# BIT 265:

# Structures and Algorithms

All Sections

2019 Spring

Instructor: Mike Panitz

## Course Description

This course teaches the students about the design and analysis of algorithms. Students will learn about big O notation, trees, tables, graphs, hashing, and methods of sorting and searching.

## Optional Materials

Introduction To Algorithms, Second Edition

by Cormen, Leiserson, Rivest, Stein

published by McGraw-Hill, © 2001 by M.I.T.

ISBN: 0-07-013151-1

This is not a required book- if you can find everything you need through other sources (online, the library, etc) then don't feel compelled to buy this book.

Note that you may be able to find a free, online version via the college’s library, or via Seattle Public Library, or via King County Library

## Class Meetings

Tuesday and Thursday, 1:15pm – 3:20pm, Room CC1-231

## Course Schedule

The course schedule is listed on the course website.

## Office Hours

Mondays 3:30 – 6:30pm

or by appointment

Office hours will be typically be held in my office (room CC1-319)

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](mailto:mpanitz@cascadia.edu)

Office: CC2-319

Phone: 425-352-8211

Mailbox: In Room CC1-154

## Website

The [course website](http://faculty.cascadia.edu/mpanitz/Courses/BIT143/) is:

http://faculty.cascadia.edu/mpanitz/Courses/BIT265/

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

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

## Prior Learning

Completion of BIT 143 with a grade of 2.0 or higher

## Course Learning Outcomes:

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

* Participate in in-class exercises designed to develop an understanding of data structures and algorithms
* Independently create programs that effectively utilize data structures and algorithms to solve problems
* Take responsibility for learning

### Think Critically, Creatively and Reflectively - Reason and imagination are fundamental to problem solving and critical examination of ideas.

* Independently investigate, comprehend, and prepare presentations on algorithms and data structures
* Recognize and solve problems using data structures and algorithms in creative, intuitive and yet analytical ways
* Work to independently apply the data structures and algorithms to solve problems of interest to the students
* Construct meaning from expanding and conflicting information

### Communicate with Clarity and Originality – The ability to exchange ideas and information is essential to personal growth, productive work, and societal vitality.

* Effectively present one or more data structure(s) and/or algorithms to the rest of the class
* Utilize multiple types of supporting materials in the presentations (e.g., PowerPoint slides, demonstration programs, pseudocode, images, videos, whiteboard demonstrations, etc)
* Develop a working knowledge of data structures and algorithms by working through sample applications in small groups on the whiteboard

### 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.

* Work in groups to develop an understanding of data structures and algorithms
* Practice supportive, group-success oriented behavior patterns, such as actively helping those who are struggling
* Practice balancing group-success behaviors and individual-success behaviors in constructive, sensitive ways
* Practice civility, empathy, honesty and responsibility

### Technical Objectives

* Trees
* Priority Queues, Heaps
* B-Trees, AVL trees
* Tables
* Graphs
* Hashing
* Merge sort, Quick Sort, Heapsort

## Assessment

### Grading Schema

**You will be graded as follows:**

**Homework / Assignments (2) @ 100 pts each**

**In-Class Presentations (2) @ 100 pts each**

**In-Class Participation @ 200 pts**

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 to your final GPA.

### Homework Submission Policies

The terms “homework” and “assignment” are interchangeable, and everything that I say here that applies to one, applies to the other.

Once a homework has been graded, I’ll return it to the class, either electronically or in print. You may then have the opportunity to revise your work (in whole or in part), and re-submit your work for a re-grade. This approach to re-grades is sometimes referred to the “mastery approach”. 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 reserve the right to not just re-grade the written work, but also check to make sure that the written work is correct, and may then follow up with verbal questioning of you. I reserve the right to assign you additional problems, if I feel that your grasp of the concept is shaky. This will be to your benefit, since the best way to learn how to program is to do it. 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.

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).

### 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.

### 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 and will emphasize problem solving, and utilization of what you’ve learned in class. For written exams, fewer points will be deducted for conceptually unimportant syntax errors (e.g., incorrectly capitalizing the word "if"), while more points will be deducted for important syntax errors (e.g., leaving the "extends Robot" off of a new class declaration).

