# BIT 143: Programming: Data Structures

Section 1 (1311)

2021 Spring
Instructor: Mike Panitz

## Course Description

This course extends the fundamentals covered in Intermediate Programming. The course will cover program specification and design, abstract data types and classes. Topics will include dynamic arrays, stacks, queues, linked lists, binary trees and recursion. Taught in C#.

(from COG version 052814)

## Required Materials

C# for Programmers

or

C# How To Program

by Deitel & Deitel

Published by Prentice Hall PTR

The edition doesn't matter: the material that we're covering hasn't changed in a while and there will be NO problems assigned from the book. So find the cheapest one you can and use that :)

Note that you may be able to find a free, online version via the college’s library.

[Try this link](http://proquest.safaribooksonline.com.offcampus.lib.washington.edu/book/programming/csharp/9780132657402), and let the instructor know if it doesn’t work:

LINK: http://proquest.safaribooksonline.com.offcampus.lib.washington.edu/book/programming/csharp/9780132657402

You may need to [set up a UW netid here](https://uwnetid.washington.edu/newid/).
Link: https://uwnetid.washington.edu/newid/

## Required Actions

 Since this class is partially online, maintaining clear lines of communication between the instructor and student is of paramount importance. There will be times when the instructor needs to inform you of changes, clarify something, etc, between class sessions, and it is imperative that the instructor be able to do efficiently, and with confidence that you have received the message, and (if appropriate) acted upon it.

 Towards that end, you must have an email address that you read at least once a day (once per 24 hour time period). You need to provide this email address to the instructor, so that the instructor can use it to contact you. If this email address changes, you are required to immediately inform the instructor.

## Class Meetings

[The most up-to-date information about the class meeting time and place is always Cascadia’s website – please check there for this information](http://classes.cascadia.edu/)

## Course Schedule

The course schedule is listed on the course website.

## Office Hours

Office hours are listed on the Canvas site for this course

These office hours may change, based on other commitments to the college.

## Contact Info

If I’m in my office, feel free to knock. Otherwise, email is a good way to contact me.

Email address: mpanitz@cascadia.edu

Office: CC2-319

Phone: 425-352-8211

Mailbox: In Room CC1-154

## Website

The course website is:

<https://cascadia.instructure.com/courses/2057891>

The website will contain announcements, assignments, and materials from class.

The URL for Cascadia Community College is: http://www.cascadia.edu/

## Accessibility

If you have or suspect you have a disability and need an accommodation please contact the front office in Kodiak Corner at 425-352-8383 to make an appointment with the Disability Support Services. Services and Accommodations through DSS are not retroactive.

## On-Campus Counseling

If you have a personal problem or stress that is affecting your schoolwork and would like to talk with someone, please contact the Cascadia counselor. Counseling at Cascadia is confidential, professional and free. Visit the Kodiak Corner front desk or call 425-352-8860 for an appointment.

## Advising

Academic advising helps students make the connection between academic interests, degree requirements and career paths. Advisors can assist students with:

* Choosing a degree and major
* Advice on degree requirements and course scheduling
* Career interest inventories
* Information about course equivalencies and transfer policies
* Setting long-term academic goals

Students should plan to meet with an advisor at least two weeks prior to registering for classes. 30-minute advising appointments and walk-in advising are available daily during regular office hours.

Location:Kodiak Corner, Cascadia 1st floor

Phone: 425-352-8860

E-mail: advising@cascadia.edu

Instant Messenger Advising

Mondays & Fridays: 9:30AM - 11:00AM

Tuesdays & Thursdays 6:30PM - 8:30PM

MSN: cascadiaadvising@hotmail.com

Yahoo: cascadiaadvising@yahoo.com

ICQ: 356084379

## Prior Learning

Completion of BIT 142 with a grade of 2.0 or higher

## Learning Outcomes

### Learn Actively

Learning is a personal, interactive process that results in greater expertise and a more comprehensive understanding of the world.

* Develop expertise in specific algorithms and data structures; apply that expertise in the creation of software that utilizes said algorithms and data structures.
* Develop and broaden understanding of the Big Oh notation.
* Apply knowledge of Big Oh notation in the informal, correct identification of the time and space required by both the algorithms and data structures covered in this course specifically, and other software functions generally.
* Construct meaning from expanding and conflicting information about complex software programs, including independently seeking out additional sources of information and knowledge as needed in order to supplement provided instruction.
* Engage in learning, both individually and with others, through reading, listening, observing and applying knowledge and skills to the creation of software programs.
* Take responsibility for learning.

### Think Critically, Creatively and Reflectively

Reason and imagination are fundamental to problem solving and critical examination of ideas.

