

# CS 3350 Fall 2020 – Data Structures and Algorithms

## Contact Information

Instructor	Dr. Robert Dyer
Office Hours	MTWRF 1–2pm OR by appointment
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**Prerequisites** Math 2220/3220 and grade of C or better in CS 2020

## Class Meeting Time

- Mondays/Wednesdays/Fridays, 11:30am-12:20pm, HAYES 117

**Textbook** The textbook is OPTIONAL but highly recommended.

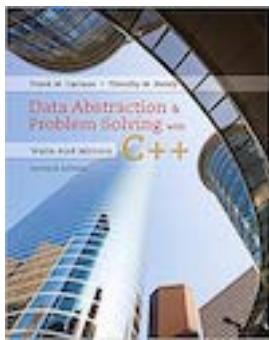


Figure 1: Book

“*Data Abstraction & Problem Solving with C++: Walls and Mirrors*,” 7th Edition (2016), Carrano and Henry, Pearson, 978-0134463971.

**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 (3)	90	270
Final Exam	130	130
Labs (10)	25	250
Programming Assignments (5)	50	250
Readiness Assessments (20)	2.5	50
In-class Activities (20)	2.5	50
<b>Total</b>		<b>1000</b>

### Grading Scale

Point Range	Percentage	Grade
900 - 1000	90 - 100%	A
800 - 899	80 - 91%	B
700 - 799	70 - 81%	C
600 - 699	60 - 71%	D
0 - 599	below 60%	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 teams for in-class activities and the RAAs. Team members are expected to all contribute equally.

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

### 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 in the Hayes 020 lab. Labs are due the following Sunday 5pm.

### Programming Assignments

There will be several programming assignments completed outside of class in pairs. 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 70% new material and 30% 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.

### **Mimir**

We 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 24, 2020. University policy states that after this date, anybody withdrawing from the course will have the grade automatically turn into a F.

### Office Hours and Help

Please check your Canvas course site, Canvas messages, 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 check BGSU email more often than I access Canvas, so if you need to contact me urgently, use both Canvas and BGSU email, if necessary multiple times. 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.

### Attendance

Students are expected to attend each class and be on time. For in person courses, I take attendance at the start of each lecture. For online courses, I check Canvas history to see what each student viewed and how often.

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/assessment 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. Note however that any make-up assessment normally done in groups will count 100% toward your score (there will be no averaging with the team's score). Make-ups are considered typically for health emergencies only.

### Academic honesty

All coursework for this class is expected to be YOUR OWN work. The 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 **REMOVAL FROM THE COURSE AND GRADE OF WF**. The offense is also reported to the dean of your college. Turnitin and Moss, 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 (<https://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](#)).

### **Classroom Environment, Language, and Behavior Expectations**

In order to promote an inclusive and constructive learning environment, demeaning, marginalizing, and otherwise negative language and behavior will not be tolerated in the classroom. Respect and courtesy toward the instructor, classmates, and classroom guests are expected. Language and behaviors that are disruptive, abusive, or harassing may result in disciplinary action as specified by the Student Code of Conduct.

### **Title IX**

Bowling Green State University (BGSU) is committed to providing a safe learning environment for all students that is free of all forms of discrimination and harassment. Sexual misconduct and relationship violence in any form are antithetical to the university's mission and core values, violate university policies, and may also violate federal and state law. Faculty members are considered "Mandatory Reporters" and are required to report incidents of sexual misconduct and relationship violence to the Title IX Coordinator. If you or someone you know has been impacted by sexual harassment, sexual assault, dating or domestic violence, or stalking, please visit [www.bgsu.edu/TitleIX](http://www.bgsu.edu/TitleIX) to access information about university support and resources.

## Tentative Course Schedule

Week	Day	Date	Topics
1	M	Jan 27	Introduction
	W	Jan 29	Ch. 1 Data Abstraction
	F	Jan 31	Lab 1 - <i>Hayes 020</i>
2	M	Feb 3	Interlude 1 C++ classes
	W	Feb 5	Ch. 2 Recursion
	F	Feb 7	Lab 2 - <i>Hayes 020</i>
3	M	Feb 10	Interlude 2 Pointers
	W	Feb 12	Ch. 3 Array-based Implementation
	F	Feb 14	Lab 3 - <i>Hayes 020</i>
4	M	Feb 17	Ch. 4 Link-based Implementations
	W	Feb 19	Interlude 3 Exceptions
	F	Feb 21	<b>Exam 1 - Hayes 020</b>
5	M	Feb 24	Ch. 6 Stacks
	W	Feb 26	Ch. 7 Implementing Stacks
	F	Feb 28	Lab 4 - <i>Hayes 020</i>
6	M	Mar 2	Ch. 8 Lists
	W	Mar 4	Ch. 9 List Implementations
	F	Mar 6	Ch. 10 Algorithm Efficiency
7	M	Mar 9	Lab 5 - <i>Hayes 020</i>
	W	Mar 11	Interlude 4 Smart Pointers
	F	Mar 13	Lab 6 - <i>Hayes 020</i>
<i>Mar 16-20</i> <i>Spring Break - No classes</i>			
8	M	Mar 23	Ch. 11 Sorting Algorithms
	W	Mar 25	Ch. 12 Sorted Lists
	F	Mar 27	<b>Exam 2 - Hayes 020</b>
9	M	Mar 30	Ch. 13 Queues/Priority Queues
	W	Apr 1	Ch. 14 Implementing Queues
	F	Apr 3	Lab 7 - <i>Hayes 020</i>
10	M	Apr 6	Ch. 15 Trees
	W	Apr 8	Ch. 16 Tree Implementations
	F	Apr 10	Lab 8 - <i>Hayes 020</i>
11	M	Apr 13	Ch. 17 Heaps
	W	Apr 15	Interlude 7 Iterators
	F	Apr 17	Lab 9 - <i>Hayes 020</i>
12	M	Apr 20	Interlude 8 STL
	W	Apr 22	Ch. 18 Dictionaries
	F	Apr 24	<b>Exam 3 - Hayes 020</b>
13	M	Apr 27	Ch. 19 Balanced Search Trees
	W	Apr 29	Ch. 19 Balanced Search Trees
	F	May 1	Lab 10 - <i>Hayes 020</i>
14	M	May 4	Ch. 20 Graphs
	W	May 6	Ch. 20 Graphs
	F	May 8	Lab 11 - <i>Hayes 020</i>
15	W	May 13	11:30am-2:00pm <b>Final exam - Hayes 020</b>