IT 179
Introduction to Data Structures
Summer 2022 – Section 01

Instructor: Dr. Abdelmounaam Rezgui
Office: WIH 17E
Class Time and Location: Asynchronous via Zoom
Office Hours (via Zoom):
By appointment
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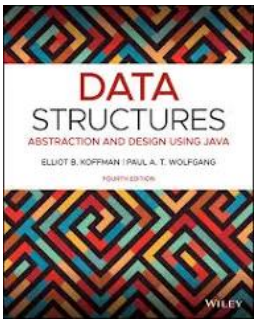
Course Description (from Catalog)
Intermediate computer programming, including elementary data structures such as linked lists, stacks, queues, binary trees.

Extended Course Description
This course will build upon your introductory programming and design skills from IT 168. You will learn new programming concepts, such as recursion, expand your understanding of object-oriented design, and be introduced to new tools for programming such as several elementary data structures: linked lists, stacks, queues, and binary trees. We will also continue to hone your testing and debugging skills. Programs will be both larger and more complex than in IT 168, growing as your skills are growing.

Objectives:
Upon completion of IT 179 you should be able to:

1. Develop moderately complex computer programs.
2. Employ appropriate object-oriented program design and documentation methods including the design of appropriate OO classes and methods.
3. Implement and use elementary data structures such as linked lists, stacks, queues, and binary trees correctly.
4. Design test data and conduct varying levels of program testing.
5. Trace and write simple recursive methods.

Textbook:
Koffman, E. and Wolfgang, P. (2021). *Data Structures: Abstraction and Design Using Java*. Wiley, 4th edition



Note: You may also use the 3rd edition (2016)

Course Activities
Examinations: There will be one mid-term exam and one final exam, which will be comprehensive. If you are unable to attend an exam due to illness, you must notify me via **email prior** to the date and time of the exam to make arrangements for making up the exam. **There will be no make ups for unexcused absences**.

Programs: The center of this course is programming, so there will be multiple programming assignments. None of the assignments are designed to be completed overnight. Make sure to read the assignments carefully when they are first assigned and begin design work and programming early. All programs must adhere to the design, coding and documentation standards presented in IT 168 and this course.

Programs will be graded in accordance with the grading standards explained on each programming assignment. Please note that programs with compilation errors cannot receive a better grade than **F** and that **A** programs must have **no** execution errors.

Class preparation: Please read the assigned material and view any assigned videos **before** working on the programing assignments.

Evaluation

Programs	80%
Final Exam	20%

Important Note: You must earn at least 70% of the total programming points possible in order to be eligible to earn an A, B, or C in the course. In other words, even if you earn 70% or better in the course overall, you cannot receive a grade higher than a D if your programming percentage is less than 70%.

A – 90% - 100%
B – 80% - 89%
C – 70% - 79%
D – 60% - 69%
F – less than 60%

Class Policies
Late work

Programs may be submitted up to 3 days late at a **penalty of 10% per day**. Except in cases of bereavement or serious illness, they will not be accepted after that. In cases of illness or bereavement, contact me as early as possible and we will work out an appropriate due date for your work to be made up.

Note that the programming assignments are **individual** work. You may **not** work with another student in the course for any reason or under any circumstances on these assignments. If you have any questions about an assignment, please ask me.

Email submissions will not be accepted for any reason.

Time: Programming courses require a significant time commitment. You must be prepared to spend the usual amount of time studying for the course **plus** additional time in designing, coding, debugging and executing your programs. Remember to reserve time to do the debugging part.

Academic honesty: Academic honesty is very important to me and to this university. You are expected to be aware of the student code, including the section on academic dishonesty (cheating and plagiarism). Knowingly turning in work that you did not do is plagiarism. It is both dishonest and unethical. This includes homework and programming exercises.
You are expected to do your own work. Showing someone else your work is also cheating, even when the other person promises not to copy it. I expect you to discuss your programs with

no one but me. All instances of cheating in this course will result in a minimum penalty of a zero on the assignment. For major assignments (such as programs and examinations), there will be a one letter grade reduction in the final course grade for all parties involved in addition to the zero on the assignment. Repeated cases of cheating will result in an F in the course. All cases of academic dishonesty will be handled according to university policy as outlined at https://deanofstudents.illinoisstate.edu/conflict/conduct/code/academic.php and may result in disciplinary penalties as well as academic penalties.