* Integrate, evaluate, and synthesize computer science knowledge in order to solve a variety of problems across a variety of situations.
* Recognize and solve computer science problems using creativity, analysis and intuition.
* Identify which algorithm/data structure is best suited to solving a particular problem.
* Correctly recognize when an algorithm/data structure should be customized in order to better suit the specifics of a particular problem (and then correctly customizing the algorithm/data structure, if appropriate); correctly recognize when customizing an algorithm/data structure will result in little or no benefit.
* Demonstrate an intuitive understanding of each algorithm and data structure; utilize algorithms and data structures in novel ways to solve problems that might not clearly suggest an algorithm/data structure.

### Communicate with Clarity and Originality

The ability to exchange ideas and information is essential to personal growth, productive work, and societal vitality.

* Organize and articulate ideas for a technical audiences and purposes
* Use written, spoken and symbolic forms to convey concepts creatively. Some examples might include computer source code, inline English comments within computer source code, English essays or blog posts, and technical documentation.
* Use different techniques, technologies, and approaches to communicating effectively. Some examples might include speaking to groups of people, drawing on the whiteboard (both text and diagrams), and utilizing the overhead projector system during a presentation.
* Be able to give coherent, concise, impromptu presentations on one’s approach to solving a problem, including (but not limited) to intuitive explanations of the approach and detailed technical explanations of the approach.

### Interact in Diverse and Complex Environments

Successful negotiation through our increasingly complex, interdependent and global society requires knowledge and awareness of self and others, as well as enhanced interaction skills.

* Identify when one needs additional help, and actively reach out for appropriate help when it is needed.
* Proactively seek out additional sources of help until source(s) have been located that provide sufficient help.
* Look for ways to help others while working in groups. Examples might include sharing one’s knowledge, and seeking knowledge from others.
* Work with peers to develop an understanding of the material, and to successfully apply that knowledge to the creation of software programs.
* Collaborate with others to solve complicated, dynamic and ambiguous problems and to make reasonable, justifiable decisions in the face of novel and/or uncertain circumstances.
* Practice civility, empathy, honesty and responsibility

### Technical Objectives

* Program Specification, Design, Analysis
* Abstract Data Types, Classes
* Dynamic Arrays
* Linked Lists
* Software reuse using templates
* Stacks
* Queues
* Recursion
* Binary Trees

## Assessment

### Grading Schema

You will be graded as follows:

| Activity | # | Points per each | Total fo |
| --- | --- | --- | --- |
| Homework / Assignments | 3 | 130 | 390 |
| Exams | 2 | 150 | 300 |
| All Online Activities (total) |  | (see below for details) | 180 |
| All In Class Activities (total)(for Hybrid students ONLY) |  | (see below for details) | 90 |

|  |  |
| --- | --- |
| Type of Student | Total Point available this quarter |
| **Online** students | 870 |
| **Hybrid** students | 960 |

Online and In Class activities can be further broken out by the type of class you’re enrolled in:

| Class Activity | Points (hybrid class) |
| --- | --- |
| PCEs | 10 / week x 9 weeks= 90 points |
| Video Outline (orViewing Quiz) | 10 / week x 9 weeks= 90 points |
| In-Class Activities (for Hybrid students ONLY) | 10 / week x 9 weeks (the midterm & final are not included in this total)= 90 points |

 Notice that the grading schema for the two versions of the class (online and hybrid) are nearly identical. It is expected that hybrid students will regularly attend class and that online students will not attend class (all students are welcome to attend class, but none are required to).

Note that the class will use an absolute grading scheme: If you get 100% of the points possible, you’ll get a 4.0. If everyone gets 100% of the points possible, everyone will get a 4.0. Table 1 (see below) shows you how to convert the points you've earned in this class into your final GPA for this class.

### Homework Submission Policies

 The terms “homework” and “assignment” are interchangeable, and everything that I say here that applies to one, applies to the other. Exercises are something different: exercises refer either to the post-class activities to be done after the weekly lecture portion of the class, or the in-class work during the weekly lecture, or the weekly
“preview videos” and the accompanying viewing quizzes.

 Once a homework has been graded I will return it to you. You may then have the opportunity to revise your work (in whole or in part), and re-submit your work for a re-grade. The higher grade of the two will be your final grade for that homework assignment. There are a couple of caveats: when you resubmit your work in this way, I won’t just re-grade parts of your work that had problems, but instead check to make sure that the entire assignment is correct; I may then follow up with verbal questioning of you. You have 1 week from the time the class gets the graded assignment returned to hand in your revision. This means that if you are absent on the day that an assignment is handed back, and haven't made prior arrangements with the instructor, then you will still only have 1 week after the rest of the class got their grades to do your revision. If you miss too many classes, you might end up not having the chance to do a revision. You may only hand in one revision per assignment.

