

CS 159: Programming Fundamentals

James Madison University, Spring 2017 Semester, 3 Credits

Home Page: <http://w3.cs.jmu.edu/weikleda/>

Class Times

Section 3: M/W/F, 10:10 – 11:00 Final Exam: Monday, 5/1/17 8-10 am

Section 4: M/W/F, 11:15 – 12:05 Final Exam: Monday, 5/1/17 10:30 am -12:30 pm

Locations: ISAT/CS 243 (classroom) ISAT/CS 143 (Linux lab)

Your Instructor

Dr. Dee A. B. Weikle

weikleda@jmu.edu

Office: ISAT/CS 205

Phone: 540-568-5013

Office Hours: MWF 2-3 pm,
Th 2:30-4:4:30 pm
(no appointment necessary)



Welcome to CS159!

I am very excited to embark on a new semester with all of you to learn what I think is one of the most fun parts of programming in an object oriented language – *the art of design*. After one of the most generally rigorous semesters of CS139/149 where all classes ended on the same programming assignment – I am convinced that each and every one of you has what it takes to be successful in this class. The semester should be lots of fun!

Note my office hours are as listed above, during which I will always be there and you do not need an appointment. Other times are available by appointment via email. You are welcome to stop by if my office door is open without an appointment as long as you realize that I may not be able to talk with you very long. I will rarely be on campus on Tuesdays though.

You are encouraged to ask course questions through Piazza. You can also email me directly. Please do not email me code – it usually gets stripped from attachments. Rather ask a general question via Piazza. This is an important skill to develop and often in formulating the question well, you can answer it for yourself. If desperate for online coding help - point me to the proper WebCat submission or come by my office.

Goals and Objectives

Official course description: Students use advanced problem-solving strategies to develop algorithms using classes and objects and techniques such as recursion, exceptions and file I/O. This course also focuses on designing small applications and effective testing strategies. Students may not receive credit for both CS 159 and CS 239.

By the end of this course, you should be able to:

- 1) use advanced programming techniques to solve computing problems. These include but are not limited to:
 - a. algorithm development and introductory algorithms for sorting, searching, etc.
 - b. polymorphism, inheritance, abstract classes, interfaces
 - c. exceptions
 - d. file I/O
 - e. recursion
 - f. data structures such as multi-dimensional arrays, ArrayList, HashTable, linked lists
- 2) use appropriate object oriented design techniques.
- 3) understand UML diagrams and their relationship to the design process.
- 4) use appropriate testing techniques to thoroughly test an application during development.
- 5) read and understand software specifications to implement code that conforms to the specifications and to course coding standards.

Methods of Instruction

In general, I try to avoid straight lecture. Research has shown that active learning methods are more effective than passively taking notes during a lecture. This course will use multiple instructional strategies: Process Oriented Guided Inquiry Learning, Peer Instruction, and sometimes Pair Programming although with less regularity than in last semester's CS149. All of these techniques fall under the guidelines of a flipped classroom. In such a model, the harder work is attempted in the classroom with the instructor available and the preparation or more straightforward work is done outside of class. This does mean that if you do not do the outside preparation in a timely manner, it is difficult to understand the material in class.

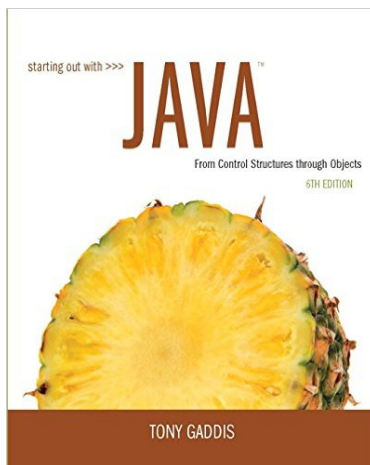
Here is the routine: Each topic will have an intro activity and/or a reading assignment, possibly with a video to help you understand core concepts. In preparation for the next class, you will complete a short online quiz. I will use the quiz results to customize instruction and clarify any misunderstandings about the current course material. We will then have a combination of lecture or in-class activities to allow you to apply concepts hands-on and practice programming when it's easy to ask questions. Most weeks you will also have a Programming Assignment (PA) to be

working on. This semester it will be even more critical to start the PAs early as they are all as difficult as PA6 from CS149. A preliminary schedule is included at the end of this document.

