

CS313E - Elements of Software Design
Fall 2023 - Class Organization

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Course Description

- ▷ This is the second course in the Elements of Software series.
- ▷ You will learn about important data structures.
- ▷ You will learn about algorithms, algorithms complexity and analysis.
- ▷ You will learn how to match the data structures and algorithms to problems.

What will you get out of this course?

In this course you will learn how to solve computational problems. Given a computational problem you should be able to:

- ➊ Analyze (understand in detail) the problem
- ➋ Design an algorithm to solve the problem. In this design process you will choose the appropriate data structure and the most efficient algorithm
- ➌ Implement the learned algorithm in Python 3
- ➍ Write your own test cases to test your algorithm. You will pay careful attention to edge cases. Make sure that the output matches the format as specified.

Course website - Canvas

- ➊ Go to <http://canvas.utexas.edu>

You can find on Canvas:

- ▷ Lecture Slides (Files on Canvas)
- ▷ Assignments
- ▷ Zoom
- ▷ Piazza Discussion board.

Prerequisite Courses

Computer Science 303E, 312, or 312H with a grade of at least C-.

Required Online TextBooks

We will use an interactive online book from zybooks.com

- ▷ Create an account on zybooks.com using your university email address (@utexas.edu)
- ▷ Sign in to learn.zybooks.com
- ▷ Use your name exactly as it appears on Canvas. Make sure that the case matches.
- ▷ Use your UT EID exactly as it appears on Canvas. Make sure that the case matches.
- ▷ Enter the correct zyBook code listed here:
zyBook: CS 313E-86439: Elements of Software Design
zyBook code: UTEXASCS313ETeymourianFall2023
- ▷ zyBook ISBN: 979-8-203-20145-4
- ▷ Cost: about \$88
- ▷ Subscribe to this book.

Important Note: Please make sure that you are using your UT email address for this zybook. It should be the same email address that you are using in Canvas site.

Recommended Textbooks

- ▷ **Introduction to Algorithms**, Third Edition, September 2009. By Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein Publisher: The MIT Press ISBN: 978-0-262-03384-8. (known as CLRS Algorithm Book)
- ▷ **The Practice of Computing Using Python**, by W. Punch and R. Enbody, 3-rd edition, Pearson Publishing, ISBN 978-0-13-437976-0.

Python Code Examples

- ▷ Our course code examples are here:
<https://github.com/kiat/Elements-of-Software-Design>
- ▷ You can clone this repository, or download them all as a single zip file.

What is git and GitHub?

- ▷ GitHub is a source code repository
- ▷ Git is a version control system
- ▷ You can download the code as zip file or use git to get the latest code.

Grading Structure

- ▷ The **Programing Assignments** are focused on applying theory learned in the class. Weekly course assignments include both theoretical analysis and practical algorithmic implementation in python. The assignments for 40% of your course grade.
- ▷ **Zybook Labs, ZyBook Quizzes**: 10%
- ▷ **Quizzes and Class Activities**: 10%
- ▷ **Term Project**: 10%
- ▷ **Three Tests during the semester** (10% each of Test 1, 2, and 3): 30%
- ▷ There will be no **Final Exam**

Grading Structure

Programming Assignments	40%
Quizzes and Class Activities	10%
ZyBook Labs and Quizzes	10%
Term Project	10%
3 Tests (10% each)	30%

Table: Percentage Coverage

A	94%
A-	90%
B+	87%
B	84%
B-	80%
C+	77%
C	74%
C-	70%
D+	67%
D	64%
D-	60%
F	60%

Assignments

- ▷ The only way to learn programming is to start coding computer programs. Doing the programming assignments is crucial to performing well in this course. There will be one assignment each week.
- ▷ **The assignments will be due on Thursdays 6:00 AM.**
- ▷ The assignments will require a substantial time commitment over several days. Be sure to budget sufficient time to complete assignments before the deadline.

We are moving all assignment submissions to **Gradescope**. Bear with us as we make this transition. Here are important things to bear in mind:

- ▷ You have multiple chances of editing and testing your code.
- ▷ Once you submit your code, you may not edit your code any further.
- ▷ You can do as many submissions as you want before the assignment due dates.