### Exams

 The exams will be cumulative: any topic covered from the beginning of class till the time of the exam is fair game for questions. The exams will include will emphasize problem solving, and utilization of what you’ve learned in class.

 If the college is closed during the time of the final exam (for example, due a to power outage) then the instructor reserves the right to not administer a final exam will and instead remove the final exam's points from the point total. While the instructor may (or may not) provide other options, and while any such options may (or may not) work for you, individually, the instructor may just remove the final exam from the course entirely.

**UPDATE FOR 2020 SPRING QUARTER: The exams will be online, since the entire rest of this class is online for this quarter.**

**The exams will still be time-limited, and will happen only on the day and time specified on the course website.**

 I’m leaving the following here (in *gray italics*) for use in further, non-Cornavirus quarters:

*The exams must be taken in-person; there are no online exams in either version of this course. The website lists the day and time that the exam will be given for the students enrolled in the hybrid section. Students enrolled in the online section have three options:*

1. *Take the exam at the same time and place as the students in the hybrid section.*
	1. *This is the recommended option, and it's free.*
2. *Arrange with the instructor to have the exam proctored at a different time. You MUST arrange this with the instructor during the first or second week of the quarter (after that time the instructor may or may not be able to arrange the proctoring). The exam will be scheduled as close to the hybrid section's exam as possible.*
	1. *This option is great for students who are taking this class online because they're enrolled in a different class at the same time, and it's free.*
3. *Arrange with the instructor to have an external proctoring service proctor the exam for you. You MUST arrange this with the instructor during the first or second week of the quarter (after that time the instructor may or may not be able to arrange the proctoring). Given that the instructor will need to communicate with the proctoring service it's recommended that you arrange this as soon as the quarter starts.*
	1. *This option is NOT free.
	Proctoring services charge for their service and you will need to pay for this service using your own money.*
	2. *If you're receiving Financial Aid you may wish to speak to someone in the Financial Aid department about having FinAid cover this. I don't know if they will or not, but it's worth asking about.*

 No make-ups will be given for exams, presentations, or other such graded events that were missed without prior notification to the instructor. The only exception is if the absence was the result of an unavoidable serious accident, a death in the family, or a serious illness. Exceptional circumstances must be verified by an appropriate third party, i.e. police report, a funeral notice, or a note form the student's doctor stating the patient's inability to take the test.

### Overall Work Plan

 Participation in the Online section of this class will accrue points: each week, you will need to complete work outside of class session time, labeled "individual Post-Class Exercises" (aka PCEs), which is due weekly (see the on-line course schedule for details). Each student must do the work individually, and submit these post-class exercises individually. Each student is free to collaborate with anyone else in the class to complete these exercises, which includes having both/all people sitting down at the same computer, and working through the exercises together. Regardless, each person needs to hand in a unique copy of the exercises that they've done on their own (so if two people sit at the computer & work through the exercises, one person will have to do the exercise a second time, and in (at least a slightly) different way). The instructor may elect to grade all the PCEs, or just a subset; points may be deducted for missing sections even when the missing sections aren't part of the graded subset.

 In addition to the Post-Class Exercises, you must complete the Viewing Quiz for the videos. In order to complete the quiz you will need to watch the Preview Videos, so make sure to budget enough time to both watch the videos and frequently pause the videos to write down your answer. The Viewing Quizzes are typically handed in by including them in the same .ZIP file that has your PCEs in them.

No matter how many weeks there are in this particular quarter, you will receive no more than 200 total points from the Online Activities category.

Any disagreements about your grade should be brought to my attention immediately.

School closure plan (this includes inclement weather, pandemics, earthquakes, etc):

If the college closes during our class time, detailed instructions on how you will make up the work will be provided online.

Unless stated otherwise, all work should represent your own original, independent thinking. Unless stated otherwise, out of class assignments are not meant to be group projects.

### Academic Dishonesty / Misconduct:

 It is okay to talk with classmates to clarify conceptual understanding necessary to complete assignments. However, copying another person’s work in whole or in part, either manually or electronically, it not acceptable; nor is copying and slightly modifying another person’s work acceptable.

Additional examples of code and exam plagiarism include:

1. Taking the work of someone else (including other students) and turning it in as your own.
2. Giving your work to another student to turn in as their own.
3. Getting information about an exam from another student.
4. Giving information about an exam to another student.
5. Copying code off the Internet and turning it in as your own.
6. Getting someone else to write your homework for you.
7. This includes paying someone else to write your homework for you.
8. If two or more homeworks or exams are found to be suspiciously similar, the burden of proof rests upon the students who submitted the work.

