Course Syllabus:
EECS 2101: Fundamentals of Data Structures; Section E; Summer 2024

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EECS 2101 3.0 Fundamentals of Data Structures; Section E; Summer 2024

The course materials (slides, assignments, and other learning resources) and announcements will be posted on the York eClass website.

Are you ON THE Waiting List or Planning to enroll in EECS2101?
Students not officially enrolled in the course (and plan to enroll) are expected to attend the lectures from the first week of the term and complete all required work within the deadlines. Please contact the course instructor for details on obtaining temporary access to the course materials while your enrolment status is being decided. Otherwise, **if you miss an assessment deadline, you will receive a zero for that assessment.**

Course Description

The course discusses the fundamental data structures commonly used in the design of algorithms. Abstract operations on data structures are specified using pre- and post-conditions and/or system invariants. Trade-offs between a number of different implementations of abstract data types (ADT) are analyzed. Each algorithm operating on data structures is proved correct using loop invariants or induction. Both formal and informal proofs are introduced, but most of the reasoning is done informally. Data structures are coded and unit tested in an object-oriented language. Selecting the appropriate ADT and a suitable implementation depending on the application is covered.

Prerequisites: LE/EECS1019 3.00 or LE/EECS1028 3.00 or SC/MATH1019 3.00 or SC/MATH1028 3.00; LE/EECS1030 3.00 or LE/EECS2030 3.00.

Course Credit Exclusion and previously offered as: LE/EECS 2011 3.00.

Learning Outcomes (CLOs)

Upon completion of the course, students are expected to:

- **CLO1:** Instantiate a range of standard abstract data types (ADT) as data structures.
- **CLO2:** Implement these data structures and associated operations and check that they satisfy the properties of the ADT.
- **CLO3:** Apply best practice software engineering principles in the design of new data structures.
- **CLO4:** Demonstrate the ability to reason about data structures using contracts, assertions, and invariants.
- **CLO5:** Analyse the asymptotic run times of standard operations for a broad range of common data structures.
- **CLO6:** Select the most appropriate data structures for novel applications.

Instructors

- Section E:
    - Dr. Mufleh Al-Shatnawi
    - Email: mufleh at yorku.ca
    - Office hours: by appointment (please email to schedule a Zoom meeting).

Lectures

- Section E: **Tuesdays** and **Thursdays**, 16:00 PM (1.5 hours). Location: Location: **LAS C**. [Lassonde Building] [Google Map]

Course Management and Organization

There are three hours of lectures weekly. Lectures introduce the concepts mainly using a problem-based approach. Students implement such concepts in their programming (mainly) assignments. Students are encouraged to discuss concepts of the lectures and assignments with their peers. This should be done mostly outside lectures – while complying with academic honesty and integrity policies. We take matters related to academic dishonesty seriously and will use various technological means, such as MOSS, to encourage academic integrity. ***Ensure you learn the concepts – do not copy to finish the assignment***. Overall, the assignments help you reinforce the theoretical concepts introduced during lectures and prepare you for the tests where you must work independently.

This course is demanding in terms of time and should not be added to an already heavy load. Slides and many other resources are available online, ***yet not actively engaging in lectures and not completing assignment exercises could severely impact your grade***.

Course announcements will be posted on eClass in the "Course Announcements" section. By default, all enrolled students should receive an email notifying them of a new announcement. Regardless, **it is the responsibility of each student to be aware of all course announcements, so check the forum regularly**.

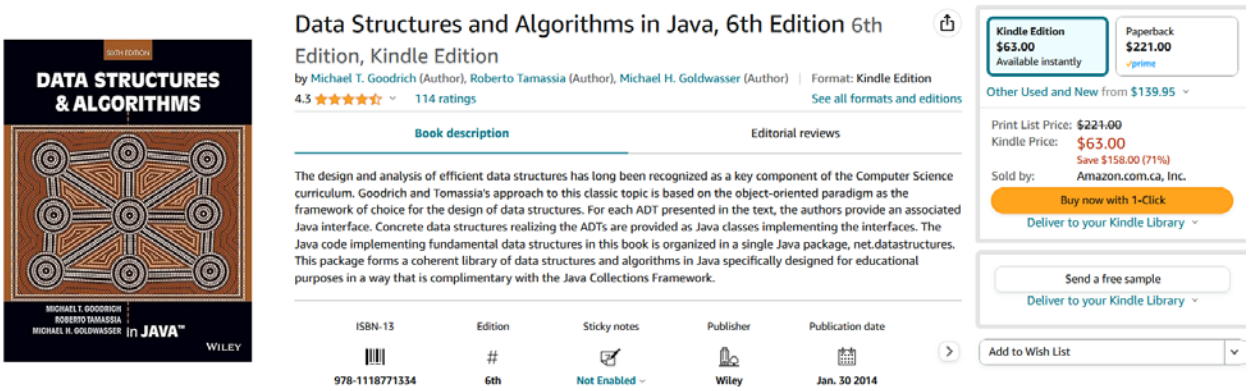
Also, all lecture slides, handout notes, links to other learning resources, assignment instructions, deadlines, and important dates are on **eClass**. Students must submit their assignments on eClass within the designated deadlines. **In order to be fair and consistent with regard to the entire class, we do not make exceptions for individual students.**

