Course Name: Data Structures

Course Number: CS 261 (Section 401)

Credits: 4

Instructor name: Randy Scovil

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Course Description

Abstract data types, dynamic arrays, linked lists, trees and graphs, binary search trees, hash tables, storage management, complexity analysis of data structures. Lec/rec.

Prerequisites: (CS 162 with C or better or CS 165 with C or better) and (CS 225 [C] or MTH 231[C])

Course Format

This course will be delivered via Canvas, Gradescope, Microsoft Teams, and Ed Discussion (https://edstem.org/us/). Within the Canvas course site, you will access the learning materials and syllabus, submit written assignments, and take quizzes. You will use Gradescope to submit programming assignments. You will interact with your instructors and the undergraduate learning assistants (ULAs) via Ed Discussion, email, and Microsoft Teams. Finally, class discussions will be on Ed Discussion.

- To preview how an online course works, visit the website: Ecampus course demo.
- For technical assistance, visit the website: Ecampus technical help.

Communication

Please post all course-related questions on our Ed Discussion forum so that the whole class may benefit from our conversation. Please contact the instructor privately for matters of a personal nature. We will do our best to reply to course-related questions within 48 hours (responses may take longer over the weekend). We will strive to return your assignments and grades for course activities to you within 7 days of the due date.

Course Credits

This course combines approximately 120 hours of instruction, on-line activities, quizzes and assignments for 4 credits.

Technical Assistance

If you experience errors or problems while in your online course, contact 24-7 Canvas Support through the Help link within Canvas. If you experience computer difficulties, need help downloading a browser or plug-in, or need help logging into a course, contact the IS Service Desk for assistance. You can call (541) 737-8787 or visit the IS Service Desk online: https://oregonstate.teamdynamix.com/TDClient/Requests/ServiceDet?ID=22911

Course Learning Objectives

At the completion of the course, students will be able to...

1. **Describe** the properties, interfaces, and behaviors of basic abstract data types, such as collection, bag, indexed collection, sorted collection, stack, and queue.
2. **Read** an algorithm or program code segment that contains iterative constructs and **analyze** the asymptotic time complexity of the algorithm or code segment.
3. **State** the asymptotic time complexity of the fundamental operations associated with a variety of data structures, such as vector, linked list, tree, and heap.
4. **Recall** the space utilization of common data structures in terms of the long-term storage needed to maintain the structure, as well as the short-term memory requirements of fundamental operations, such as sorting.
5. **Design** and **implement** general-purpose, reusable data structures that implement one or more abstractions.
6. **Compare** and **contrast** the operation of common data structures (such as linear structures, priority queues, tree structures, hash tables, maps, and graphs) in terms of time complexity, space utilization, and the abstract data types they implement.

Learning Resources

There is no required textbook for this course. Reading and learning materials are provided via Canvas.

Evaluation of Student Performance

Scores for the quizzes and programming assignments will be posted on Canvas as they are graded. If you want to know your grade, use the following weights.

- 70% – Programming Assignments
- 29% – Quizzes
- 1% – Syllabus Quiz

Programming Assignments (70%)

There are a total of 6 programming assignments (excluding assignment 0) to be completed for this course.

- Assignments include writing computer programs and sometimes written answers to questions.
- Assignments are to be turned in **before 23:59** on the date they are due.
- Assignments will be turned in via Canvas or Gradesope. Assignment descriptions will specify the turn in method. Typically written answers go to Canvas and programming assignments go to Gradescope.
- Your program must pass all the Gradescope tests in order to receive full score and adhere to the provided specifications at the same time. If a grader suspects that a submitted program has been written in such a way that it passes a listed grading test on GradeScope, but does not adhere to the specification, then an additional test is likely to be run. However, any additional test done shall be easily justified as checking that the program adheres to the specification. The number of points to be awarded or deducted by these additional tests is at the discretion of the grader.
- Any crashes, hangs, errors, infinite loops, etc. not covered in the grading instructions and/or grading scripts will cause your program to lose points on GradeScope. If your program does not work on GradeScope, you are responsible to identify which function/s that is/are causing the failure and then request the instructors for a manual regrading for the rest of your submission. The points lost depend on the severity, how much it affects the rest of the program, and how it is recovered from, if at all, all based on the discretion of the grader.
- Everyone can submit **any** assignment late on two conditions:
    - first GS submission is made at least 5 days before the deadline (any score greater than zero is acceptable)
    - 50% of points for the assignment are earned at least 2 days before the deadline.

