Introduction to Data Structures

Course Information

Course Number: COSC1P03
Term/Year/Duration: Fall 2024

Instructor Information

Instructor Name: Earl Foxwell
Office: MCD413
Contact: efoxwell@brocku.ca
Office hours: Tuesdays 4–5pm / Wednesdays 3:30–5pm

Times and Locations

Lectures: *Tuesdays / Thursdays, 2:30–4:00pm, WH324*
Tutorials: *Wednesdays, Noon–1:00pm, WH324*

Labs vary by student registration; please attend the one for which you're registered.

All lectures are delivered synchronously, in-person.
A Student may make or share an audio or video recording of a lecture, presentation, or lesson, **only with the permission of the instructor.**

Course Calendar Description

Programming and problem solving in a high-level programming language. Data structures including arrays and linked-lists. Modularity, abstraction and abstract data types including stacks, queues and lists. Introduction to searching and sorting, recursion, algorithm analysis and object-orientation.

Learning Outcomes:

- Compare performances of competing algorithms via asymptotic complexity analysis
- Design and use data structures to supplement solutions
- Solve problems according to recursive definitions
- Adopt new approaches to abstraction and class design
- Understand the strengths and limitations of both statically- and dynamically-allocated structures

Course Communications

All communication is delivered via Brightspace announcement and/or email. Students are expected to check both routinely, as anything posted to either may be deemed 'read'. This includes announcements in the event of class cancellations and inclement weather; but also postings, amendments to assessments, etc. Further requirements on assignments may also be communicated directly in lecture.

When emailing your instructor, include the name of the course in the **Subject** line. All correspondence must be from your student (Brock) email address.

Please note: your instructor is a *human being*. Emails written, 'polished', or otherwise generated by AI are incredibly unprofessional, but also might be caught by spam filters or otherwise missed. Also: trying to trick a human being into interacting with a machine because they aren't worth *your* time doesn't send a very positive sentiment.

Assessment Components

Assessment Component	Grade Weight
Labs (8)	10%
Assignments (4)	7.5 × 4 = 30%
Midterm lab test (Oct. 21st–25th)	10%
Midterm written test (Wed. Oct. 23rd)	10%
Lab Exam	10%
Written Exam	30%
Total	100%

Note: the lab test is during your regularly-scheduled lab time. The written test is during your scheduled **tutorial** time.

<u>**Important**</u>**: the final assignment grades will be determined in part by the lab test/exam.**
- For those assignments that are submitted, your final A1 and A2 grades will be assigned as the *average* (i.e. *mean*) of the raw Assignment grade, and the grades for the corresponding questions within the lab test
    - This means your actual A1/A2 grades may go up or down, according to how you perform under supervision
- The same applies for A3/A4, and the corresponding questions on the lab exam
- For missed assignments, there is no opportunity for the lab test/exam to 'raise' a missing grade

Additional requirements
The final exam is an integral component of assessment; students **must** earn a 40% on the final exam in order to qualify for credit in the course.
Labs comprise the experiential component of the course; there is no way to fully demonstrate practical skills without attending them all. To that end, **students must**

complete at least 6 of the 8 labs to qualify for credit in the course. To confirm: missing more than 2 labs — for *any* reason — will automatically result in an F.

In the event of any form of penalty imposed by the Dean's office for misconduct, offenders will be ineligible for any curving, shifting, or other academic consideration (as that would countermand prescribed penalties).

Assignments explore and reinforce concepts taught in class, and rely on content, tips, and instructions covered **only** in lecture; missing details due to skipping lecture does not constitute grounds for regrading. It is further expected that students will follow instructions, and submit cogent and sensical works. If the marker or instructor encounters anything confusing and emails a student questions (whether before or after an assignment grade has been released), that student has three **calendar** days to reply, or the work will be simply assigned a zero. It is your responsibility to ensure your submission can be understood by those evaluating it, and nobody else will put more effort into making sense of it than you do.

