COMP SCI 2XB3

Computer Science Practice and Experience: Binding Theory to Practice

Winter 2020

Announcement

- Avenue is used for submissions, discussions, and further announcements. It is your responsibility to check Avenue regularly for the course announcements.
- You need i>clicker for this course. Please register your i>clicker **before** the first class. You can also use your smart device to participate. The course ID in i>clicker website (www.iclicker.com) is CS2XB3_2020.
- The walk-throughs and practice problems for the coming weeks are posted and you can start studying them.

Last Update: Dec. 20, 2019

Administrative Details

Instructor

Dr. Reza Samavi

Office: ITB213, ext. 24895, email: samavir@mcmaster.ca

Office hours: Monday 10:30-12:30

Teaching Assistants

Aida Motemer (motamerv@mcmaster.ca)

Duncan McKay (mckayd5@mcmaster.ca)

Hong Sun (sunh95@mcmaster.ca)

Sophia Tao (Taos1@mcmaster.ca)

Course Schedule

Lectures: Tuesday 11:30-12:20, DSB AB102

Labs sections and the supervising TA:

COMPSCI 2XB3 - L01	**COMPSCI 2XB3 - L02**	**COMPSCI 2XB3 - L03**
Tue 9:30 - 11:20AM	Thu 2:30 - 4:20PM	Mon 3:30PM - 5:20PM
KTH B123	BSB 241	KTH B123
Thu 9:30-11:20AM	Fri 2:30 - 4:20PM	Tue 3:30PM - 5:20PM
KTH B123	BSB 241	KTH B123
Duncan McKay mckayd5@mcmaster.ca	**Hong Sun** sunh95@mcmaster.ca	**Sophia Tao** Taos1@mcmaster.ca

Course Website

https://avenue.cllmcmaster.ca/d2l/home/313044

The website contains information related to the class, such as the course schedule, test dates and location, assignments, and other general information. It is the student's responsibility to be aware of the information on the course website, and to regularly check for announcements and course news.

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 websites during the term and to note any changes.

Prerequisites

COMP SCI 2S03, 2XA3

Note: Familiarity with Java programming language is required for this course. Students who do not have previous training on Java should consult the Java references in the References section. The first three practice labs will provide a condensed introduction to Java programming.

Co-Requisite

COMP SCI 2C03, 2ME3 (If you drop 2C03, you have to drop this course too as materials in these two courses are tightly connected.)

Course and Learning Objectives

Course Objectives

The objectives of the course are to allow students to apply computational solutions – learned through theoretical (algorithmic) analysis (2C03) and development techniques acquired through software design methods (2ME3) – on practical open engineering problems. The course and its deliverables are designed to facilitate experiential learning through individual and team-work. Students will learn to improve their inter-personal relationships within the team to implement software projects.

Note that this is the third of a series of courses in "CS Practice & Experience" and designed as an experiential learning course. This means that you will be learning the concepts *by doing*, i.e., by your own practice. As such, it is rather different to the common course format of lectures, tests, and, possibly, some labs. Four-hour lab per week is the main component of this course giving you the opportunity to practice. Success in this course largely depends on you taking advantage of the lab hours to practice and practice. The goal of this course is to prepare you to develop software for real world problems. The course will expose you to open engineering problems with multiple ways of solving them in an exploratory fashion and sometimes with incomplete inputs that requires reasonable assumptions by you.

Learning objectives, indicators, and rubrics

Outline of Topics

Week	Lectures	Lab - First session	Lab - Second session	Due Dates
Week 1: Jan. 6	Course review Programming model for algorithms, IDEs	No Lab	**Walk-through 1** Eclipse and Java Lab Instructions Lab safety	
Week 2: Jan. 13	Java static methods	**Walk-through 2** Java Tutorial	**Walk-through 3** Java Tutorial	*Team selection due Jan 18, 11:59pm*
Week 3: Jan. 20	Software versioning and Git	**Walk-through 4** Java Tutorial	**Git Tutorial** **Java Review**	
Week 4: Jan. 27	ADTs for Algorithms	**Walk-through 5** Implementing abstract data types (ADTs)	**Practice Lab** **Quiz 1 (Java Quiz)**	
Week 5: Feb. 3	Exception handling Software testing and documentation	***Walk-through 6*** Writing unit tests using JUnit	**Practice Lab** Team meeting	Team project proposal due, Feb 7, 11:59pm
Week 6: Feb. 10	Application of sorting algorithms Experimental studies of algorithms	**Walk-through 7** *Implementing sort algorithms* *Project proposal presentations (team)*	**Practice Lab** Team meeting	*Assignment 1 due* *Feb 14, 11:59pm*
Feb. 17	Midterm Recess	No lecture	No Lab	
Week 7: Feb. 24	Modern software development methodologies (Scrum)	**Walk-through 8** Experimental studies of algorithms	**Practice Lab**	
Week 8: Mar. 2	Application of search algorithms 1	**Walk-through 9 - 1** Implementing search algorithms	**Practice lab**	Team project Requirements Specification documents due, Mar 7, 11:59pm

