COMPSCI 1JC3

Introduction to Computational Thinking

Fall 2017

Course Outline

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McMaster University

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Note: This course outline contains important information that may affect your grade. You should retain it and refer to it throughout the semester, as you will be assumed to be familiar with the rules specified in this document.

Instructor

Dr. William M. Farmer
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Office Hours: To see me, please send me an email message with some times you are free.

Teaching Assistants (TAs)

Curtis d'Alves (`dalvescb@mcmaster.ca`) [Graduate TA]
Victor Chen (`chenv5@mcmaster.ca`) [Undergraduate TA]
Natalie Chin (`chinnh@mcmaster.ca`) [Undergraduate TA]

Schedule

Lectures C01 & C02:	MoWeTh	1:30–2:20	HH 109
Tutorial T01	We	11:30–1:20	BSB 249
Tutorial T02	Th	9:30–11:20	BSB 249
Tutorial T03	Fr	2:30–4:20	BSB 249

Course Web Site

This course will be administered via Avenue to Learn. Go to

`http://avenue.mcmaster.ca/`.

to access the course's Avenue to Learn page. Please send only normal email to the instructional staff; do not send mail via Avenue.

Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster email accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the Instructor

It is the student's responsibility to be aware of the information on the course's Avenue to Learn page and to check regularly for announcements.

Calendar Description

"Inquiry into ideas and methods of computer science (CS), the science underlying our computational universe. Topics include what computers can and cannot do, the Internet and search engines, artificial intelligence, computer-controlled devices, and sustainability in computing."

Mission

The *mission* of the course is to (1) introduce students to *computational thinking* (i.e., thinking that is inspired, supported, or enabled by computing) and (2) help students begin the process of developing a sophisticated understanding of *computing*. The students will achieve these goals by exploring the salient ideas, methods, and technologies in computing and by solving problems using functional programming.

Learning Objectives: Postcondition

A *learning objective* for a course is something the student is expected to know and understand or to be able to do by the end of the course. The learning objectives for this course are given below. Taken together, this set of learning objectives constitute the *postcondition* of the course.

1. Students should know and understand:

    a. What computational thinking is.

    b. The key ideas, methods, technologies, and areas of computing.

    c. Functional programming language concepts.

2. Students should be able to:

    a. Design and write a simple functional program that satisfies a simple requirements specification.

    b. Formulate a test plan for a simple functional program.

c. Analyze a simple functional program.

d. Use the Haskell Platform as a problem-solving tool.

By the end of the course, each student should be comfortable programming in Haskell.

Learning Objectives: Precondition

The *precondition* of the course is the set of university-level learning objectives that the student is expected to have achieved before the start of the course. Since this course has no university-level prerequisites, its precondition is empty.

Required Resources

1. Textbook 1: Paul S. Wang, *From Computing to Computational Thinking* [abbreviated CCT], Chapman and Hall/CRC, 2015. ISBN-13: 978-1482217650. Available in a less expensive eBook edition.

2. Textbook 2: Simon Thompson, *Haskell: The Craft of Functional Programming (3rd Edition)* [abbreviated HCFP], Addison-Wesley, 2011. ISBN-13: 978-0201882957.

3. Equipment: An iClicker+ remote.

Work Plan

The work plan for each week will consist of 4 hours of preparation, a 1-hour lecture, two 1-hour discussion sessions (during lecture times), and a 2-hour tutorial (9 hours in total). The 4 hours of preparation will by done by the student outside of class. The lectures will be given by the Instructor; the discussion sessions will be lead by the Instructor; and the tutorials will be lead by the TAs. The Instructor will present in the lectures key ideas about functional programming and computational thinking. The Instructor and the students will discuss in the discussion sessions the material given in CCT. The students will work on programming exercises and assignments in the tutorials. The material in the entire text of CCT and in Chapters 1–11 of HCFP will be covered.

The students are expected to participate in the lectures, discussion sessions, and tutorials by asking questions and answering clicker questions. In addition during the discussion sessions, students will be selected from a randomized class list and asked questions about the weekly reading assignments in CCT. The student's answer will be given a mark ≤ 3. At the end of each week, each student is required to submit to a discussion forum on Avenue a list of three things from the week's lecture, discussion sessions, and tutorials that were especially meaningful or memorable to the students. These *meaningfuls and memorables (M&Ms)* are intended to help students to reflect on

what they are learning and to give the Instructor insight into the student's learning process.

There will be five programming assignments that will be marked by the TAs. The mark for an assignment will be determined in part by running the code and in part by reading the code. Each programming assignment will be due approximately two weeks after it is posted on Avenue. There will be an opportunity to receive extra credit marks by doing extra work on the assignments.

There will be two midterm tests, one on Friday, October 20, 2017 at 19:00–21:00 pm and another on Friday, November 17, 2017 at 19:00–21:00 pm. The final exam will be 2.5 hours long. It will test accumulative knowledge and will take place on the date scheduled by the University. The midterms and final exam are multiple choice and *closed book* (which means you may not refer to any notes or books during the exam period).

The midterm tests will be done in a two-stage manner. Each student will take the test twice. For the first time the student will do the test by herself without help from anyone. For the second time the student will do the test again with help from any of the students in the testing room. 90 minutes will be allotted for the first stage and the remaining 30 minutes for the last stage. The first stage test counts for 85% of the test mark and the second stage counts for 15%.

Course Evaluation

In the middle of the term, the students will have the opportunity complete a survey about how the course is going and to attend a course review session with the Instructor. Each student will be invited to attend a course review session in which she can ask questions about the course and give feedback directly to the Instructor. Attendance is optional, but each student who participates in one of the course review sessions will received a 2.0 percentage point bonus. The feedback that is received from the course survey and course review sessions may be used to modify how the course is working.