    By following the above conditions, you can submit one assignment late (up to 2 days) without any penalty. 15% deduction for each day late policy will be applied to your second late submission and so forth. Any assignment that is submitted after the 48 hours late window will not be graded, hence you will receive 0 points.

Quizzes (29% Total)

- There are 2 quizzes (other than the syllabus quiz) in this course.
- The midterm quiz is given in **Week 4** and the final quiz in **Week 8**. Please check the actual dates provided in the **Course Schedule** document, or on Canvas. You will have a 5-day time window to take each quiz. No extension will be allowed outside those windows.
- Quizzes only test knowledge of the course material, not Stack Overflow or anywhere else on the Internet.
- The quizzes are timed, closed-book, closed-notes, and non-proctored exams. Please be informed that multiple attempts of the quizzes are not allowed. So, take the quiz right away even if you open the quiz accidentally.
- Both quizzes are designed to take 120 minutes maximum.
- **Finally, no late submission for the quizzes will be graded.** Please plan to take and submit the quiz before the deadline. And please don't make any request for quiz deadline extensions.

Letter Grade

We will use the following grading structure to calculate your final grade.

Grade
100 >= A >= 92.5
92.5 > A- >= 89.5
89.5 > B+ >= 86.5
86.5 > B >= 82.5
82.5 > B- >= 79.5
79.5 > C+ >= 76.5
76.5 > C >= 72.5
72.5 > C- >= 69.5
69.5 > D+ >= 66.5
66.5 > D >= 62.5
62.5 > D- >= 59.5
59.5 > F

**REMINDER: A passing grade for core classes in CS is a C or above. A C- (below 72.5) is not a passing grade for CS majors.

Course Policies

Late Work Policy

With the given conditions, you can turn in one assignment late (up to 2 days) without any penalty. 15% deduction for each day late policy will be applied to your second late submission and so forth. Any assignment that is submitted after the 48 hours late window will not be graded, hence you will receive 0 points.

Incompletes

In this online program, there will rarely be cases where an incomplete is appropriate. The instructor will only consider giving an incomplete grade for emergency cases such as a death in the family, major disease, or childbirth, while also having completed at least 60% of all coursework. If you have a situation that may prevent you from completing the coursework, let the instructor know as soon as you can.

(Writing attribution: instructor Joseph Jess)

Guidelines for a Productive and Effective Online Classroom

Students are expected to conduct themselves in the course (e.g., on discussion boards, email) in compliance with the university's regulations regarding civility. Civility is an essential ingredient for academic discourse. All communications for this course should be conducted constructively, civilly, and respectfully. Differences in beliefs, opinions, and approaches are to be expected.

In all you say and do for this course, be professional. Please bring any communications you believe to be in violation of this class policy to the attention of your instructor.

Active interaction with peers and your instructor is essential to success in this online course, paying particular attention to the following:

- Unless indicated otherwise, please complete the readings and view other instructional materials for each week before participating in the discussion board.
- Read your posts carefully before submitting them.
- Be respectful of others and their opinions, valuing diversity in backgrounds, abilities, and experiences.
- Challenging the ideas held by others is an integral aspect of critical thinking and the academic process. Please word your responses carefully and recognize that others are expected to challenge your ideas. A positive atmosphere of healthy debate is encouraged.

Statement Regarding Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval, please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Expectations for Student Conduct

Student conduct is governed by the university's policies, as explained in the Student Conduct Code. Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility.