Textbook

Data Structures and Algorithms in Java (6th edition) by Michael T. Goodrich, Roberto Tamassia and H. Goldwasser John Wiley & Sons, Inc. (2014). **The textbook is required.**

The book's page on Amazon now shows two formats, "paperback" and "Kindle," and students can buy either from the same page. See the image below.

Note: "Kindle" is Amazon's name for their eBook "MOBI" format. Students can read the book using the free Kindle app on their Windows and MacOS computers as well as on their iOS and Android phones and tablets. They can also read it on their Kindle Fire Tablets (hence the name "Kindle") if they have one. Moreover, they can have multiple copies of it (e.g. one on their home machine and one on their phone), and they can sync across devices so they can pick up on one where you left off on the other. Details are here.



Highly Recommended Course References

- Cormen, T. H., Leiserson, C. E., Rivest, R. L., & Stein, C. (2009). Introduction to algorithms. MIT Press. This book does not have language-specific implementations but is very good for the theoretical components. Furthermore, the book surveys the most important algorithms and data structures in use today. They motivate each algorithm by examining its impact on applications to science, engineering, and industry.
    - https://algs4.cs.princeton.edu/10fundamentals/
- Weiss, M. A. (2012). Data structures and algorithm analysis in Java. Pearson Education, Inc.
- Best online video courses for Data Structures And Algorithms
- https://people.cs.vt.edu/~shaffer/Book/
    - C.A. Shaffer, Edition 3.2, (March 28, 2013) Data Structures and Algorithm Analysis in Java

Email Policies

- We encourage students to ask questions during lectures or office hours and **use the eClass discussion forum** before emailing the course instructors. They should use eClass to upload any paperwork within the designated deadlines. Email should be used only for special circumstances not facilitated in eClass.
    - Students are encouraged to participate in the online eClass forums to ask or comment on questions relating to course concepts.
    - Use a clear, informative subject line ("Please Help!" is **not** informative). Try to be as specific as possible.
    - Post comments appropriate to the particular discussion. Off-topic posts may be deleted without any warning or comment.
    - ***It is expressly forbidden to post or solicit solutions for tests or assignments through the discussion forum (or elsewhere, for that matter; we monitor various online venues).***
- To save time, do not ask a question for which an answer is in the Course Outline and Syllabus or the eClass discussion forum. Search this document and the course forum first.
- Only **use your York email account**. If your preferred email address is not set to your York email account, see an IT desk (online or in person) and change it.
- Please include "EECS2101", a brief indication of the topic in the subject line, and your formal name (the one used within YorkU systems), Passport York username, and student number at the end of your message. These are necessary to access your course records and materials. Also, include any additional information pertinent to your email's topic.
- Use grammatical English. Do not use SMS-style talk (e.g., "r u gonna return the tests tmr?") or other shorthand or slang. For some guides on drafting professional emails, **read this**.
- For all administrative matters (e.g., missing an assignment or a test), students should primarily follow the corresponding links on the eClass page within the deadlines. For circumstances that are not already facilitated in eClass, email the **course instructor**.
- For academic integrity and administrative fairness, we should not make any exception-- beyond the policies stated in this document-- if a student misses a test or an assignment deadline.
- Email messages not complying with these guidelines may not be answered in a timely manner.
- We generally respond to emails within 24 hours (usually much sooner) during working days. However, we reserve the right not to respond to any emails after hours, on weekends or during holidays, and the emails that pose questions that have already been answered in this document or the discussion forum.