In general I think that the general Academic Misconduct policies used at the University of Washington's CSE department are excellent, and will be using those policies in this class as well.

In the event plagiarism should occur: all participants in the plagiarism (both the person plagiarizing, and the person whose work was taken) will receive:

1. a 20% penalty on the first offense
2. a grade of zero for the second offense, and
3. for a third (and final) offense, all parties will be given the option of either withdrawing (if the drop deadline hasn't been passed) or taking a "0.0" for the term.

(Second (and third) offences include offences from prior terms)

 Note that the penalty for plagiarizing take-home exams (if any take-home exams are assigned) is different than the above: in the event that any part of one’s take home exam is plagiarized then that person will receive a zero ( 0 ) for the entire exam.

 Group projects are learning exercises like individual projects: every individual in the group is expected to understand all the material as if each person had done the entire assignment individually. Therefore, it is fair game to ask any person in a group to explain any aspect of the assignment that the group has done.

### Autograded Work:

 Much in the same way that systems like WAMAP enable math students to get immediate feedback on developmental math problems, I have created a system that can be used to immediately assign a grade to (some of) your work. Any attempt to receive a grade that you did not earn will be referred to as ‘cracking’ the tests during this course. Examples of cracking include (but are not limited to) any attempts to disable tests, to alter tests so that they always pass, or to write your code so that tests pass even though the code does not accomplish the larger goal set out in the description of the work to be done.

 The first time you are caught ‘cracking’ a test, you will get a grade of zero on that assignment. If you are caught cracking assignments a second time, you will also get a zero on that second assignment. On the third time, you will be given the option of either withdrawing (if the drop deadline hasn't been passed) or taking a "0.0" for the term. This is the ‘three strike’ rule for cracking.

 Furthermore, if the instructor detects that you have cracked (or attempted to crack) an assignment, the instructor will go through all your prior work in an effort to detect other instances of you cracking tests. These prior offenses will count towards the ‘three strike’ rule, as explained above.

For autograded weekly work students will have two chances to revise and resubmit their work:

1. On the day of the midterm exam you are allowed to upload any fully autograded PCEs (and/or Viewing Quizzes) that were due prior to the midterm exam.
2. On the day of the final exam you are allowed to upload any fully autograded PCEs (and/or Viewing Quizzes) that were due after the midterm exam and prior to the final exam

### Late Policy:

 Any work that is not submitted to the instructor for grading will be assigned a grade of "0".

 The general policy for work that is submitted electronically is that work is not late until the instructor goes to grade the work and finds it to be missing. In practical terms this means that if the instructor hasn’t graded something yet you can (typically) still upload the work and have it be graded as if the work had been handed in on-time (i.e., penalty-free). The instructor will wait until the work is due to grade it (of course), but makes no guarantees about waiting any longer than that.

In other words: for work that the instructor has not yet graded you can take your chances that the instructor will be late enough for you to get the work done and submitted but if the instructor grades it before you can finish (or submit) the work then you will get the zero for not having it in on time.

### Lesson 01 and Lesson 02 Missing File Extension Policy:

 For Lessons 01 and 02, each student will be allowed to hand in missing files, as long as the file(s) are handed in within 24 hours of when the Lesson is graded.

* These Missing File Extensions have a hard deadline (i.e., once the deadline has passed no further uploads will be accepted, even if the instructor hasn’t finished grading the extensions at that time).
* You CANNOT use a missing file extension for any homework assignments (because you already get to do a revision).
* You may only hand in missing files. For example, if you handed in a file that wasn’t complete you CANNOT use this Missing File Extension to finish / revise the file that you already handed in. Any files that you attempt to hand in a second time will not be graded.
* Your final grade for the lesson will be the higher of your initial grade, and your grade for the Missing File Extension.

### Regrades For Autograded Lessons Policy:

For the lessons that use the NUnit autograding to generate an initial grade (currently this is Lessons 03 and higher, but you should check the website to see what the current status of the lessons are) then you may hand in the autograded Lesson a second time, on the day of the next exam (either the Midterm or the Final Exam).

You may hand in any and all files, whether you handed them in the first time or not, whether the files were completely filled in or not. This is a second chance to get all the work for the Lesson graded (coding exercises, viewing quiz / video outline, etc).

Your final grade for the lesson will be the higher of your initial grade, and your regraded grade.