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.

### Overall Work Plan

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, you should consider attendance to be 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 200 points allotted to this category. Class participation will be assessed in the following manner: at the beginning of class there will be a short quiz on the contents of the previous lecture, worth 2 points. 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 quizzes and ICEs.

If you notify the instructor at least one week prior to an exam or quiz, it may be possible to take the exam or quiz at a different time than the scheduled date – this different time will be on the same day if possible, or typically on a day prior to the exam otherwise.

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.

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.

Any disagreements about your grade should be brought to the instructor's attention immediately.

### Academic Dishonesty / Misconduct:

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.

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. In the event copying 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)

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.

### 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.

| 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

This was last updated for Fall 2017 on August 28, 2017

### Pluralism and Diversity

Cascadia believes in pluralism, an intentional culture where everyone's history contributes to the collective success of our community.Cascadia is committed to creating a supportive environment for a diverse student, faculty, and staff population. Individual differences are celebrated in a pluralistic community of learners. Cascadia does not discriminate on the basis of race, color, religion, gender and/or sex, sexual orientation, national origin, citizenship status, age, marital or veteran status, or the presence of any sensory, mental or physical disability, or genetic information, and is prohibited from discrimination in such a manner by college policy and state and federal law. The following office has been designated to handle inquiries regarding non-discrimination policies and can direct inquiries to the appropriate office for ADA-related requests: Director of Human Resources, Office CC2-280, 425-352-8880.

### Title IX

Title IX of the Education Amendments of 1972 prohibits discrimination on the basis of sex in education programs or activities that receive Federal financial assistance. In compliance with Title IX, Cascadia is committed to providing an educational environment free from sexual harassment, including acts of sexual violence or sexual assault. The College is equally committed to ensuring that those who raise complaints or participate in the investigation and resolution of complaints are free from retaliation. To raise a complaint or voice a concern with Cascadia's compliance with Title IX, contact Martin Logan, Executive Director of Human Resources, at [mlogan@cascadia.edu](mailto:mlogan@cascadia.edu) or 425-352-8262.

### Academic Honesty

The College regards acts of academic dishonesty, including such activities as plagiarism, cheating and/or/violations of integrity in information technology, as very serious offenses. In the event that cheating, plagiarism or other forms of academic dishonesty are discovered, each incident will be handled as deemed appropriate. Care will be taken that students’ rights are not violated and that disciplinary procedures are instituted only in cases where documentation or other evidence of the offense(s) exists. A description of all such incidents shall be forwarded to the Student Conduct Officer, where a file of such occurrences is maintained. The Student Conduct Officer may institute action against a student according to the college’s disciplinary policies and procedures. [Click here to see the policies and procedures in the *Student Handbook*](http://www.cascadia.edu/academic_resources/handbook.aspx)*.*

For more information please see [the course-specific plagiarism information](#_Academic_Dishonesty_/)

### Student Rights and Responsibilities

Cascadia is a student-centered college, operated to provide knowledge and skills for the achievement of learners’ academic, professional and personal goals. Inherent in the college’s mission are certain rights and freedoms needed for learning and personal development. Admission to Cascadia provides these rights to students, and also assumes that students accept the responsibility to conduct themselves in ways that do not interfere with the purposes of the college in providing education for all of its learners. For the complete policy, see [the Student Code of Conduct in the Student Handbook](http://www.cascadia.edu/academic_resources/handbook.aspx).

### Course Websites

Nearly every course at Cascadia has one or more dedicated websites. The most common course website is the college Learning Management System, [CANVAS](http://www.cascadia.edu/programs/elearning/canvasinstructions.aspx); nearly all mathematics courses use [WAMAP](https://www.wamap.org/). Access to course websites is through Internet browsers, and students will use personal user IDs and passwords to log in.

* Students may not share their user IDs and passwords with anyone else or allow anyone else to participate in course sites on their behalf.
* Students need reliable access to the Internet. Some devices, such as smartphones, cannot access all aspects of CANVAS and most other course websites. Cascadia does not recommend that students attempt to complete a course using only a smartphone. Computers are available in many locations on campus.

