YZM2031 Data Structures and Algorithms - Fall2026

Course Information

Instructor: Dr. Fettah Kiran (fkiran@yildiz.edu.tr) | F-B29
Class Hours and Location: Friday 09:00 - 11:50 | B020
Lab Hours and Location: Friday 14:00 - 15:50 | D-B08
Office Hours: Wednesday 10:00 - 12:00, Thursday 14:00 - 16:00 by Appointment
Course Materials: GitHub, Online Yildiz

Required Resources

- Main Textbook: Weiss, Mark Allen. Data structures and algorithm analysis in C++, 2022.
- Secondary book: Walter, J. Savitch. Problem Solving with C++, 10th Edition, 2018.
- Algorithm Visualization: https://visualgo.net , https://www.cs.usfca.edu/~galles/visualization/
- C++ Reference:
  - www.cplusplus.com (C++11)
  - https://en.cppreference.com/
- Command line reference: https://ss64.com

Grading

Exam: 70% (30% Mid-term, 40% Final)

Lab: 30%

Note: C++17 will be used in grading

Course Objectives

- Analyzes the time and space complexity of algorithms and uses Big-O notation
- Implements the fundamental data structures (array, linked list, stack, queue) and applies them in appropriate scenarios
- Performs efficient search and insertion operations with tree structures and hash tables
- Solves path-finding and traversal problems using graph algorithms
- Compares different sorting and searching algorithms and selects the one best suited to the problem type
- Enhances algorithmic problem-solving skills by decomposing complex problems into smaller components

Programming environment

The efforts in this course will involve quite good use of Linux and GNU Compiler Collection (GCC). You may use any platform to develop your program; your final code can be compiled and executed on Linux, as this will be the testing platform used by the instructor.

C++17 or higher needs to be used in your submissions.

1. **For Windows,**
   a. Minimalist GNU for Windows (MinGW) is a development environment for Microsoft applications. MinGW includes a port of the GCC, including C, C++, ADA and FORTRAN compilers. (Download link: MinGW)
   b. Code::Blocks is highly recommended.
   c. Integrated Development Environments (IDE's) which have complex built-in tools for editing compiling, running, and debugging programs, (VSCode, Dev-C++ etc.) are available to use.

2. **For Mac OS,** make sure you install Xcode and your machine is up to date.

3. **If you say I want to use Linux,**
   To compile your C++ codes, g++ (C compiler of GCC set) on Linux Ubuntu is a very clear way. Additions were made to simplify and clarify the creation of a C/C++ program on Ubuntu Linux.

Academic Honesty

Any misconduct in this course is considered a serious offense, and strong penalties will be the results of such behaviors. It is cheating to copy others' code. Fake program outputs and documents is also considered as cheating.

Course Plan

Week	Subjects	Preparation
1	C++ Programming Basics and Classes	Weiss Ch.1
2	Lists and Linked List	Weiss Ch.3.1-3.5
3	Stack and Queue	Weiss Ch.3.6-3.7
4	Queue and Chars/Strings	Weiss Ch.3.7
5	Algorithm Analysis	Weiss Ch.2
6	Trees and Binary Search Tree	Weiss Ch.4.1-4.3
7	Balanced Tree (AVL)	Weiss Ch.4.4
8	Midterm	
9	Priority Queues (Heaps)	Weiss Ch.6
10	Sorting Algorithms	Weiss Ch.7
11	Disjoint Sets	Weiss Ch.8
12	Hash Tables	Weiss Ch.5
13	Graph Data Structures	Weiss Ch.9
14	Final	

→ *Bill Rapaport's How To Study Guide*. ←