Please note:

- In a three-hour course, you should expect six hours of homework per week. How you manage your schedule is up to you, but do spend some time each day on this course. Note that for many students advanced CS courses require more time outside class than this six hours, especially to obtain a grade of an A or B.
- Programming assignments (PA) can take about eight hours to complete; that's why they are due every two weeks. Don't wait until the second week to get started. Ask any student who has taken this class what that's like. To encourage an early start on the programming assignments and to clarify the definitions and requirements, each PA will include a readiness quiz on Canvas as part of the assignment.
- While I will answer Piazza questions over the weekend, you should realize I may not answer in the timeframe you need. If you choose to complete assignments at the last minute or after the deadline, you have significantly decreased your chances of successful completion. I will make sure any emails sent over the weekend are answered on Monday at the latest.
- Undergraduate assistants are generally available in the labs from 5:00 PM to 11:00 PM on Monday through Thursday and 1:00 PM to 11:00 PM on Sunday. A detailed schedule will be available approximately 2 weeks into the class. Do not rely on them to fix your code—you won't have TAs during exams. Do go to TAs and come to my office for clarification on concepts, ideally before you are working on the PA.

Required Textbook



The required textbook is Starting Out With Java from Control Structures through Objects, 6th Edition, by Tony Gaddis. You may use whatever version (paperback, eBook, or standard textbook) that will work best for you. If you have the funds you might consider a new copy or purchasing access to the video materials. Some students find these useful.

You may also get an older edition of the textbook, but ***I will not be responsible for explaining differences.*** Computer science textbooks change frequently so anything before edition 4 is too old to be useful.

Online Interaction

Please bookmark the following websites:

- <https://canvas.jmu.edu/>

We will use Canvas as the primary course organization resource. Here you will submit labs and in-class activities, take quizzes, find solutions, and see your grades. A preliminary schedule is included at the end of this document, but the current canvas due dates over-rule what is listed below and may change as the semester progresses.

- w3.cs.jmu.edu/weikleda/cs159/

This will likely be available after the first week as a link to the detailed schedule and relevant materials so you will not need to log into Canvas for everything – but the complete resource will be the Canvas page.

- https://canvas.jmu.edu/courses/1464212/external_tools/61659

If you have questions about course content or assignments, post them on Piazza rather than email me or TAs directly. This will help significantly in getting a timely answer as more people might answer. I get email automatically when a question is posted to Piazza. Also this semester all sections of CS159 will be using the same Piazza page. This will enable other instructors to answer your questions and students from other sections.

Note this semester private posts have been turned off – so please make sure your post can be read by the class. Anonymous posting to the entire group should be available, but faculty will know who you are. This is to prevent a student from “anonymously” being rude to another student and enable us to reply privately to a student if we feel that is more appropriate for some reason.

- <https://webcat.cs.jmu.edu/>

Web-CAT is an automated submission system we will use for programming assignments and labs similar to CS149. Note grading will be slightly different and more stringent!

- <https://eclipse.org/>

eclipse is an independent development environment that you can use to develop your code and programming assignments. Eclipse has more features and help functions than Dr. Java and jGrasp (the IDEs used in CS149). While once you know what you are doing, these added features are very useful, there is always the danger of taking the suggested fixes of an IDE rather than thinking. The IDE cannot know what you are trying to do so make sure you understand any hint you take from the software.

- If you need to schedule an appointment or have a personal inquiry, don't hesitate to email me directly. I prefer not to be sent response emails via Canvas – I often don't see them until much later than my email (or Piazza posts).

Methods of Evaluation

Participation

Class activities, labs, and reading quizzes will include a graded component. Labs and in-class activities will usually be due at the end of class or by 11:00 pm on the day they are due. You are encouraged to work with other students on these types of assignments, explaining concepts to one another. ***To receive credit for the class activity or lab you must be present on the day assigned***, unless previous arrangements have been made. I will drop a minimum of 2 of your lowest scores within class activities and labs, and one online quiz to allow for unforeseen circumstances such as illness. Please make sure and let me know as soon as possible, and at least one week ahead, if you have any JMU sanctioned events or religious holidays I will need to accommodate.

