

CS 3350 Spring 2018 – Data Structures and Algorithms

Contact Information

Instructor	Dr. Robert Dyer
Office Hours	MWF 2:20-3:30pm, TR 3:45-5p OR by appointment
E-mail	rdyer@bgsu.edu
Office	HAYES 244
Phone	(419) 372-3469

Prerequisites

Math 2220/3220 and grade of C or better in CS 2020

Class Meeting Time

Mondays/Wednesdays/Fridays, 1:30-2:20pm, OLSCAMP 208

Textbook

The textbook **MUST BE** purchased through Perusall.

=====> **DO NOT PURCHASE A BOOK** <=====

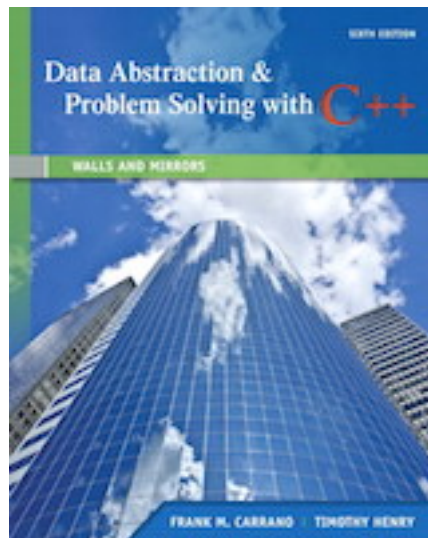


Figure 1: Book

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“*Data Abstraction & Problem Solving with C++: Walls and Mirrors*,” 6th Edition (2013), Carrano and Henry, Pearson, E-book.

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Outcomes for the course

After successfully completing CS 3350, students will be able to say:

- I can solve computation problems using recursion.
- I can implement and apply stacks, queues, trees and other custom data structures.
- I can create generic functions and classes.
- I can understand algorithmic complexity (e.g., Big-Oh notation)
- I can understand the relationship between data structures and algorithms.
- I can understand the design tradeoffs (e.g., code complexity and performance) in data structures and algorithms.

Grading

The final grade will be composed of the following weights. (The instructor reserves the right to make changes at any time.)

Assessments

Item	Points Each	Total
Exams (<i>3</i>)	80	240
Final Exam	110	110
Labs (<i>10</i>)	25	250
Programming Assignments (<i>5</i>)	50	250
Perusall Annotations (<i>22</i>)	3	66
Readiness Assessments (<i>20</i>)	2.5	50
In-class Activities (<i>11</i>)	3	34
Total		1000

Grading Scale

Point Range	Percentage	Grade
920 - 1000	92 - 100%	A
820 - 919	82 - 91%	B
720 - 819	72 - 81%	C
620 - 719	62 - 71%	D
0 - 619	below 62%	F

Teams

This course relies heavily on team work. First day of class we will form teams for the entirety of the semester. You will work with your team for in-class activities and the RAAs. Team members are expected to all contribute equally.

The reading assignments are also collaborative in nature, as every student will be put (randomly, and different for every assignment) into a group of approximately 15 students who can view and respond to your annotations.

Labs are mostly done individually, but are collaborative in nature. I encourage students to help each other during labs and students are free to work in pairs. **Each student must submit their own solution.**

Finally, all programming assignments must be done in pairs. The first lab will be an exercise to become accustomed to pair programming. Each pair will submit 1 solution in Mimir. There will be periodic evaluation of each person's individual performance to ensure fairness.

Assessments

Readings

Readings are absolutely essential to learning in this course. Almost every lecture there are readings due, meaning there are approximately 2 readings due each week. Readings will be done on the website Perusall (note: **only access Perusall via the links in Canvas!**) which let's you annotate the text being read. These annotations are required and graded. The system will automatically grade each annotation. It keeps the 5 highest annotations. Thus, to ensure the best possible score you should aim for 7-10 good annotations.

Annotations could be you summarizing a piece of text for the class, asking an insightful question, answering other student's questions, finding problems with the text, etc. Your annotations should be spread out through the whole assigned reading (and not all in one small area). You are graded on 3 criteria: quantity of annotations, average quality of annotations, and spacing of the annotations in the text.

