Comp3007 - Programming Paradigms

Description

An introduction to alternative programming paradigms such as functional, constraint-based, concurrent, and logic programming.

Prerequisites for the course: COMP2402 or equivalent

Topics Covered

Here is a list of the main topics covered:

- Introduction to programming paradigms
- Introduction to functional programming (using Scheme)
- Procedural and data abstractions
- Environments, Bindings, and Scoping Rules
- Modularity in object state
- Metalinguistic abstraction
- Introduction to logic programming (using Prolog)
- Recursive logic programming
- The Prolog cut

Course Objectives

This course will teach you to view programming languages from a broader perspective. An introduction to declarative paradigms of programming is intended to compare and contrast with your already attained knowledge of more "mainstream" imperative programming languages. An incremental focus using the simple syntax of Scheme will provide you with an appreciation and understanding of the elements of programming language design, in both Scheme as well as in programming languages in general. An introduction to logic programming using Prolog will further illustrate the consistencies and nuances of programming paradigms.

Textbook

Course textbook for Scheme is Structure and Interpretation of Computer Programs by Harold Abelson and Gerald Jay Sussman
Course textbook for Prolog is Prolog Programming a First Course by Paul Brna
Click the link(s) for access to these free resources.

Software

You will be programming using Scheme and Prolog.
Please go to racket-lang.org to download Racket on your machine.
Please go to swi-prolog.org to download Swi Prolog on your machine.

Evaluation

Students will be evaluated in this course according to the following measures:

Component	Weight
Assignments (x5)	40% (8% each)
Mid-term exam	15%
Final Exam	45%**

**Double pass rule: A grade of at least 40% on the final exam is required to pass the course.

Assignments

- There will be 5 assignments in this course.
- All assignments will be made available on the course web page as they are released.
- All assignments submissions must be your own individual and original work (see plagiarism).
- Software may be used to analyze and compare submissions to ensure that no instances of academic misconduct have been committed.
- All assignments are counted towards the final grade.
- Recommendations:
    - Do not wait until the last minute to submit your assignments.
    - Start early and keep submitting partially completed versions. That way, if you get sick, your partially completed version will be marked, and you will not get 0. Being sick on the day an assignment is due is not an excuse for not doing it. Last minute issues (e.g., home internet/device failure, sudden illness) are not considered acceptable excuses for having completed no work over the duration that the assignment was available.
    - Always keep a backup of your work, perhaps on a USB flash drive, via Dropbox, or by sending yourself an email with your assignment attached. That way you can access your code from anywhere.
    - If any instructions are unclear, please ask for clarification. Incorrect assumptions or misunderstood directions will not be accepted as valid excuses. It is your responsibility to ensure you understand the question completely.
- Submission Guidelines:
    - You will be using Carleton's cuLearn system to submit your assignments and view your grades throughout the term.
    - You should take the time to ensure that assignments are neat, legible and easy to understand. A portion of your grade for assignments will be given for the readability of them and for your demonstration that you have completed the assigned tasks. Often this is in the form of documentation and testing.
    - The assignment page is likely to have a section on submission guidelines. Please observe all special requirements placed there as well.
    - Any instructions required by the teaching assistants (for example any assumptions you made about the assignment) should be clearly indicated on a separate readme.txt file, included with the assignment.

    - DO NOT email your assignments to any TAs unless requested to do so.
    - It is your responsibility to ENSURE that your submission was successful. Submitting the wrong file or failure to correctly submit your work will result in a mark of zero for that unit.
- Grading:
    - All assignments submitted through cuLearn will be graded by the TAs or the Instructor.
    - Grading turn-around is expected to be within one week of the submission deadline, though this may vary depending on the volume and complexity of assignments.
    - You will be provided with a mark and feedback on your assignment through cuLearn as well.
    - You should ensure that the posted marks are correct.
    - Any concerns regarding assignment marks should be brought to the attention of the person who marked it, not the instructor. Contact emails are available via the Schedule page.
    - If the TA is unable to reasonably assess your concerns, either they or you may contact the instructor to arbitrate the discussion.
    - Voicing your concerns must be done **no later than two weeks** after the assignment has been returned to you. After this time, no remarking will be done.
- Late Policy & Accommodations:
    - Assignments must be handed in before or on the due date and time.
    - You will be given a sufficient amount of time to complete each assignment.
    - Any assignments submitted after the deadline will be marked with a late penalty.
    - The standard late penalty is 25% per day. (E.g., if your assignment is 30 minutes late, your maximum grade is 75%, 24 hours and 1 minute late, your maximum possible grade is 50%).
    - If an assignment indicates that no lates will be accepted then the late penalty will be 100% immediately following the deadline.
    - Any changes made to an assignment submission after the deadline (even minor or insubstantial ones) will result in the *entire* submission being considered late.
    - Illness on the due date or other last minute issues are not considered grounds for accomodation.
    - If you are sick for an extended period of time, please inform the instructor (not the TAs). You will need to have a doctor's note to verify your condition. Please ensure that the note is on the professional letterhead of the clinic. Only the attending physician who personally diagnosed the student at the time of their illness can sign/write the note. Such situations will be handled on a case-by-case basis.
    - Accomodations will not be provided once the deadline has passed.