Programming Assignments

There will be 5-6 programming assignments over the course of the semester. The source code you submit must be entirely your own work. When talking to other students or friends, never refer to code written for programming assignments, either directly or indirectly. If you receive help from an instructor or lab assistant, you must make note of it in the comments of the relevant source files. Programs will be graded on correctness, documentation, and overall code quality and must conform to the CS159 style guide, which will differ slightly from the CS149 style guide.

Note that in CS159 programming assignments are graded primarily by WebCat and any submission that does not pass all of the reference tests will get at most a 50%. Only the latest submission to WebCat will be graded and code that does not compile will receive a 0, so please be careful with last minute submissions.

Late Work Policy

If you are unable to take an exam at the scheduled time because of illness or other problems not known until that day, you must contact me as soon as possible to arrange to take the exam at a different time. To miss an exam due to JMU activities or a religious holiday, you must make arrangements at least two weeks in advance, and ideally inform me during the first week of class.

For full credit, completed programming assignments must be submitted through Web-CAT before the assignment deadline. Programming assignments will be due at 11:00 PM. Late submissions will be docked 25% if late 24 hours or less, and 50% if late 24-48 hours, after which they will no longer be accepted even when using late days. Situations may arise that make it difficult for you to complete an assignment on time, such as illness, hardware failures, or travel problems. To accommodate these situations, each student has ***three late days*** that allow them to extend the deadline by 24 hours. You may apply ***up to two days*** to a single programming assignment or distribute them across multiple assignments. ***To use a late day, you must email the instructor immediately after you submit the assignment.***

Academic Honesty

If you violate the University's Honor Code (<http://www.jmu.edu/honorcode/code.shtml>), you will receive a reduced or failing grade in the course, other penalties may be imposed, and the violation will be reported to the Honor Council. Automated tools may be used on any assignment, at any time, to detect inappropriate collaboration and to determine the originality of submissions.

You must work on programming assignments entirely on your own. You may only request help on programming assignments from the course instructor or the lab assistant. If you receive such help you must make note of it in the documentation for the relevant java class(es).

You may request help on general topics from other students and friends. However, when doing so you must never refer to code written for the programming assignment, either directly or indirectly.

Representing someone else's work as your own, in any form, constitutes an honor code violation. It is also a violation of the honor code to "render unauthorized assistance to another student by knowingly permitting him or her to see or copy all or a portion of an examination or any work to be submitted for academic credit."

For more details on what constitutes appropriate or inappropriate help, please see the academic integrity handout provided with course materials or ask the instructor!

Midterms/Final

We will have two midterms in class and a comprehensive exam on the last day of class and during finals week. Each midterm will be an in-class written or Canvas test. The comprehensive (final) exam will have two parts – a coding part on the last day of class and a written or Canvas quiz during the final exam period. If you must be absent during an exam for a legitimate reason, you must contact me at least two weeks beforehand to make special arrangements. Failure to make prior arrangements for a missed exam will result in a zero grade.

Grading Criteria

Your course grade will be based on:

- 25% Programming Assignments (PAs)
- 20% Labs, Quizzes, and In-Class Activities (5% Quizzes)
- 30% Midterms
- 25% Final Exam

Letter grades will be assigned on the scale A=90–100, B=80–89, C=70–79, D=60–69, F=0–59, with potential minor adjustments after considering the overall performance of the class and actual distribution of numeric scores. I will use “+” and “–” grades at my discretion. I do not assign WP or WF grades except in extreme circumstances.

Important Notes

Students who do not earn 60% of the points on the final exam will receive a letter grade no higher than D+ for the course. You must achieve a C– or better grade to continue on to CS 240.

University Policies

Adding/Dropping

You are responsible for enrolling in courses and verifying your schedule on MyMadison. The deadline for adding or dropping a semester course without signatures is Tuesday, 1/17/2017. With

departmental permission, 1/27/2017. The last day to withdraw from a course with a W grade is Friday, 3/17/2017.

Disability Services

If you have a documented disability and need accommodations in this course, please register with the Office of Disability Services (<http://www.jmu.edu/ods>, Student Success Center, Room 1202, 540-568-6705). They will provide you with an Access Plan Letter to verify your need for services and make recommendations for the course. I will be happy to discuss your access plan with you. I highly recommend that if you had accommodations in high school that you document that immediately. It will likely help you learn better and have a more successful college experience. It also enables faculty to give you appropriate accommodations for whatever issue you may have.

