CSC 212: Data Structures and Abstractions

01: Introduction

Prof. Marco Alvarez

Department of Computer Science and Statistics
University of Rhode Island

Spring 2025

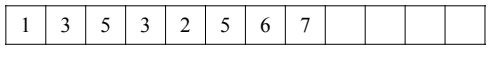
THINK BIG WE DO℠

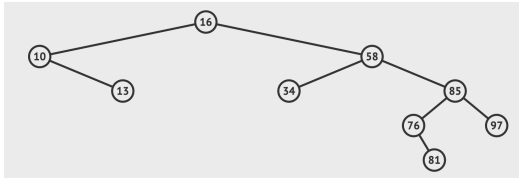
CSC 212

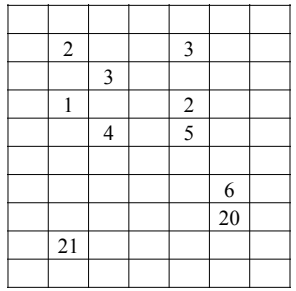
"learn how to model and solve complex problems with computers"

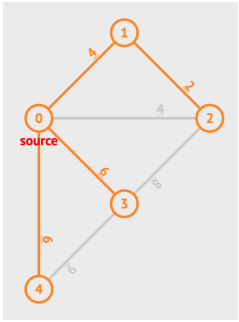
Course description

- Introduction to fundamental data structures and their algorithms
  - arrays, lists, stacks, queues, trees, hash tables, graphs (most popular topics for job interview questions)
  - survey of classic algorithms for sorting and searching
- Basic principles of analysis of algorithms
  - improve your foundation of CS theory
- Writing code that runs efficiently
  - choosing good algorithms and data structures
- Assumes solid foundation in programming fundamentals:
  - pointers, classes/objects, recursion

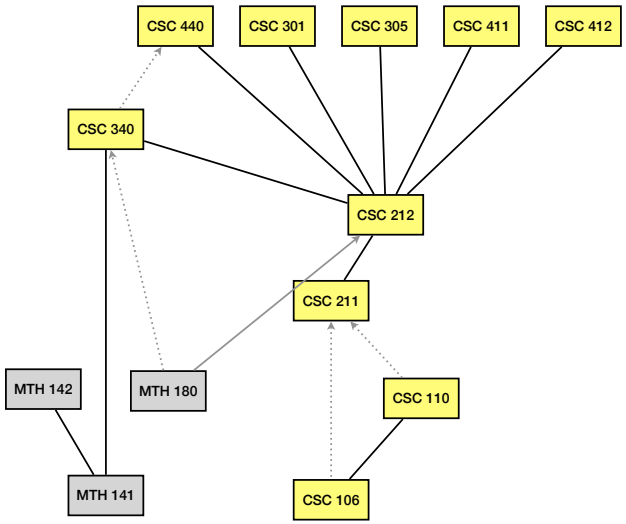








212 in the curriculum

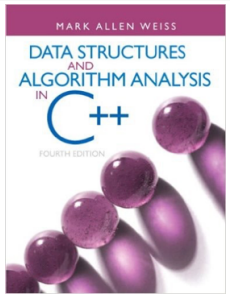


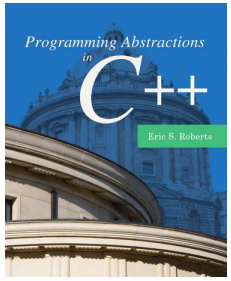
Course organization

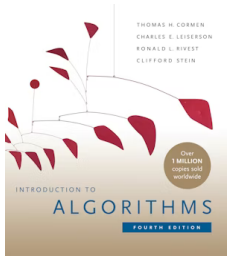
Course information

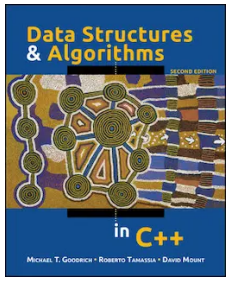
- Lectures
  - TR 9:30 - 10:45a
- Labs
  - W 8 - 9:45a
  - W 10 - 11:45a
  - W 12 - 1:45p
  - W 2 - 3:45p
- Course Website
  - https://homepage.cs.uri.edu/~malvarez/teaching/csc-212/

Recommended textbooks









Support tools

Academic discussion, polls, quizzes.

Assignment submission and grading.

Virtual meetings and office hours.

Grading (subject to change)

- Lab/Lecture/Ed Participation
  - extra points
- Assignments (35%)
  - ~6-8 homework assignments
    - programming
    - problem sets
- Exams (65%)
  - midterm 1
  - midterm 2
  - 1 final exam

All exams are based on lecture materials and assignments

Coursework

- Homework assignments
  - individual work, however discussions and collaboration are allowed
    - **you must write your own code** and solutions
  - late submissions NOT accepted
    - ample time given to complete (6-9 days)
    - start early and use office hours for guidance and feedback
- Exams
  - in-person and open-book (printed materials only)
  - no electronic devices allowed
  - mix of multiple-choice, and short-answer questions designed to test understanding

What is expected from you?

- Attend lectures/labs
  - students are expected to attend all lectures and labs
  - regular attendance is linked to higher grades and better comprehension of course material
- Participate and think critically
  - ask questions (lectures, labs, office hours, Ed, …)
- Start working on assignments early
  - avoid merely copying/pasting answers generated by LLMs
- Laptops and cellphones are **NOT permitted** unless being used for taking notes

Academic integrity

- Assignments
  - each student/team must submit their own **unique** solutions, sharing/copying solutions from peers is **prohibited**
- AI and LLMs
  - AI tools (e.g., ChatGPT, Gemini, Claude, GitHub Copilot) can be used to enhance learning through brainstorming, concept exploration, and strategy development
    - students must critically evaluate and fully understand any AI-generated content used in their work
    - all AI-assisted work **must be cited in submissions**
  - AI tools are designed to support students' learning, NOT to replace independent problem-solving and critical thinking

Resources

Need a refresher on C++ programming?

- Pick a textbook (learn syntax)
- Solve Challenges

Kattis

CODEFORCES
Sponsored by TON

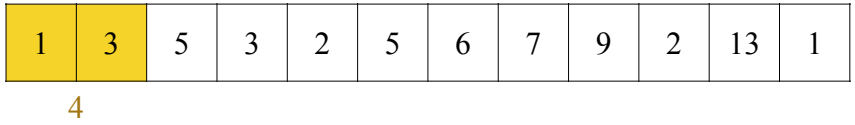
codewars

topcoder™

LeetCode

Warming up

- Adjacent elements sum
  - find the **maximum sum** of any pair of adjacent elements in an array of integers



4