

CS 280: Programming Challenges

James Madison University, Spring 2018 Semester, 1 Credit

Do you love to solve challenging problems? Would you like to increase your programming skills? Are you a competitive person? Do you want to prepare for interview exercises that companies like Google, Facebook, Amazon, Microsoft, Apple, and others give their future employees? Would you like to improve your ability to work in teams? If you answered “YES!” to any of these questions, then we have the perfect course for you!

CS 280 focuses on the development of strategies, techniques, and skills used in competitive programming scenarios (i.e., contests and interviews). Topics include problem solving techniques, advanced programming methodology, and many interesting algorithms. This course is a weekly lab that includes a short lecture followed by a live programming contest and discussion. Grading will be based on class participation, number of problems solved, and weekly code reviews.

Course Information

Home Page <http://acm.cs.jmu.edu/>

Class Time Tue, 3:30 PM – 5:00 PM

Location ISAT/CS 143 (Linux lab)

Instructor Information

Dr. John Bowers, bowersjc@jmu.edu

Office: ISAT/CS 217

Dr. Mike Lam, lam2mo@jmu.edu

Office: ISAT/CS 227

Hours: Wed 9:30–12:00, Th 14:30–17:00

Goals and Objectives

The overall goal of the course is to produce well-rounded computer scientists. By the end of the semester, you should be able to:

1. Work in groups to categorize and solve computer science problems.
2. Write robust code solutions that are accepted by automated testing.
3. Evaluate code for correctness, clean design, and readability.

Recommended Textbook

Steven Halim and Felix Halim. *Competitive Programming 3* (2013). Purchase online for \$27 (softcover) or \$36 (hardcover). URL: <http://cpbook.net/>

Although we will be covering any necessary theoretical material in class, we **highly recommend** that you purchase a copy of this textbook to use as a reference for problem-solving strategies and reference solutions to classic problems (this is especially true if you are interested in competing in the ACM contests next year). A detailed schedule with weekly readings will be maintained on the course home page as the semester progresses.

Methods of Evaluation

Participation

Participating in class discussions and learning to work effectively in a group are important aspects of competitive programming, so you will be awarded points for attending class each week.

Problem Solving

We will hold a programming contest each week, consisting of several problems. Each week, there will be an “in-class” problem as well as a “contest” problem. You will receive credit for solving both problems. You are welcome to work in groups for the “in-class” problem, but you must write and submit your own solution individually for the “contest” problem. We will use Kattis to verify that you have completed your solutions. If you are unable to get your solution to the contest problem accepted, you can still get credit for submitting your unfinished solution on Canvas. There will also be additional (and optional) “stretch” problems each week.

Code Reviews

You will submit your cleaned-up and documented solution for the “contest” problem to Canvas by midnight each Friday, and then you will have the weekend and Monday to review another students’ submission. Your code review must be submitted as a plain-text comment on Canvas, and will be given a score according to the following rubric:

- 3 - Thorough and insightful
- 2 - Acceptable
- 1 - Deficient
- 0 - No submission

A “thorough and insightful” code review is at least 2-3 paragraphs long and evaluates a submission on correctness, elegance, readability, formatting, and documentation. It also compares and contrasts the assigned submission against your own solution, highlighting differences and discussing the ramifications for efficiency and readability.

We will NOT have a written exam during finals week.

Grading Details

Your final grade will be based on:

- 20% Participation
- 50% Problem Solving
- 30% Code Reviews

Letter grades will be assigned on the scale A=90–100, B=80–89, C=70–79, D=60–69, F=0–59, with potential minor adjustments after considering the overall performance of the class and actual distribution of numeric scores. We will use “+” and “-” grades at our discretion.

University Requirements

Attendance Policy

You are expected to attend all classes and actively participate by taking notes and asking questions. Given the course is one credit and meets for an hour and a half per week, it is expected that the majority of work will be done during class. There will be no make-up work for any missed contests.

Academic Honesty

If you violate the University's Honor Code (<http://www.jmu.edu/honorcode/code.shtml>), you will receive a reduced or failing grade *in the course*, other penalties may be imposed, and the violation will be reported to the Honor Council. Automated tools may be used on any assignment, at any time, to detect inappropriate collaboration and to determine the originality of submissions.

Adding/Dropping

You are responsible for enrolling in courses and verifying your schedule on MyMadison. The deadlines for adding, dropping, or withdrawing from a semester course are posted on the Office of the Registrar's website: http://www.jmu.edu/registrar/students/print_dates.shtml.

Disability Services

If you have a documented disability and need accommodations in this course, please register with the Office of Disability Services (<http://www.jmu.edu/ods>, Student Success Center, Room 1202, 540-568-6705). They will provide you with an Access Plan Letter to verify your need for services and make recommendations for the course. We will be happy to discuss your access plan with you.

Excused Absences

Students who are unable to attend class due to JMU sponsored activities (such as sports, band, academic competition, field trips, etc) or personal religious observances may request reasonable accommodations. Please notify me during the first week of class regarding potential absences so that we can determine alternative methods for you to complete the required work.

University Closings

For severe weather and other unexpected circumstances, watch for announcements relating to make-up work. See <http://www.jmu.edu/JMUpolicy/1309.shtml> for JMU's cancellation policy. Although the schedule may adapt to canceled classes, assignment deadlines generally do not change.

Religious Observation Accommodations

Students should notify an instructor by no later than the end of the first week of the semester of potential scheduled absences for religious observations and determine with the instructor if mutually acceptable alternative methods exist for completing the missed classroom time, lab or activity.