Near the end of the term, each student will have the opportunity to evaluate the effectiveness of this course. The feedback that is received from the course evaluation is very valuable to the Instructor and will be used to improve the course in subsequent years.

Drop-In Centre and ETB 126

To help you with any questions you may have on programming in Haskell and other languages, a computing Drop-In Centre is offered by the Department of Computing and Software in ITB 242 Monday to Friday at 9:30–16:20. If you need any help with Haskell programming, please take advantage of this valuable resource.

ETB 126 will be available 10:30-14:30 each day for individual and group study.

Clickers

A clicker system is for real-time, in-class feedback. This course will be using the iClicker+ system, and all students taking this course are required to use iClicker+ remotes. Students are expected to do the following:

1. Purchase the following iClicker+ remote from the McMaster bookstore:

   iClicker+ (ISBN-13: 9781498603058).

   You only need one iClicker+ for all your classes. You must have your own iClicker+; iClicker+s may not be shared among students.

2. You must register your iClicker+ at

   `http://www.iclicker.com/registration/`

   to receive credit for clicker questions. Select "iClicker Classic (formerly iClicker 7)" and then "My institution does not use an LMS". Use your MacID where the "Student ID" is requested. *Do not use your student number.*

3. Bring the iClicker+ to all lectures, discussion sessions, and tutorials.

4. Maintain the iClicker+ in working order throughout the course.

5. Attach a label to your iClicker+ with your name so that you will not confuse your iClicker+ with someone else's.

6. Record the serial number of your iClicker+ in case it is rubbed off.

7. Failure to follow the policies related to iClicker+s may result in confiscation of the device(s).

Students are required to attend and participate in the lectures, discussion sessions, and tutorials. The iClicker+ system will be used by the Instructor during lectures and discussion sessions and by the TAs during the tutorials to assess understanding and also to measure participation. (See the Marking Scheme below for how the lecture, discussion session, and tutorial participation is factored into your final grade.) *Using another student's iClicker+ or lending an iClicker+ to someone to whom the iClicker+ is not registered will be considered as academic dishonesty.*

Academic Dishonesty

You are expected to exhibit honesty and use ethical behavior in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behavior can result in serious consequences, e.g., the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at

`http://www.mcmaster.ca/academicintegrity/`.

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g., the submission of work that is not one's own or for which other credit has been obtained.

2. Improper collaboration in group work.

3. Copying or using unauthorized aids in tests and examinations.

Your work must be your own. Plagiarism and copying will not be tolerated! If it is discovered that you plagiarized or copied, it will be considered as academic dishonesty.

Students may be asked to defend their written work orally.

Discrimination

The Faculty of Engineering is concerned with ensuring an environment that is free of all adverse discrimination. If there is a problem, that cannot be resolved by discussion among the persons concerned, individuals are reminded that they should contact their Department Chair and the Human Rights and Equity Services (HRES) office as soon as possible.

Academic Accommodation

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or email `sas@mcmaster.ca` . For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities.

Missed Work

A student who would like to receive accommodation for missed academic work due to an absence needs to complete a McMaster Student Absence Form (MSAF) on-line at

`http://www.mcmaster.ca/msaf/`.

When the MSAF tool asks you for the party who should receive your request for accommodation, enter `wmfarmer@mcmaster.ca`. MSAFs sent to any other email address will be ignored. *MSAFs are not accepted for missed class participation marks in lectures, discussion sessions, and tutorials.*

Course Modifications

The Instructor and University reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course web sites weekly during the term and to note any changes. Your McMaster email is the one with the address ending in `@mcmaster.ca`. This is a separate email address from your Avenue address.

Other Policy Statements

1. Significant study and reading outside of class is required.
2. The student is expected to participate in the discussions during lectures, discussions sessions, and tutorials.
3. If there is a problem with the marking of a programming assignment, the student should first discuss the problem with the TA who marked it. Assignment marks will only be changed if the problem is reported within two weeks of the date that the assignment was returned.
4. A student may not use his or her notes and books during the midterm tests and the final exam.
5. Cell phones may not be used during lectures, discussion sessions, and tutorials. They will be confiscated if used.
6. No electronic devices (calculators, cell phones, etc.) may be used during midterm tests and the final exam. They will be confiscated if they are within reach of a student, whether or not they have been actually used.
7. Email with a source address outside of McMaster University will not be read by the instructional staff.

8. Suggestions on how to improve the course and the Instructor's teaching methods are always welcomed.

Marking Scheme

The course grade will be based on the student's performance on class participation, programming assignments, midterm tests, and the final exam as follows:

Class participation	
a. Clicker questions	5%
b. Instructor's questions	5%
c. Meaningfuls and memorables (M&Ms)	5%
Programming assignments (5)	15%
Midterm test 1	15%
Midterm test 2	15%
Final exam	40%
Total	**100%**
Course review session bonus	2%

Notes:

1. The Instructor reserves the right to adjust the marks for a programming assignment, midterm test, or final exam by increasing or decreasing every score by a fixed number of points.

2. Class participation is measured by the number of clicker questions answered, the answers given to the instructor's questions, and the number of M&Ms submitted. The *clicker questions mark* is the percentage of clicker questions answered by the student in the lectures, discussion sessions, and tutorials. The *instructor's questions mark* is the average mark a student receives for questions that the instructor asks her in discussion sessions. The *M&Ms mark* is the percentage of acceptable weekly M&Ms that the student submitted. Submitted M&Ms must be professional and germane to the subjects studied to receive credit.

Course Schedule

The course schedule is given in a separate document entitled *Course Schedule*.