Academic Integrity

Students are expected to comply with all regulations pertaining to academic integrity. At OSU academic integrity is defined as the following: "(a) upholding the standards of the academic discipline of which you are a part, (b) honesty in all academic processes and accomplishments, (c) respect for and appropriate use of the work of others, (d) taking responsibility for your own work, and (e) accountability to protect personal academic work from misuse by others."

Academic Dishonesty - is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person or uses unauthorized materials or fabricated information in any academic work or research, either through the student's own efforts or the efforts of another. For further information, visit Avoiding Academic Dishonesty, or contact the office of Student Conduct and Mediation at 541-737-3656.

Please visit this website for detailed information: https://engineering.oregonstate.edu/current-students/advising/undergraduate-policy-manual#StudentConduct

Additionally, programming assignments in this course are considered Take Home Programming Tests. You must do your own work, entirely. You must follow the following rules:

- You MAY discuss the meaning of assignments, general approaches, and strategies with other students in the course.
- You MAY show your code to the ULAs or instructors for feedback and help.
- You MAY use the Internet to research how to solve a problem.
- You MUST include a citation in the form of a comment in your source code to indicate the source of any help you received (except the ULAs).
- You MAY share pseudocode, or documentation of any kind with any other student in the course. But you must mention the name of the collaborator.
- You MAY NOT show your assignment code to another student in the course for any reason.
- You MAY NOT ask another student for help debugging your assignment code.
- You MAY NOT use or copy code from any other source, including the Internet.
- You MUST write your own code for your assignments.
- You MAY NOT post any complete functions/procedures/logic blocks to MS Teams or Ed Discussion.
- You MAY NOT post any exam questions or solutions in any form.
- You MUST make any git repo you post this code in private, except for the Portfolio assignment.

Conduct in This Online Classroom

Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility. Students will be expected to treat all others with the same respect as they would want afforded themselves. Disrespectful behavior to others (such as harassing behavior, personal insults, inappropriate language) or disruptive behaviors in the course (such as persistent and unreasonable demands for time and attention both in and out of the classroom) is unacceptable and can result in sanctions as defined by Oregon Administrative Rules Division 015 Student Conduct Regulations.

Statement Regarding Religious Accommodation

Oregon State University is required to provide reasonable accommodations for employees and students sincerely held religious beliefs. It is incumbent on the student making the request to make the faculty member aware of the request as soon as possible prior to the need for the accommodation. Visit the following website for more information: https://eoa.oregonstate.edu/nondiscrimination-basis-religion

Establishing a Positive Community:
It is important you feel safe and welcome in this course. If somebody is making discriminatory comments against you, sexually harassing you, or excluding you in other ways, contact the instructor, your academic advisor, and/or report what happened at https://studentlife.oregonstate.edu/studentconduct/reporting so we can connect you with resources.

Tutoring Assistance

The College of Engineering (COE) offers a variety of academic support resources for students. There are remote tutoring services available through the COE by appointment and drop-in. There are also tutoring services available through the College of Science. More information about these and other academic support services can be found on the COE's Academic Support website. For writing assistance, the Oregon State Online Writing Suite is a great resource for students enrolled in Ecampus courses. If you have additional needs, or have questions about these services, please contact Casey Patterson at casey.patterson@oregonstate.edu.

Student Evaluation of Courses

The online Student Evaluation of Teaching system opens to students during the week before finals and closes the Monday following the end of finals. Students receive notification, instructions, and the link through their ONID. They may also log into the system via Online Services. Course evaluation results are extremely important and used to help improve courses and the online learning experience for future students. Responses are anonymous (unless a student chooses to "sign" their comments, agreeing to relinquish anonymity) and unavailable to instructors until after grades have been posted. The results of scaled questions and signed comments go to both the instructor and their unit head/supervisor. Anonymous (unsigned) comments go to the instructor only.

Concluding Remark

"Get your data structures correct first and the rest of the program will write itself."

—David Johnson

Please take the above quote seriously.