COMP 4019/6019: Competitive Programming and Technical Interviews (Fall 2021)

Time, place:	Wednesday 4:00pm–5:00pm Dunn Hall 119
Instructor:	Thomas Watson Dunn Hall 315 Thomas.Watson@memphis.edu http://www.cs.memphis.edu/~twwtson1/
Office hour:	Wednesday 2:45pm–3:45pm
Website:	http://elearn.memphis.edu/

Description: In this 1-credit course you will learn the skills needed for participating in programming competitions such as the ACM International Collegiate Programming Contest (ICPC) and for whiteboard-coding interviews at large tech companies.

These skills include uncovering the core computational task underlying a problem description, recognizing problem categories and assessing difficulty, applying known algorithms and data structures, practicing with online judges, developing test cases, using standard libraries, coding quickly and correctly, anticipating corner cases, using strategies for team programming, and analyzing algorithm efficiency.

Interview-specific skills include verbally explaining the thought process during problem-solving, writing bug-free code without the help of IDEs and other tools, and gracefully salvaging situations where one gets stuck.

Specific technical topics include binary search, simulation problems, bit manipulation, standard library data structures, recursive algorithms, graph traversal, dynamic programming, computational geometry, linked list manipulation, and tree traversal.

Prerequisite: COMP 2150 (Object-Oriented Programming and Data Structures)

Textbook: Recommended:
Cracking the Coding Interview by Gayle Laakmann McDowell
Guide to Competitive Programming by Antti Laaksonen
(Free online version is called *Competitive Programmer's Handbook*)

Grading: 80% of the grade will be for completion of weekly programming assignments drawn from problems on online judges such as onlinejudge.org; programming must be done in Java or C++. 20% will be for a one-on-one mock interview with the instructor toward the end of the semester.

A $\geq 90\%$ A$-$ $\geq 85\%$ B+ $\geq 80\%$ B $\geq 75\%$ B$-$ $\geq 70\%$
C+ $\geq 65\%$ C $\geq 60\%$ C$-$ $\geq 55\%$ F $< 55\%$

Participation in the actual ACM programming contest is optional but encouraged.

Cheating: TL;DR: You may discuss problems with each other and look up general advice on solving these types of problems—but only submit code that you wrote yourself. In particular, don't look up solutions to the assigned problems on the internet, and don't copy code from your classmates.

Plagiarism or cheating behavior in any form is unethical and detrimental to proper education and will not be tolerated. All work submitted by a student (projects, programming assignments, lab assignments, quizzes, tests, etc.) is expected to be a student's own work. The plagiarism is incurred when any part of anybody else's work is passed as your own (no proper credit is listed to the sources in your own work) so the reader is led to believe it is therefore your own effort. Students are allowed and encouraged to discuss with each other and look up resources in the literature, but appropriate references must be included for the materials consulted, and appropriate citations made when the material is taken verbatim.

If plagiarism or cheating occurs, the student will receive a failing grade on the assignment and (at the instructor's discretion) a failing grade in the course. The course instructor may also decide to forward the incident to the Office of Student Conduct for further disciplinary action.

Calendar: Aug 25: Introduction, using online judges
Sep 01: Binary search
Sep 08: Simulation problems
Sep 15: Bit manipulation
Sep 22: Standard library data structures
Sep 29: Recursive algorithms
Oct 06: Graph traversal
Oct 13: Dynamic programming
Oct 20: Computational geometry
Oct 27: Linked list manipulation
Nov 03: Tree traversal
Nov 10: Mock interviews
Nov 17: No class