Readiness Assurance Assessments (RAAs)

To help me gauge where the class is at, we will have in-class assessments for each reading. These contain a small number (5) of questions that anyone who completed their reading assignment should be able to answer. Students will take the assessment first by themselves. You will then collaborate with your team members and re-take the same assessment as a team. The score will be the average of your individual score and the team score.

In-class Activities

Instead of providing traditional lectures, the majority of class time will be spent doing individual and/or small group activities. The goal is to give students hands-on experience with the material while I and other students are available to help clarify concepts students may be struggling with. Although these activities are graded, the grade is based on attempting to complete the problem and not necessarily on solving it. It is vital that students show up for class having read the assigned material and ready to work!

Labs

There are several programming labs, completed in class on Wednesdays in the Hayes 020 lab. Labs may not be completed outside of your assigned lab time.

Programming Assignments

There will be several programming assignments completed outside of class and individually. To receive credit for your assignments, they must be submitted online by the due time. **There are no late submissions allowed.** Partial credit will be given for any completed portion of the assignment, so be sure to submit on time even if you are not finished with the assignment!

Exams

There are a total of 3 exams throughout the semester and a final exam during finals week. Exams will consist of a variety of question types, including multiple choice, true/false, short answer, short programming questions, and interpreting code. The final exam is approximately 60% new material and 40% cumulative questions. All exams will be completed on a computer in Hayes 020.

Technology

Canvas

The syllabus, all assignments, and due dates are posted on Canvas. Your grades will also be available on Canvas throughout the semester. Canvas is the main entry point for this course - everything you need to do is linked and organized from the Canvas course. Always start there!

Plickers

Each student will be assigned their own Plickers card. Plickers cards are 3D barcodes, and depending on the orientation of the card (4 possible sides can face up) you are able to respond to questions with answers A, B, C, or D. This allows quick, interactive feedback from the class. I also use these to quickly record attendance near the start of each class.

Perusall

The reading annotation website we use is Perusall. To access Perusall, please click the link for a particular reading assignment in Canvas. This should open the reading (in Perusall) in a new tab/window. THERE IS NO NEED TO CREATE A USER ON PERUSALL (and doing so will actually break your grading!).

Perusall provides some documentation to explain [what kind of comments we are looking for](#).

Mimir

Section 1001 will use the Mimir platform, an online platform for compiling and running our C++ programming assignments. It can be accessed from a link in Canvas. Mimir will allow you to submit your solution to the problem, compile it on their server, and then run against pre-defined tests and show if your solution passes those tests or not. You will have the ability to re-submit to try for a higher grade. You can also edit your code directly in their platform using their online IDE.

Course Policies

Withdrawal Deadline

Friday, April 6, 2018. University policy states that after this date, anybody withdrawing from the course will have the grade automatically turn into an F.

Office Hours and Help

Please check Canvas, Canvas inbox, and your BGSU email regularly. [You may have your Canvas messages forwarded to your BGSU/other email, and have your BGSU email forwarded to another favorite email address, if necessary, but do check it (multiple times) daily.] I forward my own Canvas messages to my BGSU email and check my BGSU email multiple times everyday (with rare exceptions). I will do my best to accommodate you ASAP, even if outside my posted office hours and without appointment. In general, if you need to see me in my office outside of my regular office hours, please make an appointment to ensure I am available.

Attendance

Students are expected to attend each class and be on time. I take attendance at the start of each lecture. I typically use good attendance as a factor when considering final grades. I reserve the right to penalize students up to 1% of their final grade, per absence, for more than 3 un-excused absences.

Make-up policy

If you cannot take an exam as scheduled, you (or an authorized person, only in case you are unable to do so) must contact me ahead of time with the reason. Make-ups are considered typically for health emergencies only.

