Introduction to Algorithms
COMP 582

Professor: Dr. Mike Fagan
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Office Hours : Friday@7:00PM Central Time. Appointments for other times.

Course Materials:

Textbook

There is *no* required textbook.
There is however, a free online textbook that could be helpful.
The book can be found at the URL

http://algs4.cs.princeton.edu/home/

Software Requirements:

The required software for this course are:

- A modern browser. You will need this to watch videos, and interact with the Canvas CMS.
- Some kind of word processor that can produce PDF files. All problem sets and exams must be submitted in PDF format. A word processor with an equation editor and/or diagram drawing tool will be helpful, but neither feature is required.

  If you choose to use some handwritten material. then you will need a scanner (students often use their smart phones for this), and some mechanism for inserting your scans into a PDF file
- A text editor capable of putting out plain text. NOTE: Plain text means no secret hidden characters. Your PDF-capable editor may have this capability. If not, however, you will need a separate editor for plain text.
- A ZIP utility. You may be asked to combine PDF files and text files into 1 ZIP file.

Strongly Recommended Software

Your instructor strongly recommends that you install a modern Python (≥ 3.6) development environment on your laptop. You are not required to have this software, but it is highly recommended that you run your programs before turning

Course Subject Matter

Overview:

This course covers the fundamental algorithms and data structures that all masters of computer science should know.

These fundamental algorithms are the building blocks for crafting solutions for more complex problems.

At the end of this course, students will have mastered classic algorithm design methods and have well-stocked toolkit of fundamental algorithms to serve as a starting point for solving more complex problems.

Detailed Topic Schedule

Week	Topic	Problem Set Due Date
22 Aug - 28 Aug	Introduction to Algorithms	28 Aug, 11:59 PM CT
29 Aug - 04 Sep	Union/Find	04 Sep, 11:59 PM CT
05 Sep - 11 Sep	Simple Sorts	11 Sep, 11:59 PM CT
12 Sep - 18 Sep	Recurrences	18 Sep, 11:59 PM CT
19 Sep - 25 Sep	Divide-and-Conquer Sorts	25 Sep, 11:59 PM CT
26 Sep - 02 Oct	Sort-Adjacent Algorithms	02 Oct, 11:59 PM CT
03 Oct - 09 Oct	Priority Queues	09 Oct, 11:59 PM CT
10 Oct - 16 Oct	Midterm	16 Oct, 11:59 PM CT
17 Oct - 23 Oct	Looking Stuff Up	23 Oct, 11:59 PM CT
24 Oct - 30 Oct	Graphs	30 Oct, 11:59 PM CT
31 Oct - 06 Nov	Strings and Regular Expressions	06 Nov, 11:59 PM CT
07 Nov - 13 Nov	Dynamic Programming	13 Nov, 11:59 PM CT
14 Nov - 20 Nov	Numerical Algorithms	20 Nov, 11:59 PM CT
21 Nov - 27 Nov	Break	Nothing Due
28 Nov - 02 Dec	Hard-to-Solve Problems	02 Dec, 11:59 PM CT
05 Dec - 13 Dec	Study Days + Final	13 Dec, 11:59 PM CT

Course Grading:

The weighting of the various assessments are as follows:

Problem Sets	70%
Quizzes	3%
Feedback Forms	2%
Midterm	10%
Final	15%

The determination of the final grade will be determined by a class performance curve,

but with the following guarantee:

If you get 90% or better, you will get an A
If you get 80% or better, you will get at least a B.
If you get 60% or better, you will get at least a C.

For example, if all students score 90% (or better), every student gets an A.

Assignment Details:

All quizzes and feedback forms are due on Monday, at 11:59PM Central Time before the Tuesday class for that week.

In general, problem sets and programming assignments are due on the Sunday after the Thursday class for that week at 11:59PM Central Time.

The midterm exam will be due on the Sunday after the day it is released. The exam will be due at 11:59PM Central Time.