Evaluation Scheme

Components	Weights
Assignments (Up to 9 Assignments): **Theoretical (Exercise Sets) and Programming** **For programming Assignments**, you will be graded **not only by JUnit tests given to you** but also by additional tests covering some other input values. This is to encourage you to take more responsibility for the correctness of your code by writing your tests. There will be a **40% penalty** on your lab final grade if your submitted code does not compile due to minor compilation errors, given that TAs can fix these minor compilation errors. You will receive **a zero if your code contains significant compilation errors that TAs cannot fix.**	**20%**
Weekly Test Your Knowledge Quizzes (TYKQs) **(At least 10 TYKQs, best 10 out X). These TYKQs will be open for 24 hours.**	**10%**
Midterm Test: Week of July 1, 2024. Students must take the midterm test during their official lecture hours on **Thursday, July 4, 2024**. The duration of the Midterm test is 80 minutes.	**25%**
Final exam (Comprehensive) (TBA)	**45%**

All Assignments, TYKQs and Tests are to be completed individually; no group work is allowed.
It is considered a **breach** of academic honesty if:

- ***You collaborate with someone on completing an assignment, TYKQs, or test during any stage of your development.***
- ***After you have attempted the assignment, TYKQs, or test, before that assignment, TYKQs, or test is closed, share your assignment solution, TYKQs or test questions with someone.***
- ***There are up to 9 assignments in the course. There will be no shifting of grade weights for assignments.***

Required Software and Programming Language:

- Your program must compile and run using the JDK (Java 17 Development Kit) with the Eclipse IDE for Java Developers
- Eclipse: The recommended IDE for the EECS2101 course.
- We will focus on object-oriented programming, testing, and debugging in the programming assignments using Eclipse IDE.

The Midterm Test and Final Exam are held in person.

Due to enrollment size and academic integrity, **no exception** will be made or accepted.

- For the midterm test, students must write the test during their official lecture hours, as seen above.
- For the Midterm test and Final exam, students with ***accommodation*** should arrange with the Office of Students Accessibility Services far in advance to conduct the test and exam in person on scheduled dates and times.

Bonus points

To receive up to **5% bonus** points toward their final course grade:

- **(3%) In-Class Test Your Knowledge Interactive Activity (TYKIA)**
- **(2%)** You must actively participate in the discussion forum in eClass.
    - Students are encouraged to participate in the online eClass forums to ask or comment on questions relating to course concepts.
    - Use a clear, informative subject line ("Please Help!" is not informative). Try to be as specific as possible.
    - Post comments appropriate to the particular discussion. Off-topic posts may be deleted without any warning or comment.
    - ***It is forbidden to post or solicit solutions for tests, labs or assignments through the discussion forum (or elsewhere, for that matter; we monitor various online venues).***
    - *Examples of active participation in the forum are when a student checks the forum regularly (e.g., at least once per day) and participates by providing high-quality answers to questions asked by others or posing their questions.*

Tentative Schedule

Please see eClass for tentative weekly lecture topics.

Policies

- Plagiarism: When a student submits their labs, assignments or tests, they claim that it is solely their own work. It is considered a violation of academic integrity if a student copies or shares any parts of their work (e.g., code, diagrams) during any stages of their development as well as after that—both directly or through third–party websites.
    - The instructor and TAs will examine all submitted codes and suspicious submissions will be reported immediately to Lassonde as a breach of academic integrity. We do not tolerate academic dishonesty, so please be fully responsible for your learning.
- Online Submission/Assessment: **Stringent deadlines are imposed on all scheduled tests and labs (to be submitted to the eClass site electronically)**.
- **No Teamwork in labs, assignments and tests.** All labs, assignments and tests must be developed and completed individually (i.e., teamwork is forbidden). This is meant to prevent students from having difficulties finding a suitable teammate and disputes between teammates (e.g., non-responsiveness, overdue progress, a last-minute notice of withdrawal).
- The course announcements will appear on the course's eClass site. Students are responsible for **checking the eClass site daily**, especially the Course Announcements!
- Students can post questions to the course forum. **Don't post solutions to the lab, assignment or test questions even after the lab, assignment, or test is due!**
- Communication with the course instructors on general matters ((such as clarification on lab works, lecture concepts, course structure, etc.) should be done only through the course forum in eClass and through office hours. Email should be used only for personal or sensitive matters that should not be posted in eClass. Moreover, if emailing instructors, everyone is required to use their YorkU email account, put **EECS2101** in the Subject line, and include your Passport York ID in the message.

Late Submission:

- No late submission will be accepted.

