

Catalog Description

Data and procedural abstraction for larger programs. Using the Java language for programming, topics include analysis of algorithms, ... strings, linked lists, queues, trees, and networks. [A]pplications includ[e] simulations, parsing, searching and sorting, and others. Prerequisite: COSC 182. (3 credit hours)

Resources

Instructor. Dr. Gene B. Chase. Office: Frey 123. Telephone 766-2511, ext. 2770 (office); 766-7904 (home, before 10 p.m.). Email: chase@messiah.edu. Please come to me for extra help as often as you need to. I am not just teaching Data Structures and Algorithms. I am teaching *you*. My work-study assistant is on duty at the Math Help room two evenings a week too. Read the schedule posted in our classroom.

Text. Duane A. Bailey's *Java Structures: Data Structures in Java for the Principled Programmer*. $\sqrt{7}$ edn. Privately published, 2007. ($\sqrt{7} \approx 2.6$, so this is not quite the third edition, but more than the second edition. The author teaches at Williams College, which is on Route 7. Get it? $\sqrt{7}$.)

Computers. I have decided to use the JCreator integrated development environment (IDE), because it is the IDE with which you are most familiar if you had COSC 182 at Messiah College. If you need a copy for your personal computer, you may visit the home page of our COSC 181 course, <http://www.messiah.edu/departments/mathsci/CSC181/Index.shtml>

You are welcome to use NetBeans or Eclipse, each of which has advantages, but you must deliver your code to your drop box in a form that I can run from a command line: `java MyMain`

There are three places for materials online at Messiah College related to our course.

- (1) The public course web site is www.messiah.edu/~chase/csc/282 .
- (2) Files that I wish to give you privately are at `Q:\InstructorFiles\Chase_Gene\ds`
- (3) `Q:\StudentFiles\cs\chase\ds\gc1153` is a drop-box into which you put all your assignments.

Each assignment should be submitted both electronically and as a printed report (not just a program listing, but a report). Each assignment should have its files in its own clearly named subdirectory. (Of course you will find your email address in place of `gc1153`.) Leave your assignments there all semester so that I can archive everything just once at the semester's end. Do not put material related to other courses in your directory, or they are likely to be removed by me without notice. Do not share your password with anyone. When we do team assignments in this course, team folders will appear within which you can work together.

Email. Reading your Messiah College email at least once a day will allow you to stay abreast of our course. I forward answers to student questions, grade reports, and important notices to you in that way.

Prerequisites

The following topics were treated in COSC 182. We will review them rapidly, but they are background for this course. This course treats some of them again in more depth: strings, arrays, stream i/o, objects, references (to objects, including passing object parameters), exception handling in i/o, packages, `this`, inheritance, types and casting, algorithmic analysis (Big O notation), binary searching, the `Comparable` interface (used in sorting), sorting algorithms, and analysis of sorting, including divide-and-conquer algorithms.

If your background is in C++, you will catch onto Java quickly if you have had the material above. Your C++ experience must be object-oriented for you to be ready for this course. If you come to this course knowing C++ that was not taught in an object-oriented way, then I recommend that you complete COSC 182 first.

Objectives

1. To evaluate the relative merits of alternative algorithms to solve a problem.
2. To evaluate the relative merits of alternative data structures to solve a problem.
3. To develop proficiency in designing and coding object-oriented programs in Java.
4. To develop good style in writing internal and external documentation of computer programs.
5. To be able to explain how computer scientists can further the cause of missions.
6. To explain standard data structures that are basic to all of Computer Science such as queues (including priority queues), stacks, linked lists, trees (including binary search trees), tries (including Huffman tries), and graphs (including digraphs).
7. To explain standard algorithms that are basic to all of Computer Science, such as hashing, divide-and-conquer, filters, and state-based algorithms.
8. To develop proficiency in working on a team to solve a problem.
9. To develop proficiency in learning technical details through critical reading.
10. To develop confidence in presenting technical material orally to a group of peers.

Grading

The following letter grades are assigned: A 93%; A– 90%; B+ 87%; B 83%; B– 80%; C+ 77%; C 73%; C– 70%; D+ 67%; D 60%; F below 60%. Three monthly hour-long tests weigh 10% each, at the dates announced in the daily schedule (attached). None of them, including the one during final exam week, is cumulative. Seven bi-weekly graded homework labs weigh 9% each. Fourteen weekly reading quizzes weigh 7%. Specific due dates for the labs will be announced as we go. Bonus points will be awarded for class participation; penalty points will be assigned for unexcused absences.

My grading rubric for the program code part of your lab reports is found here

www.messiah.edu/acdept/depthome/mathsci/courses/coverSheetAndRubric.htm

For the first assignment you should actually put checks in the boxes and attach it to the back of your assignment. After that, you are expected to follow it without attaching it.

One way to earn class participation points is to present some computer topic that interests you for 5 minutes or so at the start of a Wednesday period, or on one of the 3 days of the semester that I will be out of town. The topic does not have to be related to our course. It is graded all-or-nothing. You must get approval of the topic from me beforehand. Two such examples are mentioned in the daily schedule.

Legal Matters

Americans with Disabilities Act

Any student whose disability falls within ADA guidelines should inform me at the beginning of the semester of any special accommodations or equipment needs that you will have to complete the requirements for this course. You must register documentation with the Office of Disability Services (Hoffman 101) to receive such accommodation. If you have questions, call Dr. Keith Drahn at ext. 5358.

Academic Integrity and Intellectual Property

Read carefully the Messiah College policy on academic integrity. It is found on pages 108–112 of the Student Handbook, which is found online at

www.messiah.edu/offices/student_affairs/student_handbook/resources/policies.pdf

It is incorporated here by reference. Note that the use of undocumented sources for computer programs that you write—such as including Java code that you found on the web or received from a classmate—

without citing your source **will result in a zero grade on the assignment.** If you supply such code to a classmate, you are also in violation of Messiah's plagiarism policy, and so you too will receive a failing grade on the assignment.

Let me spell this out with a catch-phrase. **Consult, don't copy.** That is to say, you may look at each other's code. You may discuss it. You should share ideas. But you may not supply the computer-readable data, or allow someone to re-enter any part of your program from a printed page, or do the work for another student. Take printouts with you from the labs so that this does not happen inadvertently. **Even in team assignments,** document in your code which teammates contributed to which parts.

Materials that you produce for this course are your intellectual property. Your words—including software that you write—are automatically copyrighted by you; your original algorithms may be patentable. I will ask your permission to use your work for class demonstrations and for other educational purposes.

Passwords

You should not share your password for your Messiah College account with anyone. Not your significant other; not your teammate for team projects; no one. Team labs will have team folders in which to put work.

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