			Quiz 2 (ADT + Sorting implementation) Searching algorithms Team meeting	
Week 9: Mar. 9	Application of search algorithms 2	**Walk-through 9 - 2** Implementing search algorithms	**Practice lab** Searching algorithms *Project progress checkpoint (team)*	
Week 10: Mar. 16	Application of Graph algorithms 1	**Walk-through 10 - 1** *Implementing graph algorithms*	**Practice lab** ***Quiz 3 (Search implementation)*** *Searching and Graph* Team meeting	
Week 11: Mar. 23	Application of Graph algorithms 2	**Walk-through 10 - 2** *Implementing graph algorithms*	**Practice lab** Searching and Graph Assignment 2 support Team meeting	*Assignment 2 due* *Mar 27, 23:59*
Week 12: Mar. 30	Algorithms in advanced contexts and basics of Machine Learning	**Practice Lab** Team meeting Final Project support	**Practice Lab** ***Quiz 4 (Graph implementation)*** Final Project support Team meeting	
Week 13: Apr. 6	*Final Project Presentation (team)*			*Final Project implemantation,* *Design Specifications and Peer review due Apr 12, 23:59 (team)*

Materials & Fees

References

Required Textbook: Since SE/CS 2C03 is a co-requisite of this course, all reading materials from the required text book for 2C03 (**"Algorithms", 4th ed., by R. Sedgewick and K. Wayne**) will also be required for this course.

The lecture notes and lab walk-throughs together with the textbooks of 2C03 and 2AA4 are the main resources for this course.

The free electronic edition of the book "Thinking in Java, 4th Edition" or purchasing the latest edition is recommended if you are interested in a paper copy.

This reference is the recommended background reading material for Java, to be used as a refresher source for the prerequisite Java information that is required by this course. There are many other online and paper copy Java references available that you can use, such as:

- Oracle online tutorials:

  http://docs.oracle.com/javase/tutorial/

- Head First Java, 2nd Edition, O'Reilly Media

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Course Overview and Assessment

Grading Scheme and Assessment

Evaluation is based on the following four components:

1. Assignments	30%
2. Quizzes and Lab participation	30%
4. Final Project (team)	40%

1. Labs and lectures

Labs are the major components of the course. There are a total of four hours of lab per week per section. This is divided into two 2-hour sessions of walk-through labs and practice labs. In the walk-through labs, students are provided with walk-through examples, highlighting the application of theories covered in the course lectures and in 2C03 and 2AA4. Teaching assistants will tutor students during the walk-through sessions and at the end of each walk-through session students should submit the completed examples to the assigned folder on the course website which be counted towards the lab participation. Practice labs are designed for two main purposes: problem solving and supervised team meeting. The first half of each practice lab (45 minutes) is designated for team meetings. In the practice lab, students from each group will sit close to each other to facilitate cooperation and consultation in a quiet manner such that it is not disruptive to other teams. Members of each team will meet, discuss the project progress, complete the project progress weekly form and communicate the issues such as team dynamics or any specific issues related to the final project (e.g., project topic selection, proposal, implementation, documentation). The course instructor and/or the assigned teaching assistant will be present to facilitate the meetings and address the questions or issues that may arise. The first three practice labs cover Java basics. You need self study to improve your Java programming skill too. Students lab attendance and Walk through submissions count for 5% of your final marks: 5%

for attending at least 90% of the labs, 4% for at least 80%, 3% for at least 70%, 2% for at least 60%, and 1% for at least 50%. You do not need to submit an MSAF for a missing walk-through or practice lab as you can get the full mark even if you miss one of each.

