CS35X: Competitive Programming

Lecture 1: Introduction, I/O

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What is Competitive Programming?

- Teams of three students collaborate to solve coding problems
  - Each team has one computer
  - 8-10 problems of *varying difficulty*
  - Students can use reference books, but start with no code
  - Score is # problems solved; tiebreaker: time to solve, penalties
- Solutions are submitted to **online judge**

This Class

We will use competitive programming problems to explore ADTs and data structures and gain expertise in algorithmic problem solving.

- Hands-on practice in class

- Weekly problem sets

- 2-3 practice contests

- 2-3 quizzes

YOU: consistent practice and effort, 4+ hours per week.

Exercise: set up Kattis accounts

CP Style Problems

Competitive Programming style problems all have a similar structure:

1. **Flavor Text**:   description of problem, what you should solve

2. **Input** Specification: precise description of input

3. **Output** Description: precise description of what to output

4. *Sample input/output(s)*

 Note: all Kattis problems use standard input/output (**cin, cout**).

Kattis Problem: hello

Development Process Recap

1. **Write sample inputs into files**

2. **Think about how to solve your problem**

3. **Code your solution in a single C++ file.**

4. *Test your solution on sample inputs*

5. Are you confident the solution works? *Submit to online judge!*

6. **Debug/resubmit** until solution is accepted.

C++ Input/Output

Every problem takes in input and produces output, so it's important to understand exactly how you'll process I/O!.

You should know how to:

• Read in one input variable at a time

• Read in an entire line of input at once

• Detect end-of-file.

C++ Standard I/O

- Load Standard I/O Stream library: `#include <iostream>`

- Read one variable at a time:

  - `int x;`

  - `cin >> x;`

- Read in an entire line:

  - `String input;`

  - `getline(cin, input);`

- Detect end of file:

  - `while(getline(cin, input)) {…}`

Kattis Problem: echoechoecho