This also means you are expected to follow the same coding standards and practices as expected in Brock classes.

All solutions are to be implemented on a single computer; otherwise include an explanation with your submission. Failure to do so will result in a summary zero. All solutions must not require higher than **JDK 11**.

Late Submission Policy
Assignments may be submitted, up to 3 days late, subject to a flat 25% penalty.

- Late vs not-late is determined solely by Brightspace's server date/time
  - Do not inquire to have a penalty waived, or be permitted to submit after closing, because you lost track of time
  - Please remember that **lying about technical difficulties in Brightspace** is no different from any other form of misconduct
- Do not email submissions to your instructor
  - They will not be accepted
  - Unsolicited attachments may lead to your email address becoming blocked (by the instructor, or by ITS's automated filter)
  - There will *never* be any circumstances in which an exception should be made; you will *not* receive a reply restating this policy
- If any work must be missed, prompt communication is mandatory for any accommodation to be considered. i.e. when a student knows an assessment or assignment may be missed, the instructor must be notified *immediately* upon the student learning of the issue
- If e.g. any illness should occur immediately before a due date, submit whatever you have to demonstrate the amount you've completed thus far. If for some reason this is not possible,

upload it to your OneDrive/Sharepoint (under your Brock account credentials), set the upload to share with your instructor, and email a link to your instructor. Failure to demonstrate work completed to that point will result in the assumption of having forgotten the assignment

See Medical Exemption Policy and the medical health certificate at the [Registrar's Website (Forms).](#) Your instructor will decide what, if anything, to do *after* receiving the form, subject to the same points as above. If accepted, accommodations may include alternate submission arrangements, omitting a piece of work, shifting its weight onto some other work, or assigning an alternate work.

Common issues, such as leaving insufficient time to upload files, slow internet, etc. are easily anticipated, and avoided just as easily; and **not** grounds for exceptions. Accordingly, no such requests will receive a reply.

Important dates

The most recent listing of Important Dates for all durations is at https://brocku.ca/important-dates/all/

First day of classes: 4 September

Last day of lectures: 3 December

Last day of exams: 19 December

Deadline for withdrawal without academic penalty: 5 November

National Truth and Reconciliation Day: 30 September

Fall break week: 14–18 October

Academic Policies
Academic Integrity
Statement for undergraduate courses

Academic misconduct is a serious offence. The principle of academic integrity, particularly of doing one's own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should consult Section VII, "Academic Misconduct", in the "Academic Regulations and University Policies" entry in the [Undergraduate Calendar](#) to view a fuller description of prohibited actions, and the procedures and penalties. Information on what constitutes academic integrity is available at [Brock University Academic Integrity Website.](#)

This course may use phrase-matching software, or additional tools and scripts to assist with detection of academic misconduct. There is **no** opt-out, nor alternative provided.

Penalties for Academic Misconduct in the Faculty of Mathematics and Science

The following are standard penalties imposed in academic misconduct cases in FMS. Please be aware that the Associate Dean, Undergraduate Programs, may assign different penalties than those listed here, depending on the details of individual cases. ***Requests for special academic consideration, such as exceptions to academic regulations, will not be considered while academic integrity cases are ongoing.***

Penalties for miscondcuct in course work, including mid-term tests

First offence: Zero grade on assignment, additional penalty of 100% of the weight of the assignment to be subtracted from the final grade, mandatory completion of the AZLS Academic Integrity workshop

Second offence: Zero grade on assignment, 4-month suspension

Third offence: Zero grade in course, 1-year suspension, permanent removal from major program.

Fourth offence: Permanent suspension / debarment.

Penalties for misconduct in final exams:

First offence: Zero grade in course

Second offence: Zero grade in course, 4-month suspension

Third: Zero grade in course, 1-year suspension, permanent removal from major program,

Fourth offence: Permanent suspension / debarment.