We have one lecture per week. Each lecture is a mixture of lecturing and i>clicker questions. You don't need to prepare for the lectures but the expectation is that you read the required readings for the co-requisite courses (i.e. 2C03 and 2AA4) for each week. Every class has a number of i>clicker questions. You get up to 2% bonus mark for participation in lectures: 2% for at least 80% participation, 1.5% for at least 70% participation, 1% for at least 60% participation. Using someone else's i>clicker or lending your i>clicker to someone else is considered Academic Dishonesty and will be pursued as such.

2. Quizzes

There will be four lab quizzes, distributed throughout the course. The content of the quizzes are about the Java implementation of the content you learned in this course and 2C03. The quizzes start at the beginning of the lab hours in the scheduled weeks (as appear above). Each quiz worth 7.5% of the course grade. If you MSAF a quiz the weight will be shifted to the the other remaining quizzes except for the last quiz. If you MSAF the last quiz, there will be a make up quiz to take.

2. Assignments

There are two homework assignments distributed throughout the term. Assignments will be posted on Avenue and must be completed before the due date. Completing assignments requires Java implementation of algorithmic solutions. Assignments are individual work. The work you submit must be your own. If you include libraries from any sources other than your own or from the course material (course lecture notes and lab notes/instructions) you must acknowledge them and explicitly give proper credit with meaningful comments inside your code (when using methods from the external libraries). The included libraries should not be a substantial part of your assignment. Copying full or partial codes from other resources and including them inside your code is strictly forbidden. Your work will be checked for plagiarism to account for this. Both copying assignments and allowing others to copy your assignments are strictly forbidden and will be treated as an academic offence. Your grade for assignments will be determined based on the following rules:

- A submitted assignment that does not compile or run gets 0 credit.
- A solution that runs but is partially correct gets partial credit (depending on the progress towards a full solution).
- Providing adequate, concise, and meaningful comments throughout your code is part of the solution grade (i.e., a piece of code that correctly solves a problem without (or with inadequate) comments will score less than a well-commented piece of code that does the same).
- Every hour after an assignment deadline, 2% will be deducted from the assignment mark. After 48 hours, the student will get 0 credit for the missing assignment. However, you should still submit your assignment as failing to submit an assignment will result in an incomplete grade in this course.
- If you miss an assignment due date for a legitimate reason (the legitimacy will be determined by the Associate Dean's office through MSAF and supplied documentation), it is your responsibility to immediately contact (email) the course instructor to arrange for the submission of the missed work.

4. Final project

The final project is team work and an important component of this experiential course. The main learning objective of the final project is to prepare you for developing software for real world problems. The final project is a software implementation project with algorithmic content consisting of the components described below. By doing the final project students will experience team-work in a situation similar to the real world software development environment. Early in the semester, students will form teams of four to five students. **All students in a team must belong to the same lab section**.

The final project consists of the following five items each extensively described in an additional document (Final Project Description) posted on the course website (Avenue). Although the first project deliverable is in about Week 5, your work on the final project starts from the first week. I strongly recommend you to read the full project document early in this course and discuss the contents and deliverables with the other team members:

1. Project proposal and its presentation

2. Requirements specifications

3. Design specifications

4. Final project implementation

5. Final project presentation

6. Team peer evaluation (individually completed)

Course policies:

Lab Safety

performing lab work. Please take the quiz before your first lab attendance. The quiz will not take more than 5 minutes of your time. There is no grade associated with the quiz. However none of your submitted work will be graded unless you successfully pass this lab safety quiz.

Re-grading Policy

(1) you should first meet with your TA in person (Please do not email prior to the meeting as it would not be accepted) during the last 45 minutes of the PRACTICE LAB of the week you received your grade to discuss with your TA your questions and concerns.

(2) The TA will not regrade your Assignment during the lab hour.

(4) Only after the meeting and if your TA realizes that a regrading is required you should ask the TA to send an email to the course instructor and CC you (your course code, your lab section should be included) describing what has been discussed with the TA and the rationale for regrading.

(5) the course instructor will make the final decision for regrading.

(6) Regrading requests for a deliverable will not be accepted after one week of the grade release.

The regrading request will not be accepted if the instructions above has not been followed.

