CSI2101 Discrete Structures Winter 2009: Introduction and Review (Lectures 1 and 2)

Lucia Moura

Winter 2009

Course Content Overview
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Administrative issues
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Introduction to Discrete Structures
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Course Content Overview

Calendar description:

CSI2101 Discrete Structures (3,1.5,0) 3 cr. Discrete structures as they apply to computer science, algorithm analysis and design. Predicate logic. Review of proof techniques; application of induction to computing problems. Graph theory applications in information technology. Program correctness, preconditions, postconditions and invariants. Analysis of recursive programs using recurrence relations. Properties of integers and basic cryptographical applications. Prerequisite: MAT1348.

Objectives:

- Discrete mathematics form the foundation for computer science; it is essential in every branch of computing.
- In MAT1348 (discrete mathematics for computing) you have been introduced to fundamental problems and objects in discrete mathematics.
- In CSI2101 (discrete structures) you will learn:
  ▶ more advanced concepts in discrete mathematics
  ▶ more problem solving, modeling, logical reasoning and writing precise proofs
  ▶ how to apply concepts to various types of problems in computing: analyse an algorithm, prove the correctness of a program, model a network problem with graphs, use number theory in cryptography, etc.

Textbook and extra material

References:

- Textbook:
  Kenneth H. Rosen, Discrete Mathematics and Its Applications, Sixth
  Edition, McGraw Hill, 2007.
  (same textbook as MAT1348; we will use different sections!)
- Reference classnotes: Winter 2008, Prof Zaguia:
  http://www.site.uottawa.ca/∼lucia/courses/2101-09/csi2101-
  2008/index.html

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Course Content Overview

Topic by topic outline (tentative dates):

1. Introduction and review of propositional logic (Sec 1.1,1.2) Jan 8,12
2. Predicate logic (Sec 1.3, 1.4) Jan 15,19
3. Review: rules inference/proof methods (Sec 1.5, 1.6, 1.7) Jan 22, 26
4. Review of mathematical induction (Sec 4.1, 4.2) Jan 29, Feb 2
5. Program correctness and verification (Sec 4.4, 4.5) Feb 2, 5, 9
6. Review lecture/*Study Break*/Midterm Test. Feb 12/*Feb16-20*/Feb 23
7. Recursive definitions and structural induction (Sec 4.3) Feb 26
8. Growth of functions, complexity of algorithms (Sec 3.2, 3.3) Mar 2
9. Basic number theory and applications (Sec 3.4, 3.5, 3.7) Mar 5, 9, 12
10. Solving recurrence relations and complexity of divide-and-conquer algorithms (Sec 7.1, 7.2, 7.3) Mar 16, 19, 23
11. Selected problems involving graphs and trees (Selection Ch. 9, 10 and/or other sources) Mar 26, 30, Apr 2,6
12. Review of the course Apr 9

Lectures, tutorial and contact

Professor Lucia Moura, Office: STE 5-027
email: lucia@site.uottawa.ca
(Your email message must have in the subject line:
"CSI2101 *student full name*" or it may not be read)
Office hours: Mondays 12:00-13:00
WEB PAGE: http://www.site.uottawa.ca/ lucia/courses/2101-09/

TUT Mondays 8:30-10:00 (MCD 121)
(tutorials are integral part of the course, presence is mandatory)
Lec1 Mondays 10:00-11:30 (MCD 121)
Lec2 Thursdays 1:00-2:30 (STE J0106)
Announcement: No tutorial on January 12!
Tutorial on January 17 to be confirmed!

Marking scheme

Assignments (A)	20%
Tutorial activities and quizes (Q)	5 %
Midterm exam (M)	25 %
Final exam (F)	50 %
Grade (G)	100 %

Final Grade (G):
if $(0.25*M + 0.50*F)/0.75 < 50\%$ then
$\quad$ G=$(0.25*M + 0.50*F)/0.75$

if $(0.25*M + 0.50*F)/0.75 \geq 50\%$ then
$\quad$ G=$0.25*M + 0.50*F + 0.20*A+0.05*Q$

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Important dates:

Assignment (currently tentative) due dates:

(A) is the average of:	Due date:
Assignment 1	week of Jan 26 (TBA)
Assignment 2	week of Feb 9 (TBA)
Assignment 3	week of Mar 16 (TBA)
Assignment 4	week of Apr 6 (TBA)

Important dates:

Midterm test date: February 23 (Monday) start 9:30 in MCD121

First lecture: January 8 (Thursday).

Study break: February 16-20.

Last date to drop: March 2.

Last lecture: April 9 (Thursday).

Final Exam Period: April 14-30, 2009

Introduction to Discrete Structures and Review of Propositional Logic

Now we will move to lecture notes 2008 slides (N1,N2):

CSI2101/2008 Introduction (Introduction08.pdf, p. 4-22).
CSI2101/2008 Review of Propositional Logic (Review08.pdf, p. 1-29).

(If you have troubles hyperlinking to this file directly from here, open the secondary file directly)