School of Computer Science, University of Guelph

CIS*4650 (Winter 2024) Compilers [0.50]

Instructor: *Dr. Fei Song*
Contact: fsong@uoguelph.ca
Office Hours: Mon., Wed., and Fri., 3:30 – 4:30 pm (Zoom meetings)

Graduate Teaching Assistants:
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Office Hours: Mon., Wed., and Fri., 4:30 – 5:30 pm
(Zoom meetings between Jan. 15 and Apr. 8 except the reading week)

Course website: https://courselink.uoguelph.ca/

This course introduces different programming paradigms followed by a detailed study on the compilation process of a procedural programming language. Students will gain an in-depth understanding of compiler construction by considering the fundamental issues such as scanning, parsing, building and manipulating the intermediate representation of a program, and code generation and optimization. The knowledge learned will be put into practice through the construction of a working compiler for a simple procedural language using the widely adopted tools (JFlex and CUP) and a general-purpose programming language (Java). More specifically, the warmup assignment and project checkpoints are designed to reinforce various concepts that are typically abstracted by tools during compiler construction in order to provide a complete picture of the compiler design and implementation process.

Students are expected to have a solid background in modular programming, assembly language, and basic computer architecture (e.g., machine instructions, registers, and memory organization). Experience with the development of large software projects such as those practiced in CIS*2750, CIS*3750, and CIS*3760 will be beneficial.

Prerequisites: CIS*2030, CIS*3110, and CIS*3150

Evaluation

- Warmup assignment: 10% (due on Feb. 2)

- Three checkpoints for the project: 45% (due on Mar. 4, Mar. 18, and Apr. 3)

- Midterm: 15% (online on Feb. 14, 9:30 – 10:20 am)

- Final exam: 30% (online on Apr. 16, 8:30 – 10:30 am)

Lecture attendance is important since the textbook and lecture notes will not necessarily provide adequate coverage for the course materials, especially the detailed explanations of examples and question answering in classes. Although labs are normally scheduled by the University, they will not be conducted this semester since all tutorial information will be explained in the regular lectures. Late submissions for the assignment and project checkpoints are not encouraged, and

there will be mark deductions of 10% for one day late, 25% for two days late, and 50% for three days late. No marks will be given for late submissions that are more than three days late.

Recommended References

Alfred Aho, Monica Lam, Ravi Sethi, and Jeffrey Ullman. "*Compilers: Principles, Techniques, and Tools*", Second Edition, Pearson, 2006.

John R. Levine, Tony Mason, and Doug Brown. "*Lex & Yacc*" 2nd Edition. O'Reily & Associates, 1992. (Available on CourseLink)

Standard Statements from the University

Email Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration: https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/.

Drop Date

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for Dropping Courses are available in the Undergraduate Calendar: https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/.

Copies of Out-Of-Class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. More information: www.uoguelph.ca/sas

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the

responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is outlined in the Undergraduate Calendar: https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs: https://www.uoguelph.ca/registrar/calendars.

Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via Courselink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (https://news.uoguelph.ca/2019-novel-coronavirus-information/) and circulated by email.

Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

COVID-19 Safety Protocols

For information on current safety protocols, follow these links:

- https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/
- https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces

Please note, that these guidelines may be updated as required in response to evolving University, Public Health, or government directives.