# Intro to Competitive Programming

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# What is Competitive Programming?

Competitive Programming is a type of contest where the goal is to produce correct algorithms to Computer Science problems with known solutions as quickly as possible.

# Types of Competiive Programming Events

- International Olympiad in Informatics (IOI)
- ACM International Collegiate Programming Contest (ICPC)
- Online Contests for Adult such as Topcoder

# Distinguishing Charactersistics

- Timed competitions
- Algorithm design
- Correctness of algorithms emphasized
- Can write tests to trip up other contestants

# Why it is important for engineers?

- Helps teach how to work using timeboxing
- Helps teach innovation
- Keeps coding interview skills fresh
- Helps improve testing and debugging skills
- Teaches you to identify hard problems vs solvable ones

# Why it is important for academics?

- Great as a teaching tool
- Good way to practice algorithm design techniques
- Can be used to review formal methods
- Provides a framework for thinking about algorithm problems

# Types of problems

- Sorting and Searching
- Dynamic Programming
- Graph Algorithms
- Range Queries
- Tree Algorithms
- Mathematics
- String Algorithms
- Other Advanced Problems

# References and additional resources

1 Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. 2009. Introduction to Algorithms, 3rd Edition (3rd Edition ed.). The MIT Press, Cambridge, Mass.

2 Steven Halim. 2013. Competitive Programming 3 (Third Edition ed.). lulu.

3 Antti Laaksonen. CSES - CSES Problem Set - Tasks. Retrieved September 19, 2020 from `https://cses.fi/problemset`