

ITK 179 Introduction to Data Structures

Instructor: Dr. Mary Elaine Califf

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Office Hours: MWF 11-11:30 and 12:30 -1; MW 2-3:00; and by appt.

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Catalog Description

Intermediate computer programming, including elementary data structures such as linked lists, stacks, queues, and binary trees.

Course Description :

This course will build upon your introductory programming and design skills from 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 168, growing as your skills are growing.

Objectives:

Upon completion of this course 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 OO 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.

Textbooks:

Simon Gray. *Data Structures in Java*, Addison Wesley, 2007.

Course Requirements

There will be four examinations, including the final exam, which will be comprehensive. If you are unable to attend an exam due to illness or another valid reason, you must notify me *prior* to the date and time of the exam to make arrangements for making up the exam. If you are unable to reach me personally, leave a message on my voice mail or email. **No makeup examination will be administered unless these guidelines are followed.**

There will be nine programming assignments in this course. Programming assignments must adhere to the design, coding and documentation standards presented in ITK 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. Late programs will be accepted until midnight of the day following the due date at a 10% penalty. You have two “late passes” which allow you to turn in two programs up to 5 calendar days (24-hour periods) after the due date at no penalty. Unused late passes are worth 0.5% each on your final course grade.

You are expected to attend class. There will be a participation component in your grade. This will be based on your active participation in class, not your attendance. However, it is impossible to participate when you’re not in attendance.

You are expected to read all assigned material **before** class and come prepared to participate in class.

There will be regular quizzes in the class. Some may be given via Blackboard; some will be given in class. The in-class quizzes will NOT be announced in advance, in general. These will cover the reading assignment as well as topics previously covered in class. The quiz grade will be curved. No other aspect of the course grade will be curved.

I will assign homework, but will usually not collect it. Instead, quiz questions (and exam questions) will often be based on the assigned homework. For this ungraded homework, I encourage you to work in groups. However, make sure everyone in the group can do the work, since the quizzes will obviously be individual work. For graded homework assignments, I will specify whether they may be completed in groups or should be individual work.

Commitment:

Programming courses are time intensive. You must be prepared to spend the usual amount of time studying for the course (about 2 hours for each hour spent in class) plus additional time in designing, coding, debugging and executing your programs.

Remember to reserve time to do the debugging part.

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. 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. In all cases, the occurrence will be reported as

required by university policy and may result in disciplinary penalties in addition to the academic penalty.

Disability Concerns:

Any student needing to arrange a reasonable accommodation for a documented disability should contact Disability Concerns at 350 Fell Hall, 438-5853 (voice), 438-8620 (TDD).

Evaluation:

	Final: 15%
	Midterms: 30%
	Programs: 40%
Homework, quizzes, and participation:	15%

	100%

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%

Course information on the web:

You can find slides and other course materials posted on the course website at <http://www.itk.ilstu.edu/faculty/mecalif/ITK179/Fall2009/index.htm>. I will be using Blackboard for a variety of purposes. You can access Blackboard at <http://blackboard.ilstu.edu>. There will also be a link from the course website. Your login id and password are your ULID and its associated password.

Contacting me:

I try hard to keep my office hours free for you – please come see me for help as needed. Do not call in advance; I typically won't answer the phone if there is a student in my office or if I've stepped out for just a minute, so my not answering the phone does not indicate that I'm not there.

I answer email frequently when I am home – responses will be less prompt when I am on campus, as I seldom have time to check email while on campus between classes, committee meetings, and office hours. 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.

I am typically available for instant messaging when sitting at my home computer – which is a great deal of many evenings and most of the time on days when I am not on campus. While IM is not as effective as face-to-face help in most cases, it can work better than email for getting help. See the information at the beginning of this document for my IDs on various systems.

Tentative Schedule

Wk	Date	Topics	Reading	Programs due
1	1/12	Java and OO Review	1.1-1.3	
2	1/19	No Class Monday – MLK Polymorphism	1.4-1.6	Review
3	1/26	Program Correctness and Efficiency	Ch. 2	
4	2/2	Dynamic Arrays Linked Lists	Ch. 3	OO
5	2/9	Linked Lists cont. Collections	Ch. 4	Testing
6	2/16	Exam 1 List ADT	Ch. 5	
7	2/23	Stacks	Ch. 6	Linked List
8	3/2	Queues	Ch. 7	Stack
-	3/9	Spring Break – No School		
9	3/16	Exam 2 UNIX	Handout	
10	3/23	Recursion	Ch. 8	Queues
11	3/30	Sorting	Ch. 9	
12	4/6	Exam 3 Binary Trees	10.1-10.4	Recursion (due Monday)
13	4/13	Binary Search Trees	11.1-11.2 12.1	Sorting
14	4/20	Ethics Problem Solving	Handouts	
15	4/27	Problem Solving Review	Handouts	Binary Trees

The final exam is Monday, May 4 at 7:50 am.

This is a tentative schedule, subject to change. Most programs will be due on Friday of the week indicated. When an exam is listed, that means the exam will most likely fall in that week. Specific exam dates will be determined and announced later.