Intellectual Property Notice

All slides, presentations, handouts, tests, exams, and other course materials created by the instructor in this course are the intellectual property of the instructor. A student who publicly posts or sells an instructor's work, without the instructor's express consent, may be charged

with misconduct under Brock's Academic Integrity Policy and/or Code of Conduct, and may also face adverse legal consequences for infringement of intellectual property rights.

Accommodations

The University is committed to fostering an inclusive and supportive environment for all students and will adhere to the Human Rights principles that ensure respect for dignity, individualized accommodation, inclusion and full participation. The University provides a wide range of resources to assist students, as follows:

a) If you require academic accommodation because of a disability or an ongoing health or mental health condition, please contact Student Accessibility Services at askSAS@brocku.ca or 905 688 5550 ext. 3240.

    In the interest of removing roadblocks before they're encountered, and for the sake of equal dignity for all, this course follows the principles of Universal Design for Learning. This means, where possible, the SAS-prescribed UDL alternatives will typically be favoured rather than the usual, more generalized individual accommodations. All students with accommodations are encouraged to discuss their requirements to ensure they're being met, but this must occur *before* issues arise.

b) **Medical Self-Declaration Forms (brief absence up to 72 hours)**

    In the case of a short-term medical circumstance, if a student wishes to seek an academic consideration, please use the Medical Self-Declaration Form. The request is to be made in good faith by the student requesting the academic consideration due to a short-term condition that impacts their academic activities (e.g., participation in academic classes, delay in assignments, etc.).

    The period of this short-term medical condition for academic consideration must fall within a 72-hour (3 day) period. The form must be submitted to the instructor either during your brief absence or if you are too unwell, within 24 hours of the end of your 3 day brief absence.

    Medical Verification Form (extended duration)
    In cases where a student requests academic consideration due to a medical circumstance that exceeds 72 hours (three days) and will impact their academic activities (e.g., participation in academic classes, delay in assignments, etc.), or in the case of a final exam deferral, the medical verification form must be signed by the student and the health professional as per process set out in the Faculty Handbook III:9.4.1.

c) If you are experiencing mental health concerns, contact the Student Wellness and Accessibility Centre. *Good2Talk* is a service specifically for post-secondary students, available 24/7, 365 days a year, and provides anonymous assistance: Good 2 Talk or call **1-866-925-5454**. For information on wellness, coping and resiliency, visit: Brock University (Mental Health)

d) If you require academic accommodation on religious grounds, you should make a formal, written request to your instructor(s) for alternative dates and/or means of satisfying requirements. Such requests should be made during the first two weeks of any given academic term, or as soon as possible after a need for accommodation is known to exist.

e) If you have been affected by sexual violence, the Human Rights & Equity Office offers support, information, reasonable accommodations, and resources through the Sexual Violence Support & Education Coordinator. For information on sexual violence, visit Brock's Sexual Assault and Harassment Policy or contact the Sexual Violence Support & Response Coordinator at humanrights@brocku.ca or 905 688 5550 ext. 4387.

f) If you have experienced discrimination or harassment on any of the above grounds, including racial, gender or other forms of discrimination, contact the Human Rights and Equity Office at humanrights@brocku.ca.

List of topics

Week	Tuesday	Thursday	Lab
1: Sep 4–6		Java/Booleans/Review	
2: Sep 9–13	Arrays		
3: Sep 16–20	ADTs/interfaces/inheritance		Arrays
4: Sep 23–27	Complexity		ADTs
5: Sep 30·–Oct 4	Linked Structures		—No labs this week—
6: Oct 7–11	Stacks/Containers		Linked Structures
(Fall Break Week — Oct 14–18)			
7: Oct 21·–25	Generics/Queues		→ **Lab Test** ←
8: Oct 28–Nov 1	Recursion		Generics
9: Nov 4·–8	Searching/Sorting		Recursion
10: Nov 11–15	Software Development		Searching/Sorting
11: Nov 18·–22	Something Interesting		Software Development
12: Nov 25–29	Review	?	Debugging