Lab, Assignment and TYKQs Activity Submission:

- Please ensure all submissions for labs, assignments, TYKQs (Test Your Knowledge Quizzes), and other activities are made exclusively through eClass unless a different method is explicitly specified in the assignment description. **Submissions sent via email will not be accepted**.
- **No Makeup or Weight Shift**: **There will be no makeup opportunities or weight-shifting for missed labs, assignments or TYKQs**. It is essential to complete and submit these on time per schedule.

Missed Midterm Tests (not the final exam):

In our course this term, we will have one midterm test. You need to understand the policy regarding missed midterm tests due to legitimate reasons such as medical issues or family emergencies:

- If you miss the midterm test, you must upload a justification document in PDF format, including any supporting documentation, **within one week of the missed test**. You will upload your document to an assignment called ***missedMidtermTest*** using the Course eClass site within ***one week*** of the missed test.
- If your explanation for missing the test is approved, then **50% to 100%** of the weight of the missed test will be moved onto the final exam – **on a case-by-case basis at the instructor's discretion**. Otherwise, **your grades for the missed midterm test will be zero.**
- **Once a student begins writing a test or other assessment, the weight of that assessment will not be shifted for any reason. Thus, if a student is feeling ill, the student should not attend the test and seek the advice of a physician within twenty-four (24) hours.**

Missed Final Exam

- **Missed final exam:** Students who miss the final exam and want to take a deferred final exam must properly complete a Deferred Standing Agreement form and submit it to eClass within one week of the originally scheduled exam.
- ***Deferred Examination**. The Department of Electrical Engineering and Computer Science has predetermined that Deferred Examinations for the department's courses will be held **during the last two days of the exam period of the same term**. Students who are unable to write their final exam at the original schedule for any reasons beyond their control – such as illness, family emergencies, or religious observance, etc.—may formally request to write a **1st deferred exam**.*
- *If the request is approved, the student should write the deferred exam during one of the last two days of the final exam period of the same term as **determined by the department**. If a student is unable to write the 1st deferred exam due to any reasons beyond their control, they can submit a 2nd request to participate in another deferred exam. **The 2nd deferred exams are scheduled during the exam period of the following term.** **Note that any deferred exam beyond the 1st one may be designed by a different course director**. However, the exam once written will be sent to the original course director to be possibly adjusted and graded at their discretion.*
- *Please note that requests for deferred standing must be submitted within certain timelines. **For religious observance, the deadline is 21 days before the exam date**. **For illness and other reasons, the deadline for submitting the request is as soon as possible and no later than 7 days after the exam date**. Any petition, such as writing a 2nd deferred exam or missing a deadline, should be submitted immediately. Note that petitions may not be successful.*
- *If allowed at all in the course outline, the procedures and dates for deferring any coursework other than the final exam are determined at the course director's discretion.*

Academic Honesty

Students are expected to work individually during tests and exams and for all coursework and only access permitted resources. Communicating with others during tests or exams or when doing assignments, weekly quizzes, using aids that are not permitted, and impersonation are all examples of academically dishonest behaviour. Reusing work from a previous course offering (even if it is your own work) or from any other source violates the Senate Policy on Academic Honesty. Every term, many students are reported for breach of academic honesty or integrity; Penalties are severe. It's the student's responsibility to learn what is and what is not a breach of academic honesty.

Copyrights

Images and materials presented in lectures are subject to Canadian copyright law. Lectures are the intellectual property of the professor. Course materials are the intellectual property of the associated author(s). You may not allow others to reproduce or distribute lecture notes, test questions and other course materials publicly for commercial and non-commercial purposes without express written permission from the professor or author. If it can be shown that you violated these terms, your course grade may be changed to an F even after the course is completed.

Students are expected to read the Senate Policy on Academic Honesty. See also the EECS Department Academic Honesty Guidelines.

Programming Environment

- Students will need to have access to a computer with JDK (Java 17 Development Kit) with the Eclipse IDE for Java Developers IDE installed. Students should make sure the version they install on their devices is the same as the versions installed on the computers in YorkU labs. Otherwise, their lab submissions may not run when TAs mark them and will receive 0.

York's Course Accessibility Statement

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all faculties and programs at York University. Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. Students are encouraged to schedule a time early in the term to meet with each professor to discuss their accommodation needs. Please note that registering with disabilities services and discussing the needs with the professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet the needs. (http://www.yorku.ca/secretariat/senate/ committees/ascp/index-ascp.html)