CS 325 Analysis of Algorithms

4 credits

Spring 2017

OSU catalog course description including pre-requisites/co-requistes: Recurrence relations, combinatorics, recursive algorithms, proofs of correctness. **Prerequisites**: CS 261 and (MTH 232 or CS225)

Instructor: Julianne Schutfort

E-mail: schutfoj@engr.oregonstate.edu
Email should be a secondary contact for course questions with the primary contact being the Canvas messaging or the course discussion boards.

Textbook: ***Introduction to Algorithms*** by Cormen, Leiserson, Rivest, Stein, 3rd Edition.
An ebook version of the text is available through the OSU library at
http://site.ebrary.com.ezproxy.proxy.library.oregonstate.edu/lib/oregonstate/reader.action?docID=10397652

Canvas: Announcements, office hours, weekly homework assignments, group activities, readings and other course information will be placed on Canvas. For technical assistance see
http://ecampus.oregonstate.edu/services/technical-help.htm

Course Content:

- Analyzing algorithms for correctness and running time.
- Divide and Conquer and the use of recurrences to analyze recursive algorithms.
- Dynamic Programming
- Linear programming
- Complexity Classes
- Heuristics and Approximation Algorithms

Measureable Student Learning Outcomes:

At the completion of this course, students will be able to:

1. Use O, Ω, Θ and simple recurrences to analyze the time complexity of iterative and recursive algorithms.
2. Prove the correctness of algorithms.
3. Implement recursive, iterative and heuristic algorithms.
4. Prove that a problem is NP-complete using reductions.

Course Policies:

Makeup Exams – Makeup exams take a considerable effort to schedule, so they will not be given under normal circumstances. Any requests for makeup exams must occur in the first week of classes to be considered.

Incompletes – In this online program, there will rarely be cases where an incomplete is appropriate. I will only consider giving an incomplete grade for emergency cases such as a death in

the family, major disease, or child birth, while also having a passing grade. If you have a situation that may prevent you from completing the coursework, let me know as soon as you can.

Grading:

Scores for coursework items will be posted on Canvas as they are graded. Feedback will be provided when available. You will turn in all coursework items through **both** Canvas and TEACH **before** 23:59 (**TEACH server time, Pacific Time Zone**) on the date they are due (generally Sunday unless otherwise specified), be sure you give yourself an hour or more to submit coursework. To receive a passing grade in this course you must demonstrate at least basic proficiency in each of the following course work item grading categories:

Grade Evaluation: Your course grade will be based on the following:

Homework	30%
Discussion	5%
Projects	25%
Midterm Exam	20%
Final Exam	20%
TOTAL	**100%**

Homework and Discussion Groups:

There are five homework assignments. Homework assignments will be a combination of written problems and small programming exercises. Students can discuss the homework questions with each other but must independently write up a solution. Assignments are to be individually submitted in Canvas in **by 11:59pm** on the date. A subset of the homework problems will be graded. Assignments that are not neatly written up using a word processor/text editor will not be graded.

Students will be randomly placed into Homework Discussion Groups of 6-7 students to discuss the homework problems and other discussion questions (not submitted for grading). For each discussion topic (such as Homework 1) students will be graded on a 0 to 3 scale. To receive a 3/3 score a student must contribute to the discussion in a "meaningful way" by submitting at least three posts on at least two different days. The discussion group is the first place to go to get help on homework.

Note: Groups may be reformed/changed during the term due to students dropping the class, time conflicts among group members and to add a variety of perspectives to the discussions.

Exams:

There are 2 exams for this course,

- The Midterm Exam available Week 5: Thursday at 8:00am to Sunday at 11:59pm
- The cumulative Final Exam available during Final's Week: Sunday at 8:00 am to Wednesday at 11:59 pm.

You will have 110 minutes to complete each of these exams. Exams will be proctored, so you should schedule your exams a week or two in advance. There is generally a small fee associated with exam proctoring. For more information see http://ecampus.oregonstate.edu/services/proctoring/,
You will be allowed one 8.5"x11", double-sided, typed-or-handwritten note sheet at each of your Exams. You are allowed a scratch piece of paper which MUST be destroyed at the end of the exam

REMINDER: A passing grade for classes in CS is a C or above. A C- in a CS course is not considered a passing grade toward a CS degree.