Academic Integrity

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

"Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and 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 kinds of academic dishonesty please refer to the Academic Integrity Policy, located at http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf .

The following illustrates only three forms of academic dishonesty:

- Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained. (e.g. submitting a copy of someone else's writeup for an assignment)
- Improper collaboration in group work. (e.g., collaboration between groups in an assignment)
- Copying or using unauthorized aids in tests and examinations."

Requests for Relief for Missed Academic Term Work (Assignments, Mid-Terms, etc.)

The McMaster Student Absence Form is a self-reporting tool for Undergraduate Students to report absences DUE TO MINOR MEDICAL SITUATIONS that last up to 3 days and provides the ability to request accommodation for any missed academic work. Please note, this tool cannot be used during any final examination period.

You may submit a maximum of 1 Academic Work Missed requests per term. It is YOUR responsibility to follow up with your Instructor immediately (NORMALLY WITHIN TWO WORKING DAYS) regarding the nature of the accommodation.

If you are absent for reasons other than medical reasons, for more than 3 days or exceed 1 request per term you MUST visit your Associate Dean's Office (Faculty Office). You may be required to provide supporting documentation.

This form should be filled out immediately when you are about to return to class after your absence. http://www.mcmaster.ca/msaf/

E-Learning Policy

To utilize e-learning as a complement to traditional classroom instruction, students are expected to obtain appropriate passwords and accounts to access Avenue To Learn for this course. Materials will be posted by class for student download. It is expected that students will avail themselves of these materials prior to class. 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 e-mail account, and program affiliation may become apparent to all other students in the 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 this disclosure, please discuss this with the course instructor. Avenue can be accessed via http://avenue.mcmaster.ca.

Communications

It is the student's responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address to communicate with the course staff.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their @mcmaster.ca alias.
- Check the McMaster/Avenue email and course websites on a regular basis during the term.

Turnitin (via Avenue)

This course will be using a web-based service (Turnitin.com) to reveal plagiarism. Students submit their assignment/work electronically to Turnitin.com where it is checked against the internet, published works and Turnitin's database for similar or identical work. If Turnitin finds similar or identical work that has not been properly cited, a report is sent to the instructor showing the student's work and the original source. The instructor reviews what Turnitin has found and then determines if he/she thinks there is a problem with the work. Students who do not wish to submit their work to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to

http://www.mcmaster.ca/academicintegrity/turnitin/students/

MOSS

Measure Of Software Similarity is an automated system that will be used to detect similarity of software programs for the purpose of detecting plagiarism. All submitted work is subject to verification.

Protection of Privacy Act (FIPPA)

The Freedom of Information and Protection of Privacy Act (FIPPA) applies to universities. Instructors should take care to protect student names, student numbers, grades and all other personal information at all times. For example, the submission and return of assignments and posting of grades must be done in a manner that ensures confidentiality.

http://www.mcmaster.ca/univsec/fippa/fippa.cfm

Academic Accommodation of Students with Disabilities Policy

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 e-mail sas@mcmaster.ca. For further information, consult McMaster's policy for Academic Accommodation of Students with Disabilities

http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf

Students must forward a copy of the SAS accommodation to the instructor of each course and to the CAS Undergraduate Advisor immediately upon receipt. If a student with a disability chooses NOT to take advantage of a SAS accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete.
http://sas.mcmaster.ca

Student Code of Conduct

The Student Code of Conduct (SCC) exists to promote the safety and security of all the students in the McMaster community and to encourage respect for others, their property and the laws of the land. McMaster University is a community which values mutual respect for the rights, responsibilities, dignity and well-being of others. The purpose of the Student Code of Conduct is to outline accepted standards of behavior that are harmonious with the goals and the well-being of the University community, and to define the procedures to be followed when students fail to meet the accepted standards of behavior. All students have the responsibility to familiarize themselves with the University regulations and the conduct expected of them while studying at McMaster University.

http://judicialaffairs.mcmaster.ca/pdf/SCC.pdf and http://www.mcmaster.ca/policy/Students-AcademicStudies/StudentCode.pdf

Faculty Notices

"The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as the problem occurs."

“At certain points in the course it may make good sense to modify the schedule outlined above. The instructor reserves the right to modify elements of the course and will notify students accordingly (in class and post any changes to the course website).”