Academic honesty

All coursework (unless done in pairs/groups) for this class is expected to be YOUR OWN work. The MINIMUM penalty for copying someone's work (including current classmates, students from a previous offering of the course, or postings found on the web) or knowingly allowing someone to copy your work is a zero for the homework/project/exam/paper/presentation. The offense is also reported to the dean of your college. Plagiarism detection tools will be used in this course. I will follow the Department's policies and the University's code of academic conduct as defined in the BGSU Student Handbook. For details refer to:

1. [Department of Computer Science Academic Honesty Policy](#)
2. [BGSU Code of Academic Conduct](#)
3. [The Academic Charter, section B-I.G](#)

Disability Policy

In accordance with the University policy, students with disabilities must verify their eligibility through the Office of Disability Services, 38 College Park Office Building, 419-372-8495 (<http://www.bgsu.edu/disability-services.html>). Contact me as soon as possible this semester to arrange any accommodations needed to assist with your success in this course.

Religious Holidays

It is the policy of the University to make every reasonable effort allowing students to observe their religious holidays without academic penalty. In such cases, it is the obligation of the student to provide the instructor with reasonable notice of the dates of religious holidays on which he or she will be absent. Absence from classes or examinations for religious reasons does not relieve the student of responsibility for completing required work missed. Following the necessary notification, the student should consult with the instructor to determine what appropriate alternative opportunity will be provided, allowing the student to fully complete his or her academic responsibilities ([The Academic Charter, section B-I.F-4.b](#)).

Tentative Course Schedule

Week	Day	Date	Topics
1	M	Jan 8	Introduction
	W	Jan 10	Ch. 1 Data Abstraction
	F	Jan 12	Interlude 1 C++ classes
2	M	Jan 15	Holiday - No class
	W	Jan 17	Lab 1 - <i>Hayes 020</i>
	F	Jan 19	Interlude 2 Pointers
3	M	Jan 22	Ch. 2 Recursion
	W	Jan 24	Ch. 3 Array-based Implementation
	F	Jan 26	Lab 2 - <i>Hayes 020</i>
4	M	Jan 29	Ch. 4 Link-based Implementations
	W	Jan 31	Lab 3 - <i>Hayes 020</i>
	F	Feb 2	Interlude 3 Exceptions
5	M	Feb 5	Exam review
	W	Feb 7	Exam 1 - <i>Hayes 020</i>
	F	Feb 9	Ch. 6 Stacks
6	M	Feb 12	Ch. 7 Implementing Stacks
	W	Feb 14	Lab 4 - <i>Hayes 020</i>
	F	Feb 16	Ch. 8 Lists
7	M	Feb 19	Ch. 9 List Implementations
	W	Feb 21	Lab 5 - <i>Hayes 020</i>
	F	Feb 23	Smart Pointers
8	M	Feb 26	Ch. 10 Algorithm Efficiency
	W	Feb 28	Lab 6 - <i>Hayes 020</i>
	F	Mar 2	Ch. 11 Sorting Algorithms
9	M	Mar 5	Spring Break - No class
	W	Mar 7	Spring Break - No class
	F	Mar 9	Spring Break - No class
10	M	Mar 12	Exam review
	W	Mar 14	Exam 2 - <i>Hayes 020</i>
	F	Mar 16	Ch. 12 Sorted Lists
11	M	Mar 19	Ch. 13 Queues/Priority Queues
	W	Mar 21	Lab 7 - <i>Hayes 020</i>
	F	Mar 23	Ch. 14 Implementing Queues
12	M	Mar 26	Ch. 15 Trees
	W	Mar 28	Lab 8 - <i>Hayes 020</i>
	F	Mar 30	Ch. 16 Tree Implementations
13	M	Apr 2	Ch. 17 Heaps
	W	Apr 4	Lab 9 - <i>Hayes 020</i>
	F	Apr 6	Interlude 6 Iterators
14	M	Apr 9	Exam review
	W	Apr 11	Exam 3 - <i>Hayes 020</i>
	F	Apr 13	Interlude 7 STL
15	M	Apr 16	Ch. 18 Dictionaries
	W	Apr 18	Lab 10 - <i>Hayes 020</i>
	F	Apr 20	Ch. 19 Balanced Search Trees
16	M	Apr 23	Ch. 20 Graphs
	W	Apr 25	Lab 11 - <i>Hayes 020</i>
	F	Apr 27	Exam review
17	R	May 3	1:15pm-3:15pm Final exam - <i>Hayes 020</i>