Excused Absences

Students who are unable to attend class due to JMU sponsored activities (such as sports, band, academic competition, field trips, etc) or personal religious observances may request reasonable accommodations. Please notify me during the first week of class regarding potential absences so that we can determine alternative methods for you to complete the required work. Since I will post all deadlines and work, I expect you to have access to all materials necessary without coming to see me when unavoidable absences occur. You are however encouraged to stop by and get whatever assistance and perspective might be beneficial.

University Closings

For severe weather and other unexpected circumstances, watch for announcements relating to make-up work. See <http://www.jmu.edu/JMUpolicy/1309.shtml> for JMU's cancellation policy. Although the schedule may adapt to canceled classes, **assignment deadlines rarely change**. Also, since I live in Crozet, an hour away, many students think that I will not come in inclement weather. I often stay in Harrisonburg if snow or other weather may keep me from teaching or another faculty member will substitute for me or an online assignment will be given instead. So, follow the university closing information!

Preliminary Schedule

The schedule below represents my current best estimate concerning due dates (and everything else). I am providing this information to give you a general idea of the pace and timing of the class. This schedule will certainly change as the semester progresses.

Readings should be completed *before* class on the day they are listed. Readings followed by (s) are supplemental. You are not required to complete the supplemental readings, but you may find them useful. Unless otherwise noted, all readings below are from *Starting Out With Java, 6th edition*, by Tony Gaddis.

Week	Date	Topic	Reading	Out	In
1. 139/149 Review	01-09	Introduction CS243			
	01-11	Review: Types and Memory CS243	Course syllabus 2.1-2.12, 3.6, 6.5 3.1-3.10(s), 4.1-4.9(s)		
	01-13	Review: Arrays and Classes CS243	6.1-6.7, 7.1-7.7, 8.1-8.8	PA1	
2. Multi-dimensional Arrays	01-16	MLK Day			
	01-18	MD Arrays POGIL			PA1 A (11:00 pm)
	01-20	MD-Array Lab	7.9-7.10		PA1 B (11:00 pm)
3. Exceptions	01-23	Eclipse Lab	Eclipse Tutorial/Video		
	01-25	ArrayList	7.13		
	01-27	Exceptions	11.1-11.2	PA2	PA1 (11:00 pm)
4. File IO	01-30	File IO POGIL			
	02-01	File IO Lab	4.10		
	02-03	Unit Testing	Unit Testing Guidelines JUnit Basics		
5. Unit Testing	02-06	Unit Testing Lab			
	02-08	Designing Classes POGIL			
	02-10	Design Lab	6.9		PA2
6. Midterm1 Inheritance	02-13	Midterm Review			
	02-15	Midterm #1			
	02-17	Inheritance POGIL		PA3	
7. Polymorphism	02-20	Inheritance Lab	10.1-10.6		
	02-22	Polymorphism POGIL			
	02-24	Polymorphism Lab	10.7		
8. Abstract Classes	02-27	Abstract Classes and Interfaces	10.8-10.9		
	03-01	Abstract Classes Lab			
	03-03	Interfaces Lab			PA3
9. Spring Break	03-06	SPRING BREAK			
	03-08	SPRING BREAK			
	03-10	SPRING BREAK			
10. Enum Types	03-13	Design w/Inheritance		PA4	

	03-15 03-15	Enum Types/Pack	6.8, 8.9 Enum Types Tutorial Java Packaging Tutorial		
	03-17	Enumerated Types Lab			
11. Recursion	03-20	Intro to Recursion POGIL			
	03-22	Tracing Recursion Lab	16.1-16.4		
	03-24	Recursive Coding Lab	16.5		
12. Recursion Midterm 2	03-27	More Recursion			PA4
	03-29	Midterm 2 Review			
		Midterm #2		PA5	
13. Collections	04-03	Java Collections Framework	Java Collections Tutorial (thru Map)		
	04-05	Collections Lab			
	04-07	More Collections			
14. Collections	04-10	Linked Structures		PA6	PA5
	04-12	Linked Structures Lab			
	04-14	TBD			
15. Misc	04-17	TBD			
	04-19	TBD			
	04-21	Coding Final Exam Practice			
16. Final	04-24	Final Review/Eval			PA6
	04-26	In-Lab coding portion of Final			
	04-28	NO CLASS			
<i>Final Exam Monday, 05-01, Section 3: 8-10, Section 4: 10:30-12:30</i>					