course guide for cmput 355

up to September 14, 2020

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I joined UAlberta in 1999 and started a computer Hex project around 2000. Thanks to students, postdocs, and faculty members — Yngvi Björnsson, Michael Johanson, Morgan Kan, Nathan Po, Jack van Rijswijck, Philip Henderson, Broderick Arneson, Aja Huang, Jakub Pawlewicz, Brad Thiessen, Henry Brausen, Jesse Huard, Kenny Young, Noah Weninger, Chao Gao, Martin Müller, Jonathan Schaeffer — the project grew and grew. 

Around 2017 Paul Lu suggested that Martin Müller and I create two general-audience games courses that build on the buzz of AlphaGo. Martin created 455, I created 355. Thank you Paul and Martin for helping get this course started.

Ryan B. Hayward
This is a course guide for CMPUT 355, with links to lectures and home study work. Assignments and worksheets are found on eclass, not here.

CMPUT 355 — games, puzzles, algorithms — is a first course on algorithms for one-player puzzles or two-player games. The course is inspired by AlphaGo and by the recreational math of Martin Gardner, John Conway, Elwyn Berlekamp, Richard K. Guy and many others.
On March 16 2016, in a luxury hotel in Seoul Korea, the legendary 9-dan professional Lee Sedol sat down in front of a board to start an unusual go match. Aja Huang, the human who faced him across the board, was there only to place stones on the board: Lee’s opponent was the computer program AlphaGo.

Millions of people watched this game live, (including 60 people who met late at night to watch on a big screen in the Computing Science Center at UAlberta).

The opening moves were typical of a professional match, until move 7, when Lee played a strange move perhaps intended to confuse AlphaGo. But AlphaGo was not confused.

AlphaGo soon established a strong position, which gradually but continually improved as the game progressed. And then, more than 3 hours after it had started, the game ended when Lee Sedol resigned.

For the first time ever, a computer program — playing with no handicap advantage — had defeated a top go professional in a game.

How did this happen?
Here is what we have covered so far. Each lecture is recorded and posted on eclass, under reference materials: https://eclass.srv.ualberta.ca/mod/page/view.php?id=4401146

week 1
• lecture 1: course outline
• lecture 2: course overview, some of the games we will cover, including go and hex

week 2
• no Tuesday lecture, instead do home-study 1 (worksheet 0): http://webdocs.cs.ualberta.ca/~hayward/355/asn/20/wk0.pdf
• lecture 3: the rules of go, a simple python go environment

week 3
• worksheet 1 due on eclass
• no Tuesday lecture, instead do home-study 2, listed on the course webpage
• lecture 4 will be on Conway’s game of life