Individual vs group work: Software development is a team effort in the real world, and people benefit from learning in groups. Thus, I encourage students to work together on most homework assignments so that you can benefit from learning in community, and I hope that you will all participate collaboratively in class. However, being an effective team member requires individual skills, and this course is mostly about important skills and concepts needed to be an excellent software developer. Therefore, programming assignments and exams in this course are individual activities and you are not to seek help from anyone but me. However, I will work hard to be available to help you, and you are strongly encouraged to reach out to me both to seek help and to just talk through your ideas as your plan your programs.

ReggieNet: I will be using ReggieNet to provide course information as well as access to your grades, quizzes, exams, and electronic assignment submission. If you have not used ReggieNet in the past, I encourage you to check out the information on ReggieNet available at https://ithelp.illinoisstate.edu.

Contacting me: I answer email frequently.

- When asking questions about programs via email, please be as specific as possible about your question or bug. If you are asking for help with a bug, explain the problem and the error you're seeing and zip the program as if you were submitting and attach it to your email. The error you think is in one method may be actually caused by something else entirely, so it can speed my answer significantly if I have the whole program as well as your information.
- Important: It might take me up to 48 hours to respond to emails especially emails sent on the weekends and holidays. If I do not respond within 48 hours, please resend your email and ensure that you have the correct email address and that your email follows the email policy below.

Email Policy and Etiquette (use it for all your classes not only IT179)

- **Do not wait until the last minute** to request assistance from your professor or lab instructor.
- Always **check the class syllabus** before asking a question about the course.

- Always **sign your email with your full name** and the **specific class** (for example, IT179 followed by the section number - section 01)
- Be clear in your email and **use a proper subject** for your email to identify the email purpose.
- **Include all relevant details** in your email to quickly get a response to your request.
- Double check your email before you send it.
- **Do not email asking for**:
    - A higher grade
    - An extension to the deadline (except for in cases of bereavement or serious illness verified by the dean of student's office)

Student Access and Accommodation Services

Any student needing to arrange a reasonable accommodation for a documented disability and/or medical/mental health condition should contact Student Access and Accommodation Services at 350 Fell Hall, (309) 438-5853, or visit the website at StudentAccess.IllinoisState.edu.

Permission required to record

Students must obtain written permission from the instructor if they wish either to photograph classroom lectures or discussions or to record them using audio or video devices. This restriction includes visual materials that accompany the lecture/discussion, such as lecture slides, whiteboard notes/equations, etc. Such recordings are to be used solely for the purposes of individual or group study with other students enrolled in the class in that semester. They may not be reproduced, shared in any way (including electronically or posting in any web environment) with those not in the class in that semester. Students with disabilities who need to record classroom lectures or discussions must contact Student Access and Accommodation Services to register, request and be approved for an accommodation. Students who violate this policy may be subject to both legal sanctions for violations of copyright law and disciplinary action under the University's Code of Student Conduct.

Acknowledgements

I will be using material from several sources, including material by the authors of the textbook, by Dr. Mary Elaine Califf, Scott Chadde, and other instructors of courses similar to IT 179 at different academic institutions worldwide.

Tentative Schedule

This is a **tentative schedule**, subject to change. The specific date of the final exam will be determined and announced later via my.illinoisstate.edu.

Wk	Date	Topics	Reading
1	5/16	Introduction Java Review Entrance Exam Program 1 – Review of IT 168	Appendix A
2	5/23	Multi-dimensional Arrays Program 2 - Multi-dimensional Arrays	
3	5/30	Abstract Data Types Inheritance and Polymorphism Interfaces Abstract Classes Program 3 – Abstract Classes	Ch. 1
4	6/6	Algorithm Efficiency List ADT The ArrayList Class Program 4 – The ArrayList Class	2.1-2.4
5	6/13	Single-Linked Lists Program 5 – Linked Lists	2.5
6	6/20	Double-Linked Lists Program 6 – Double-Linked Lists	2.6 2.7-2.10
7	6/27	Testing	Ch. 3
8	7/4	Stacks Program 7 – Stacks	4.1-4.4
9	7/11	Queues Program 8 – Queues	4.5-4.7
10	7/18	Recursion Program 9 – Recursion	Ch. 5
11	7/25	Binary Trees Program 10 - Binary Expression Trees	6.1-6.5
12	8/1	Elementary Sorting Program 11 – Sorting **Final Exam**	8.1-8.4