Tutorials

There are no scheduled tutorials for this course.

Midterm

The midterm will be closed-book and will cover material discussed up to the lecture prior to the midterm. The midterm will be held during regularly scheduled lecture. The date of the midterm will be announced on the main course page. Your test must be handed back immediately when completed in order to be graded. You must attend, write, and submit the midterm in order to be graded. If sick, you must inform the instructor via email by the day before at the latest, and you will need to have a doctor's note to verify your condition. Please ensure that the note is on the professional letterhead of the clinic. Only the attending physician who personally diagnosed the student at the time of their illness can sign/write the note. The doctor's note must be submitted within one week of the missed test. Exceptions are only granted at the discretion of the instructor.

Final Exam

The time and place, as well as the format of the final exam will be announced later in the term. Do not make travel plans until the dates are known as no advance exams will be given. The exam period can be found at http://carleton.ca/registrar/registration/dates-and-deadlines/. Attendance of this exam is mandatory. Note the **"Double pass"** rule is in effect for this course. That is, a grade of less than 40% on this exam will result in failure of the course.

If you become ill during the examination period and need to apply for a deferral, please visit the Registrar's Office website for the most up-to-date information about deferred examination eligibility, deadlines, application, documentation and more.

Collaboration Policy

Collaborating on assignments is strictly disallowed. You must complete the work by yourself and all submitted material must be your own unique and original work. If you need help, please see a TA or your instructor. Posting assignment solutions on discussion boards is also prohibited.

SCS Computer Accounts

Any student taking an SCS course qualifies to have an SCS account. SCS accounts can be created at the following URL: http://www.scs.carleton.ca/newacct. SCS students can access one of the designated labs for your course. The labs are operational 7 days a week 24 hours per day, please be advised that the building will be closed overnight, Mon. - Fri. 23:00 - 8:00 and on weekends from 17:00 - 8:00. Technical support is available in room HP5161 Monday to Friday from 9:00 until 17:00. All SCS account related information is accessible at the following URL: http://www.scs.carleton.ca/nethelp.

Undergraduate Academic Advisor

The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP, by telephone at 520-2600, ext. 4364 or by email at undergraduate_advisor@scs.carleton.ca. The undergraduate advisor can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisor will also refer students to appropriate

resources such as the Science Student Success Centre, Learning Support Services and the Writing Tutorial Services.

Fair use of materials

All materials created for this course (including, but not limited to, lecture notes, in-class examples, tutorial exercises, assignments, examinations, and posted solutions) remain the intellectual property of the instructor. These materials are intended for the personal and non-transferable use of students registered in the current offering of the course. Reposting, reproducing, or redistributing any course materials, in part or in whole, without the written consent of the instructor, is strictly prohibited.

CSAS

The Centre for Student Academic Support (CSAS) is a centralized collection of learning support services designed to help students achieve their goals and improve their learning both inside and outside the classroom. CSAS offers academic assistance with course content, academic writing and skills development. Visit CSAS on the 4th floor of MacOdrum Library or online at: carleton.ca/csas.

University Policies

Student Academic Integrity Policy

Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University. Some examples of offences are: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found in the Undergraduate Calendar.

Plagiarism

As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science.

Unauthorized Co-operation or Collaboration

Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis". Please refer to the course outline statement or the instructor concerning this issue.

Students with Disabilities Requiring Academic Accommodations

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

Religious Obligation

Write to me concerning any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website http://www.carleton.ca/equity/accommodation

Pregnancy Obligation

Write to me concerning any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website http://www.carleton.ca/equity/accommodation

Medical Certificate

Students who are ill during an in-class test, or for an extended duration and are seeking accommodation for an assignment, will require a doctor's note as evidence of their inability to complete the assessment. The note must be the original documentation on official letterhead, signed by the attending phsician who personally diagnosed the student at the time of their illness. The note should indicate the nature of the illness/issue, and duration date that the student is expected to be unable to work. For more information see: https://carleton.ca/health/doctors-notes/