Projects:

- Projects **must** be completed in a group of 3 individuals. Project Groups are different than Homework Groups. Projects can be written in any language that compiles and runs on the flip server.
- Form your group within the first week of class and send me an email with your group members by Sunday night (end of week 1). You may elect to enter a pool to be automatically assigned to a group. Students not in a Project Group by Monday of Week 2 will be randomly placed in a group.

- Your project group will have a Canvas group homepage for each project which will include a discussion board, file sharing, conferencing and collaboration tools. You can use any other tools you want to communicate as a group but each group member is required to post at least three updates to the Canvas discussion board.

- Projects are graded on how well they demonstrate understanding of the problem, approach and solve the problem, how well they show that you have tested all possible states of a problem, meet specification, and follow an easy to read, academically acceptable, and consistent style in any code that is submitted

- Programs submitted must compile and run on our servers or they will not be graded, (to help ensure that you have a working program at the end of your assignment, be sure to start with a simple program that you can get to work, then add to it, expanding its capabilities, so that if at some point it stops compiling you might know where an error was introduced)

- Each group will elect 1 member to hand in the project code, documentation, necessary files, and report to TEACH. This is the only TEACH submission that should be made for your group. Be sure to submit all relevant files (all reports, source files, and files used in IO) for each project.

- Any group member can submit the Project report only to Canvas. In the comments section give the onid username of the student that submitted to TEACH.

- Note: Project groups may be reformed/changed during the term due to students dropping the class, time conflicts among group members and to add a variety of perspectives to the problem solving process. You may be asked to privately evaluate the members in your group.

Grading Policies and Scale:

1) Any requests for extensions/special accommodations must be made in advance, in writing (email).
2) Homework and Projects will be accepted up to 1 day late for a 10% penalty.
3) Any **disagreement in scoring** must be addressed within one week of the work being graded.

Note: Numerical scores will be rounded to the nearest integer

Grade	Average
A	93 or greater
A-	90 - 92
B+	87 - 89
B	83 - 86
B-	80 - 82
C+	77 - 79
C	73 - 76
C-	70 - 72
D+	67 - 69
D	63 - 66
D-	60 - 62
F	less than 60

Students With Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Expectations for Student Conduct:

Academic Integrity: Students in academic studies are expected to demonstrate their own knowledge and capabilities. This means that a student will be graded on the work that is clearly their own work and that additional materials will be excluded from consideration of the grading of that submission. Work that is not created by the student or cited by the student, but still submitted will be considered plagiarized material and may result in a failed submission and may result in administrative action.

- You May openly discuss the presented learning materials and participation category materials at any time with any party as long as they explicitly know that it is for an academic assignment,

- You May openly discuss the demonstration category of coursework and exams category of coursework after grading of the item is complete with any party as long as they explicitly know that it is an academic assignment and that the discussion is accompanied by an explanation of any materials presented,

- You MAY openly discuss the meaning of assignments, general approaches, and strategies with other students in the course; you may do this even before the grading date of the assignment has passed.

- You MAY (and should) use the Internet and other resources to research how to solve a problem, and you should share what you find for others in the course to learn from, but be sure to cite your sources!

- You MAY share source code, but only if it is accompanied by an explanation on how each piece of code works,

- You MUST include a citation in the form of a comment in your source code to indicate the source of any help you received (otherwise you will be claiming that you authored the work, and that is unfair and possibly a misrepresentation of your own direct skills); you should do this even if the source is an instructor or TA. This basically means that a citation will save you from most situations that may get you in trouble with plagiarism, but that I will exclude any work by others from grading consideration,

- You MUST write your own code for your assignments; this means that you should take notes on anything you do with others and use your notes instead of any shared code when working on the assignments at hand. If you cite your sources, then instead of confronting you about possible plagiarism, we will grade you based on the work that you authored.

In this online program we want to encourage collaboration and building upon the work of others in an honest way, this means that instead of strictly disallowing working with others (or their work) we will primarily be using your exams as a gauge of your individual work and the other coursework (labs, assignments, tutorials, and lectures) should be viewed as preparatory material for the exams.

We may use plagiarism-detection software check your code against other code-bases, reduce the likelihood that we will use these tools by citing your sources and recreating the desired behavior by recreating the code you learn from (in the very least it will give you more practice)!

If you are found in violation of any of the above policies, whether you are the giver or the receiver of noncited help, you may be given a zero on the assignment, failed from the course, or receive higher administrative action. The academic dishonesty charge will be documented and sent to your school's dean and the Office of Student Conduct. The first offense may result in a warning; the second offense results in an academic dishonesty charge on your transcript, a disciplinary hearing, and possible expulsion.