### Homework Assignments:

General philosophy:

 These are more substantial projects, and should be handed in on time. If you miss the initial version, I'll grade the assignment, but as the one-and-only version (i.e., you don’t get a chance to do a revision).

Exact Rules:

 If you don't have handed in the initial version of the homework assignment by the time that the instructor goes to grade it, then you can still hand it in on or before the deadline for the revision, and it will be graded without penalty but you will NOT BE ALLOWED TO REVISE that assignment

 If you haven't submitted a revision to a homework assignment by the time that the instructor goes to grade it then you will keep the initial grade for the homework (if you didn't submit the initial version either, this means that you will be get a zero for that assignment).

### A Warning about unreliable technology

 Today’s technology is inherently unstable: AOL might give you a busy signal, your ISP might be down, the public library might not be open, you might be unable to get Microsoft Word to do exactly what you want. While you might have this happen to you, it’s not an excuse for handing in an assignment late. Knowing this, you should include time in your schedule to compensate for possible technological snafus. This will allow you to hand in work on time, even in the fact of unexpected techno-faults. For assignments that have a hard deadline, no leeway will be given to students who fail to hand in an assignment because of technological problems.

### For Hybrid students only:

Class time will be used not just for lecture time, but also for various in-class activities that you will be expected to participate in. Thus, attendance is mandatory; roll call will be done at the start of each class. If you show up on time for all classes, stay for the entire class, and actively participate in the in-class activities and do well on the quizzes, you should receive the full points allotted to this category. Class participation will be assessed in the following manner:

1. at the beginning of class there will be a short quiz on the contents of the previous lecture, worth 2 points.

2. If you do a reasonable job of correctly completing the In Class Exercises, you will get another 8 points,

for a total of 10 points per day.

The two most important aspects of doing the ICEs are that you are doing a reasonable job for your ability level, and that you are learning the material.

No matter how many lectures there are, you will receive no more than 200 total points from the In Class Activities category.

| Minimum Percent Needed | GPA |
| --- | --- |
| 95 | 4.0 |
| 94 | 3.9 |
| 93 | 3.8 |
| 92 | 3.7 |
| 91 | 3.6 |
| 90 | 3.5 |
| 89 | 3.4 |
| 88 | 3.3 |
| 87 | 3.2 |
| 86 | 3.1 |
| 85 | 3.0 |
| 84 | 2.9 |
| 83 | 2.8 |
| 82 | 2.7 |
| 81 | 2.6 |
| 80 | 2.5 |
| 79 | 2.4 |
| 78 | 2.3 |
| 77 | 2.2 |
| 76 | 2.1 |
| 75 | 2.0 |
| 74 | 1.9 |
| 73 | 1.8 |
| 72 | 1.7 |
| 70 | 1.5 |
| 69 | 1.4 |
| 68 | 1.3 |
| 67 | 1.2 |
| 66 | 1.1 |
| 65 | 1.0 |
| <65 | 0.0 |

I would like you to electronically submit all assignments. You should type all assignments & homework answers into the computer (including essay type questions), make sure it runs correctly, and submit the files for any given assignment. More details will be given in individual assignments.

### Attendance

You are responsible for what goes on in class whether present or not. You are responsible for making up any work, assignments, quizzes, etc., for missed classes.

Attendance is very important, since the course is structured to require active involvement and participation on the part of the student. Missing a class means missing material that is difficult to make up. Daily attendance records will be kept.

If you must miss a class, you will have to arrange to get the class notes and any other information from another person. I suggest that once you get to know some people in the class, you exchange phone numbers with one or two, so if you do miss a class you can obtain assignments, quiz information, etc., for the following class.

### Other Notes

I reserve the right to modify any and all aspects of the course, at any time, including this syllabus.

In general, the final exam in this class will NOT be returned to students. You may request to view your completed, graded exam for a reasonable, short amount of time in the instructor’s presence, but you will not be given the final, nor may you make copies of the final exam.

##  Cascadia College Syllabus Learning Agreement

The [Syllabus Learning Agreement is available behind this hyperlink](http://www.cascadia.edu/programs/sla.aspx)

### Campus Closures and Inclement Weather

1. Find information about and sign up for alerts and notifications at [Emergency Notifications Cascadia FlashAlert](http://www.cascadia.edu/services/emergency/alert.aspx). The site includes instructions for subscribing to alerts. In the event of a campus closure, instruction for this class will continue in the following way:
2. In the event of a campus closure, please log into [CANVAS](http://cascadia.instructure.com) for announcements and instructions. [Click here for CANVAS instructions, including technical support information](http://www.cascadia.edu/programs/elearning/canvasinstructions.aspx).