Middle East Technical University | Department of Computer Engineering

CENG 213 - Data Structures

Fall 2022

Syllabus

`http://www.ceng.metu.edu.tr/courses/ceng213`

1 Objectives

This course aims to introduce the abstract concepts for data organization and manipulation, show how these concepts are useful in problem solving and how the abstractions can be made concrete by using a programming language. At the end of this course, students are expected to be able to use appropriate data structures for the solution of a given problem. Students will also be able to design and implement abstract data types which use efficient algorithms to manipulate these data structures. Various concepts such as searching, sorting, and algorithm analysis are also introduced.

2 Instructors

Nihan KESİM ÇİÇEKLİ
nihan@ceng.metu.edu.tr
A308
Section 1

Şeyda ERTEKİN
seyda@ceng.metu.edu.tr
B108
Section 2

Yusuf SAHİLLİOĞLU
ys@ceng.metu.edu.tr
B107
Section 3

3 Teaching Assistants

Ömer BAYKAL
obaykal@ceng.metu.edu.tr
A310

Yavuz KARA
myk@ceng.metu.edu.tr
IBM LAB

Bora YALÇINER
yalciner@ceng.metu.edu.tr
A210

Feyza YAVUZ
fyavuz@ceng.metu.edu.tr
IBM LAB

4 Textbook

Mark Allen Weiss, Data Structures and Algorithm Analysis in C++ (3rd Edition), Addison Wesley, 2006

- Source code for the book are available at `http://users.cis.fiu.edu/~weiss/dsaa_c++3/code/`
- Note that the 4th edition of this book uses C++11.

5 Outline

	Week	Topics
1	03.10.2022 - 09.10.2022	Introduction to C++
2	10.10.2022 - 16.10.2022	C++
3	17.10.2022 - 23.10.2022	Algorithm Analysis
4	24.10.2022 - 30.10.2022	Linked Lists
5	31.10.2022 - 06.11.2022	Stacks
6	07.11.2022 - 13.11.2022	Queues
7	14.11.2022 - 20.11.2022	Introduction to Trees and Binary Trees
8	21.11.2022 - 27.11.2022	Binary Search Trees and AVL Trees
9	28.11.2022 - 04.12.2022	*Midterm Exam*
10	05.12.2022 - 11.12.2022	Heaps
11	12.12.2022 - 18.12.2022	Hashing
12	19.12.2022 - 25.12.2022	Graphs
13	26.12.2022 - 01.01.2023	Graphs
14	02.01.2023 - 08.01.2023	Sorting

6 Course Schedule

Section 1	Tuesday, 15:40-17:30, @BMB3
	Thursday, 12:40-13:30, @BMB3
Section 2	Monday, 15:40-17:30, @BMB2
	Wednesday, 16:40-17:30, @BMB2
Section 3	Wednesday, 12:40-13:30, @BMB4
	Thursday, 13:40-15:30, @BMB4

It is important to attend the lectures to learn the concepts of this class. Make a habit of attending the classes.

7 Grading

Midterm Exam	25%
Final Exam	30%
Lab Sessions	10%
Programming Assignments	15% (3 x 5%)
Lab Quizzes	15% (3 x 5%)
Online Exercises & Participation in Class	5%

8 Exams

There will be a midterm exam in the 9^{th} week of the semester. The final exam will be at the end of the semester. Both exams will be in-person in the classroom.

9 Lab Sessions

Lab sessions aim to familiarize you with writing, testing, and debugging C++ programs as well as experimenting basic data structures. The teaching assistants will be available in labs to help you do the lab exercises for 90 minutes. You are expected to finish and submit lab exercises by the midnight of the lab day.

Lab	**Date**	**Topics**
1	10.10.2022 - 16.10.2022 (Week 2)	Introduction to C++ (1)
2	17.10.2022 - 23.10.2022 (Week 3)	Introduction to C++ (2)
3	24.10.2022 - 30.10.2022 (Week 4)	Linked Lists
4	14.11.2022 - 20.11.2022 (Week 7)	Stack & Queue
5	21.11.2022 - 27.11.2022 (Week 8)	Trees
6	12.12.2022 - 18.12.2022 (Week 11)	Heaps
7	19.12.2022 - 25.12.2022 (Week 12)	Hashing
8	26.12.2022 - 01.01.2023 (Week 13)	Graphs

** Exact date and time of the labs will be announced later on ODTÜClass.*

10 Programming Assignments

Assignment	Announcement	Due Date	Subjects
1	24.10.2022 - 23:55	06.11.2022 - 23:55	C++, Linked Lists
2	14.11.2022 - 23:55	27.11.2022 - 23:55	Stacks, Queues, Trees
3	19.12.2022 - 23:55	01.01.2023 - 23:55	Heaps, Hashing, Graphs

There will be three programming assignments. Programming assignments are distributed via CengClass (`cengclass.ceng.metu.edu.tr`). These assignments are to be completed individually, although you may discuss concepts and problems at a high-level as outlined in the collaboration policy given below.

11 Lab Quizzes

Quiz questions will be related to the programming assignments and they will take place right after the deadlines of the respective assignments. Therefore, it is critical that you have worked on and submitted your programming assignments before the quizzes.

Quiz	Date
1	07.11.2022 - 13.11.2022 (Week 6)
2	05.12.2022 - 11.12.2022 (Week 10)
3	02.01.2023 - 08.01.2023 (Week 14)

** Exact date and time of the quizzes will be announced later on ODTÜClass.*

12 Participation

Your participation to class activities is important. Participation includes attendance to classes and attempting to solve the questions in classes. Each section instructor will keep track of your participation separately.

Online exercises focus on mechanical, theory, and basic application problems to reinforce content from lecture, and to provide practice for the exams. Exercises are distributed via ODTÜClass. Exercises are to be completed individually subject to the collaboration policy given below.

13 Late Submission Policy

Each student receives 5 late days for the entire semester. You may use late days on programming assignments, and each allows you to submit up to 24 hours late without penalty. For example, if an assignment is due on Thursday at 11:30pm, you could use 2 late days to submit on Saturday by 11:30pm with no penalty. Once a student has used up all their late days, each successive day that an assignment is late will result in a loss of 5% on that assignment.

No assignment may be submitted more than 3 days (72 hours) late without permission from the course instructor. In other words, this means there is a practical upper limit of 3 late days usable per assignment. If unusual circumstances truly beyond your control prevent you from submitting an assignment, you should discuss this with the course staff as soon as possible. If you contact us well in advance of the deadline, we may be able to show more flexibility in some cases.

14 Collaboration Policy

We encourage you to discuss course activities with your friends and classmates as you are working on them. Ask questions, answer questions, and share ideas liberally. However, to encourage everyone to learn the material, we impose restrictions on the information you may share with your classmates. You must obey the following guidelines:

1. You should never directly show another student your code.
2. You should never distribute solutions of any programming assignment, lab assignment or online exercises at any time, even after the course is over. "Distribution" includes uploading them to public websites (e.g. GitHub), group repositories (e.g. "answer bank"), or private chats (e.g. a group chat with a few friends), or sharing screen.
3. You are not allowed to collaborate with any student in an exam.

15 Makeup Policy

Students need to provide official documentation (e.g. report approved by Medical Department of METU) strictly within a week of missing an exam. Only in that case a make-up will be given. Make-up exams will be also in-person in the classroom.

- Makeup for the midterm exam will take place within 1 week right after your legal excuse terminates.
- Makeup for the final exam will take place at the end of the semester.