Conduct in this online classroom: Students are expected to conduct themselves in a civil manner at all times through any communication media (voice, body language, email, discussion boards, etc.). 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, or inappropriate language) or disruptive behaviors (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
http://arcweb.sos.state.or.us/pages/rules/oars_500/oar_576/576_015.html.

Communications:

Ground Rules for Online Communication and Participation:

- Online threaded discussions are public messages, and all writings in this area will be viewable by the entire class or assigned group members. If you prefer that only the instructor sees your communication, send it to by email, and be sure to identify yourself and identify the class in the subject line.
- Posting of personal contact information is discouraged (e.g. telephone numbers), but not forbidden.
- Online Instructor Response Policy: I will check email somewhat frequently and will respond to course related questions within a day or two if possible. Begin the subject line of your email with "[CS325]" to ensure I see it quickly.

- Observation of "Netiquette": All your online communications need to be composed with fairness, honesty and tact. Spelling and grammar are very important in an online course. What you put into an online course reflects on your level of professionalism.
- Check the Announcements area and the course syllabus before you ask general course "housekeeping" questions (i.e. how do I submit assignment 3?).

Guidelines for a productive and effective online classroom

- The discussion board is your space to interact with your colleagues related to current topics or responses to your colleague's statements. It is expected that each student will participate in a mature and respectful fashion.
- Participate actively in the discussions, having completed the readings and thought about the issues.
- Pay close attention to what your classmates write in their online comments. Ask clarifying questions, when appropriate. These questions are meant to probe and shed new light, not to minimize or devalue comments.
- Think through and reread your comments before you post them.
- Assume the best of others in the class and expect the best from them.
- Value the diversity of the class. Recognize and value the experiences, abilities, and knowledge each person brings to class.
- Disagree with ideas, but do not make personal attacks. Do not demean or embarrass others. Do not make sexist, racist, homophobic, victim-blaming, or other discriminatory comments at all.

Student Assistance:

Getting assistance:

• Your first line of assistance should be to take a break, skim through the book, lectures, notes, and Internet. If you cannot find the answer yourself after some searching, you should then communicate with your fellow classmates.

• If you and your classmates cannot find a solution, then asking the TAs or I by discussion board.

• Contacting us by email is a poor way to ask a question, not because email is bad, but that questions can usually benefit the whole class,

• Traditional students form study groups for a reason, I strongly encourage you to find people to support you throughout the class and throughout the other classes that you take in our online program,

• I will have virtual office hours and review sessions via WebEx Conferencing. The review sessions will be recorded. Specific questions about individual student's assignments or projects will not be recorded. If you request a private meeting it will not be recorded. Recordings of review sessions will be posted within 24 hours.

• We have several methods of communicating, but I would prefer we use a discussion board so that we can refer back to our previous discussions and citations and build upon our previous learning.

Technical Assistance – If you experience computer difficulties, need help downloading a browser or plugin, assistance logging into the course, or if you experience any errors or problems while in your online course, contact the OSU Help Desk for assistance. You can call (541) 737-3474, email

osuhelpdesk@oregonstate.edu or visit the OSU Computer Helpdesk online. You can also clearly ask in discussion with the class and we can try to work through it for the benefit of the class as well!

Tutoring – Effective fall term 2009 we went to a new online Tutoring Service - NetTutor to meet the needs of Ecampus students. NetTutor is a leading provider of online tutoring and learner support services fully staffed by experienced, trained and monitored tutors. Students connect to live tutors from any computer that has Internet access. NetTutor provides a virtual whiteboard that allows tutors and students to work on problems in a real time environment. They also have an online writing lab where tutors critique and return essays within 24 to 48 hours.

Course Evaluation:

OSU Student Evaluation of Teaching – Course evaluation results are extremely important and are used to help me improve this course and the learning experience of future students. Results from the multiple choice questions are tabulated anonymously and go directly to instructors and department heads. Student comments on the open-ended questions are compiled and confidentially forwarded to each instructor, per OSU procedures. The online Student Evaluation of Teaching form will be available toward the end of each term, and you will be sent instructions through ONID. You will login to "Student Online Services" to respond to the online questionnaire. The results on the form are anonymous and are not tabulated until after grades are posted.