There are no quizzes or feedback forms for the week of the Midterm

The Final Exam will be in the self-scheduled format. The final will be posted to Canvas. It will be timed. The due date will be posted in Canvas.

There are no quizzes or feedback forms for the week of the Final.

Course Protocol

The course follows a standard Tuesday/Thursday schedule.

The presentation of the course mostly follows a 'flip classroom' paradigm. The 'lecture' part of the course appears primarily in the pre-recorded videos for the course. The 'problem solving' part of the course is primarily done during class sessions.

Before Tuesday Class

You should:

- Watch the videos and read the additional information for the week's module.
- Take the quiz.
- Look over the problem set. You should make sure you have a viable solution approach for each problem.
- Fill out and submit the Feedback Form for the module.
  On the form, you should note any conceptual questions you have about the week's module. You may write 'None' if you are comfortable with the week's material.

  In addition, you may select 1 or 2 problems from the problem set that you would like to see addressed in class. Again, 'None' is fine answer if you are comfortable with the entire module problem set.

Tuesday

The first part of a Tuesday class will be 'lecture'-like. Conceptual questions from the feedback form will be addressed.

The remainder of a Tuesday class will be devoted to interactive problem solving.

Thursday

Thursday classes will largely be devoted to interactive problem solving. Thursday will be a continuation of the 2nd part of Tuesday classes.

Honor Code As Applied To COMP 582:

The Honor Code text can be found in your student handbook.

In this course, you will experience multiple types of assessment. Each of these assessments apply the Rice Honor Code to them in different ways. The following discussion indicates how the honor code applies to each kind of assessment.

Problem Sets

Problem sets are 70% of your final grade. The purpose of the problem sets is for you to learn the concepts in whatever way you are most comfortable.

What you can do

- Use notes and books
- Use the internet, but with a mild restriction (see below).
- Use a mathematical AI such as Wolfram Alpha
- Ask your instructor and/or TA for help
- Work in groups of any size and composition
- Use a tutor (does not have to be part of the Rice tutoring resource).

What you can't do

- *Post* a question on a question-answering site (like Stack Overflow).

  Please note: Should you find a substantial portion of a solution in a resource, online or physical, please cite the resource.

- Copy another student's work

- If you do work in groups, each member is responsible for their own work. This work must be unique. You can get an approach/technique from a group colleague, but you may not copy verbatim.

Exams

Exams count for 25% of your total grade. These exams are take home and are expected to be completed within 3 hours of downloading. Per the Honor Code, you are on your honor to uphold the time constraints.

What you can do

- Use notes and books
- Use the internet in a limited manner

Please note: Should you find a substantial portion of a solution in a resource, online or physical, please cite the resource.

What you can't do

- Post a question on Stack Overflow (or other question answering sites)
- Copy another student's work
- Work in groups

Quizzes

Quizzes count for 3% of your total grade. These are meant to be easy and focus on the main trivial takeaways from the videos. You are allowed to take the same quiz up to 3 times. If you are struggling with the quizzes you can go back to the videos to find the answers.

What you can do

- Use notes and books
- Rewatch the lecture videos in between attempts

What you can't do

- Use the internet
- Receive help from others
- If you can't get a perfect score within 3 attempts, reach out to the instructor.

Disability-based Accommodations:

If you have a documented disability that will impact your work in this class, please contact your instructor to discuss your needs. Additionally, you will need to register with the Disability Resource Center (DRC) Office in the Allen Center. The phone number for DRC is (713) 348-5841.

Title IX Policy

Rice University cares about your wellbeing and safety. Rice encourages any student who has experienced an incident of harassment, pregnancy discrimination, gender discrimination, or relationship, sexual, or other forms interpersonal violence to seek support through The SAFE Office. Students should be aware when seeking support on campus that most employees, including myself, as the instructor/TA, are required by Title IX to disclose all incidents of non-consensual interpersonal behaviors to Title IX professionals on campus who can act to support that student and meet their needs. For more information, please visit safe.rice.edu or email titleixsupport@rice.edu .