Assignment Completion & Late Work

- ▷ All assignments should be submitted on time.
- ▷ Late submissions without reasons will result in grade deduction. You can turn in an assignment up to 24 hours late, in which case you receive a 10% penalty (that is, 10 points are subtracted from an assignment that is worth 100 points), or up to 48 hours late, in which case you receive a 20% penalty.
- ▷ Assignments turned in after that are not accepted.
- ▷ You can submit your assignments 3 times late during the semester (up to 2 days after original due date) without any penalties. After the 3rd times we will apply the penalties.
- ▷ We kept on saying no exceptions, but there are exceptions in very extreme circumstances, with proper documentation. For example, if you **obtain a doctor/dentist note stating that you were so ill** at the due date/time that you could not reasonably be expected to meet the deadline, it is possible to get an extension.
- ▷ Answers of Quizzes/Assignments are publish 48 hours after due date.

Class Participation

Our class will be in-person with a live streaming on Zoom. However, there is a live Zoom link for anybody who has a good reason not be present in classroom. For all Zoom links, see the Zoom tab in Canvas.

Either in-person or zoom attendance is required. You may miss up to 3 classes without any excuse. If you miss multiple sessions of the class we will reduce up to 10% of your grade.

- ▷ We use Instapoll (<https://polls.la.utexas.edu/>) for attendance (please bring a phone or laptop).
- ▷ Please join us over zoom if you have any health concerns, or may be sick.
- ▷ We will record the zoom sessions and publish them 10 days later on Canvas for your review.
- ▷ Office hours will be exclusively through Zoom. Please make an appointment over email before you show up.

About me

Kia Teymourian

- ▷ Email: kiat@cs.utexas.edu

Include the class number in the subject of your email.

Like this tag : "[CS313E] – Question about Assignment-1"

- ▷ **Office hour:** Times on Canvas

- ▷ Academic Website: <http://www.teymourian.de>

Please do not send me emails if ...

- ▷ you are missing the class and this is one of the 3 times that you do so.
 - ▷ you are late in your assignment submission, and this is one of the 3 times that you do so.
 - ▷ you have question about an assignment. You should post it to the Course discussion board or ask a TA.
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- ▷ Please do not send me Canvas messages. They do not receive them on time.
 - ▷ Please send me emails to this address: kiat@cs.utexas.edu

You are welcome to send me emails!

Your Teaching Assistance

Office hours in person and via Zoom (The same zoom as class):

▷ to be announced on Canvas site.

Please ask your questions on Piazza Discussion board or use the Office hours.
OH starts from the second week.

Course Topics

- ▷ Review of CS303 Topics, Testing and Debugging, Exceptions and Assertions
- ▷ Object Oriented Programming (OOP), Classes and Objects
- ▷ OOP Features, Inheritance, Polymorphism, Encapsulation, Abstraction
- ▷ Basic Algorithms, Complexity of Algorithms
- ▷ Classes of Algorithms, Simple Recursion Algorithms
- ▷ Complexity of Recursive Algorithms (**Test 1**)
- ▷ Data Structures: Hash Tables, Stacks and Queues
- ▷ Data Structures: Stacks and Queues, Linked Lists
- ▷ Binary Trees
- ▷ Searching with Binary Trees (**Test 2**)
- ▷ Data Structures: Heaps and AVL Trees
- ▷ Graphs, Directed and Undirected Graphs
- ▷ Weighted Graphs, The Shortest Path Problem
- ▷ Dynamic Programming (**Test 3**)

Tentative Course Schedule

Course schedule can be found on Canvas on a spreadsheet [Link](#). We may adjust this schedule slightly as we go through the semester.

Study Guide - How to study in this class

Do the following each week:

- ➊ Read the **Book Chapters and Run the Examples**
- ➋ Read the **Lecture Slides and watch our short videos**
- ➌ Run and analyze the code examples
- ➍ **Ask your questions on discussion board or participate in TA's Office Hours**
- ➎ **Do the assignment** and go back to the above steps as needed.