Students who enroll in courses that make use of a course website are expected to check that site frequently with their own devices and campus computers. Technical support for accessing learning management systems is available at the Cascadia Learning Center.

### Learning Center Services

To support student success, Cascadia offers a variety of support services through its Learning Center. The Learning Center, located in CC2-060 and CC2-080, provides tutoring in a range of subjects, space for students to work individually or in small groups, computer and printing resources, technology support, and graphing calculators available for checkout. [Click here for hours and contact information for the Learning](http://www.cascadia.edu/services/tutoring/) Center.

### Online Tutoring and Writing Assistance

Cascadia provides online access to live tutors in a variety of subjects through the Western e-Tutoring Consortium. This service includes live, interactive sessions and asynchronous feedback through an Essay Center. Many subjects have convenient tutoring hours late into the evening and seven days a week, depending on tutor availability; schedules are available online. To learn more or get started, visit the Learning Center’s [etutoring webpage](http://www.cascadia.edu/services/tutoring/etutoring.aspx).

### Disability Support Services

Cascadia provides services to help students with disabilities successfully adapt to college life.  Students who meet specific criteria may qualify for reasonable academic accommodations. If you have or suspect you have a disability and need an accommodation please contact the DSS Office at 425-352-8128 to make an appointment, or email us at [disabilities@cascadia.edu](mailto:disabilities@cascadia.edu). Services and Accommodations through DSS are not retroactive. It is the student’s responsibility to approach the faculty member with the accommodation letter as soon as it is issued from DSS.

### Counseling Services

If you have a personal problem or stress that is affecting you and would like to talk with someone, please contact [UWB’s Mental Health Counseling Center](http://www.uwb.edu/studentaffairs/counseling). Counseling at Cascadia (provided through UWB) is confidential, professional and free (six sessions). Visit the Counseling Center front desk Monday through Friday, 8:30 a.m. to 5 p.m. or call 425-352-3183 for an appointment. The number for a 24-hour Crisis Line is 206-461-3222.

### Advising

Students should schedule an appointment to meet with an advisor to consult about classes and degrees, and to create a tentative education plan. They can call 425-352-8860 or come to the Kodiak Corner to make an appointment. Appointments are not made via email. At the time of the appointment, they need to indicate which degree they are pursuing. [See the Cascadia website for information about Drop-In Advising hours](http://www.cascadia.edu/advising/academic.aspx).

### Online Advising

Email advising is available at [advising@cascadia.edu](mailto:advising@cascadia.edu). Our distance advisor can answer most questions via email, but we don’t schedule advising appointments via email.

### Campus Closures and Inclement Weather

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:

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).

In the event of inclement weather affecting morning classes, there will be notification on the local media by 5:30 a.m. You may also call the main campus number: 425-352-8000to hear a message that will be updated with the latest Cascadia closure information. Should the weather deteriorate during the day, you may check online, listen to the main campus message, check email or the media to hear news about closures or class schedule changes.

### Emergency Procedures

Emergency procedures are posted in each classroom. To reach campus security personnel, dial 425-352-5222. City of Bothell fire and police may be reached by dialing either 9-9-1-1 or 9-1-1 from any campus phone. Campus emergency phones are located on campus walkways and parking lots.

### Acceptable Use Policy on Information Technology

In general, the same ethical conduct that applies to the use of all college resources and facilities applies to the use of Cascadia’s systems and technology. These systems may only be used for authorized purposes, using only legal versions of copyrighted software, and with consideration and respect for the conservations of resources and the rights of other users. For additional information, see [the online version of the Student Handbook](http://www.cascadia.edu/academic_resources/handbook.aspx) or go to the Open Learning Center for assistance with any questions*.*

### Family Education Rights and Privacy Act (FERPA)

Cascadia College complies with the Family Education Rights and Privacy Act (FERPA) of 1974 concerning the information that becomes a part of a student’s permanent educational record and governing the condition of its disclosure. Under FERPA, students are protected against improper disclosure of their records. [See the student handbook for details](http://www.cascadia.edu/academic_resources/handbook.aspx).