

2025 SI@UCF Introduction to Competitive Programming Syllabus

Course Description: This course will teach the basics of C++, mostly from the ground up, with an emphasis on syntax necessary for competitive programming, along with the following topics that often appear in programming competitions: Vectors, Strings, use of built in custom sorting, Vector of Vectors, Sets, Maps, Number Theory, Recursion, Brute Force and Binary Search. In addition, we'll introduce students to the two most common online platforms that high school students compete in for online competitions: USACO and Codeforces.

Course Web Page: <http://www.cs.ucf.edu/~dmarino/ucf/bhcsi/2025/compprog>

Grading: Homework (8) – 40% total
Quizzes (2) – 20% total
Contests (2): 20% total
Final Project: 10% total
Final Contest: 10% (no upsolving)

Day	Recitation	Lecture	Homework/Contest
6/9	Intro C++ (Vars, Asgn)	If	H0, H1
6/10	For	While, Break, Continue	H2
6/11	Math Functions	User Defined Functions	H3
6/12	Vectors	Vector Examples	H4
6/13	Strings	Custom Sorting	Contest #1
6/16	Sorting Examples	2D Vectors	H5 (String Hmk)
6/17	Quiz #1	2D Vector Examples	H6 (Sorting Hmk)
6/18	Sets	Maps	H7 (2D Vector Hmk)
6/19	Recursion	Number Theory	H8 (Set/Map Hmk)
6/20	Brute Force Intro	Project Intro	Contest #2
6/23	Use of Codeforces	Brute Force (Perm)	Final Project
6/24	Use of USACO	Binary Search	Final Project
6/25	Quiz #2	Breadth First Search	Final Project
6/26	Contest Strategy	Class Choice	Final Contest
6/27	Non-FIEA Field Trip	Non-FIEA Field Trip	Closing Ceremony

Typical Day

In a typical class day, in the morning, students will have lecture and recitation, where they will be taught some new C++ syntax, along with corresponding problem-solving techniques typically used with that syntax. Most lectures will involve some live coding as well as covering solutions to some competitive programming problems that utilize the topic for the day. In the afternoon, students will be given several homework problems from Kattis that utilize the day's topic to solve. On homework assignments, students will primarily be graded on correctness (via upload of a problem's accepted status on Kattis and source code), and secondarily on programming style for contests.

Friday Contests

Each Friday we'll have a competition for students run on Kattis with new problems, most of which can be solved using previously taught techniques. Last year each competition had 10 questions and ran a length of 3 hours. I am planning to stick to this design this year unless I find a good reason to change it. In the first two contests, any problem solved during the three-hour time limit will be given full credit (3 points). Any problem from these contests solved afterwards (by the next Monday afternoon at 5 pm) will receive partial credit (2 points). For the Friday contest, the only thing that matters is correctness. For the last Friday contest, we'll treat it as a real contest and students will earn 1 point for each problem correctly solved during the contest time limit.