420, Math 1630 or CS 3130

Assumed Prerequisite:
1) I assume you are comfortable programming in some language available on the PC. If you can’t program, go back and take the prerequisites! You will be exposed to several AI languages and technologies for this course—you must be willing to learn and use new languages and techniques.
2) You should have taken some kind of data structures and algorithms course. If not, go back and take the prerequisites!

What I expect you to do for the class:
2) Have experience working on software projects that show the application of Artificial Intelligence (AI).
3) Do the exercises in the book for the assigned chapters. They will not be checked or count toward your grade, but will contribute to successfully learning AI concepts.
4) Participate, ask questions, and state your point of view with mutual respect.
5) Work hard and try your best.
6) Participate to your best ability on projects.
7) Honesty in all aspects of your work. Cheating on any deliverable (project, etc.) will guarantee you an E grade on that work and may result in you failing the course. See the cheating section below.

What you can expect from the Instructor:
1) Presentations of material that will help you understand the fundamental nature of AI.
2) Fairness.
3) Introductory experiences with tools that will help you begin to understand the importance of some AI techniques.
4) Assigning and working with you on projects that will help teach you some aspects of Artificial Intelligence.

What your grade will be composed of:
1) Work on five software projects:
   a. Graded at 12% each: 60%
2) Paper: Checkers to other game 10%
3) Attendance 10%
4) Midterm & Final 20%

Grades:
A  95-100    C  74-77
A- 91-94    C- 71-73
B+ 88-90    D+ 68-70
B  84-87    D  64-67
B- 81-83    D- 61-63
C+ 78-80    E  0-60

What are the projects?
1) You will learn about the concepts of state-space search and heuristics by implementing the program to find a solution to the eights (sixteens?) puzzle. You will use a variation of the A* algorithm.
2) For the Min/Max paper, you will study game playing strategy and experiment with a program to play the computer with tic-tac-toe and checkers using the Min/Max algorithm. You will propose how the software could be re-hosted to play a different game of your choosing.
3) You will learn a subset of the expert system language CLIPS and program a simple expert system with it.
4) You will learn about artificial neural network systems by experimenting with Neuroph, the Java Neural Network Framework. You will use it to train different types of neural nets.
5) You will use the See5 (C4.5) decision tree induction system to produce a set of rules that model a set of real world data that you will give the system.
6) You will parse a block of text with the OpenNLP tool-set and evaluate that parse.
7) Projects can be turned in late but they will lose an additional 25% per each class period they are late. I may modify due dates based on the flow of the course.
What deliverables are required for the project?

1) Source code listing, test cases, and test results.
2) Executable system to be graded by me (the customer). Note: my interpretation of “works” and “does what is required” is my interpretation—not yours. A VERY big part of your project this semester is reading what I (the customer) like and want and what I don’t like and don’t want. If you can’t stand working this way, I suggest you consider weather reporting as a major and not Computer Science! Project grades:
   a) A: does everything I asked for AND MORE—no obvious bugs,
   b) B: does everything I asked for—perhaps a few bugs but excellent,
   c) C: does MOST of what was asked for—perhaps some bugs and not exceptional,
   d) D: does some of what was asked for—perhaps many bugs,
   e) E: not what was asked for or doesn’t work or no work.

Lab:
We will have lab time for one class period most weeks except towards the end of the semester when we may do lab both class periods. Plan to be there for lab unless told otherwise. If you just show up to be counted and then leave, you may be marked absent. If you have finished your project and passed it off then work on the next project.

Class cancellation announcement:
SLCC will cancel classes based on SLC weather (not the weather at the main Weber campus). However, if Weber cancels classes at the main campus, and SLCC still holds classes then I will probably hold class. You will be responsible for making up any missed work. It’s not my responsibility to make sure you are made up—it’s yours!

Accommodations for disabilities:
Any student requiring accommodations or services due to a disability must contact Services for Students with Disabilities (SSD) in room 181 of the Student Service Center.

The instructor reserves the right to modify this outline without prior notice.
<table>
<thead>
<tr>
<th>Schedule:</th>
<th>Projects Due:</th>
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<tbody>
<tr>
<td>Jan.</td>
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</tr>
<tr>
<td>W 14</td>
<td>Lab: A*</td>
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<tr>
<td>M 19</td>
<td><strong>Martin Luther King, Jr. Day – No Class</strong></td>
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<tr>
<td>W 21</td>
<td>Lecture: Chap. 1, 4 / Min/Max / Give Min/Max Paper Assignment</td>
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<tr>
<td>M 26</td>
<td>Lab: A*</td>
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<td>W 28</td>
<td>Lecture: Chap. 5, 6 / Logic</td>
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<td>Feb.</td>
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<td>M 2</td>
<td>Lab: Min/Max paper</td>
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<td>W 4</td>
<td>Lecture: Chap. 7 / Production Systems / CLIPS / Give CLIPS Proj.2</td>
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<tr>
<td>M 9</td>
<td>Lab: CLIPS</td>
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<tr>
<td>W 11</td>
<td>Lecture: Chap. 9 / Expert Systems / Lab: CLIPS</td>
</tr>
<tr>
<td>M 16</td>
<td><strong>President’s Day – No Class</strong></td>
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<tr>
<td>W 18</td>
<td>Lecture: Chap. 8 / Fuzzy Logic / Demo FzyWzy</td>
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<tr>
<td>M 23</td>
<td>Lab: CLIPS / Midterm Review</td>
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<tr>
<td>W 25</td>
<td><strong>Midterm Exam</strong></td>
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<tr>
<td>March</td>
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<tr>
<td>M 2</td>
<td>Lab: CLIPS</td>
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<tr>
<td>W 4</td>
<td>Lecture: Machine Learning: See5 &amp; SVMs / Give See5 Proj.3</td>
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<tr>
<td>M 9</td>
<td><strong>Spring Break – No Class</strong></td>
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<tr>
<td>W 11</td>
<td><strong>Spring Break – No Class</strong></td>
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<tr>
<td>M 16</td>
<td>Lab: See5</td>
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<tr>
<td>W 18</td>
<td>Lecture: Chap. 10 / Neural Nets / Neuroph Give NN Proj.4</td>
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<tr>
<td>M 23</td>
<td>Lab: See5</td>
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<td>W 25</td>
<td>Lab: Neuroph</td>
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<td>M 30</td>
<td>Lecture: Chap. 12 / NLP / OpenNLP Give OpenNLP Proj.5</td>
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<td>April</td>
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<td>W 1</td>
<td>Lab: Neuroph</td>
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<td>M 6</td>
<td>Lecture: Chap. 11 / Genetic Algorithms</td>
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<td>W 8</td>
<td>Lab: Neuroph</td>
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<tr>
<td>M 13</td>
<td>Lecture: Intro. To Prolog and Lisp</td>
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<tr>
<td>W 15</td>
<td>Lab: OpenNLP Parser</td>
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<td>M 20</td>
<td>Lab: OpenNLP Parser</td>
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<tr>
<td>W 22</td>
<td>Lab: OpenNLP Parser / Final Review</td>
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<td>M 27</td>
<td><strong>Final Exam</strong></td>
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Cheating:
Students are expected to maintain academic ethics and integrity in regards to performing their own work. The WSU Student Code states:

a. Cheating, which includes but is not limited to:
   1) Copying from another student's test paper;
   2) Using materials during a test not authorized by the person giving the test;
   3) Collaborating with any other person during a test without authority;
   4) Knowingly obtaining, using, buying, selling, transporting, or soliciting in whole or in part the contents of any test, without authorization of the appropriate official;
   5) Bribing any other person to obtain any test;
   6) Soliciting or receiving unauthorized information about any test;
   7) Substituting for another student or permitting any other person to substitute for oneself to take a test.

b. Plagiarism, which is the unacknowledged (uncited) use of any other person or group's ideas or work. This includes purchased or borrowed papers;

c. Collusion, which is the unauthorized collaboration with another person in preparing work offered for credit;

d. Falsification, which is the intentional and unauthorized altering or inventing of any information or citation in an academic exercise, activity, or record-keeping process;

e. Giving, selling or receiving unauthorized course or test information;

f. Using any unauthorized resource or aid in the preparation or completion of any course work, exercise or activity;

g. Infringing on the copyright law of the United States which prohibits the making of reproductions of copyrighted material except under certain specified conditions; If a student is caught cheating, the student will receive an automatic failure for the course. If it occurs again, the student will be expelled from the program for a period of one semester (not including summer). The third occurrence will result in dismissal from the program.

Weber CS department chair Dr. Rague has stated:
"CS Department policy dictates that any verifiable evidence of student academic cheating, as defined and determined by the instructor, will result in: 1) an automatic failing grade for the class and 2) a report to the Dean of Students that will include the student's name and a description of the student's dishonest conduct."

What software will be used:
1) CLIPS
2) Larry’s Fuzzy Logic System (FzyWzy)
3) See5
4) Neuroph, the Java Neural Network Framework
5) OpenNLP Parser
6) For Project 1, C# or Java can only be used!
7) For Project 2, use Clips
8) For Project 3, See5 will be used  
9) For Project 4, use Neuroph  
10) For Project 5, the OpenNLP parser will be used

Questions from the class?