

# Contest Strategy

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## 1 Brute Force

- Average medal cut-offs 2005–2008
  - Bronze: 202
  - Silver: 303
  - Gold: 381
- Correct attempts awarded with points increasing as solution approaches optimal solution
- Brute force ~30 points or more
  - Submit at least brute force for *all* questions!
  - $1 \times 100 + 5 \times \text{brute force} \approx \text{bronze}$
  - $2 \times 100 + 4 \times \text{brute force} \approx \text{silver}$
- Time for implementation, testing, debugging
- Time at end for last-resort brute force
- Time for final checks
- Easiest questions first!
- Know when to accept “failure”
- Core first, brute force data structures and operations
- Test against brute force methods
- Always keep a working solution
- if (small) brute; else optimised method;

## 2 Testing

- Correctness of algorithm
  - Proof, compare to brute force
- Correctness of implementation
  - Code analysis, testing
- Grouped cases hurt incorrect/incomplete solutions
- Detailed feedback for half the problems tests both correctness and resources
- What?
  - Boundary cases
  - Extreme cases
  - Code coverage
- How?
  - `#include <cassert> assert(condition)`
  - Continuously add to list of test cases
  - Random test cases
  - Verify with brute force
- Bug?
  - Incorrect algorithm or implementation bug
  - Debug using gdb

## 4 Problem Solving

- Check admissible time complexities
  - ~100 million ops per second
- Check limits on parameters
- Speed ups
  - Faster data structures (STL)
  - Precomputation
  - Relations between values
  - Pruning

## 3 Time Management

- Allocate time wisely
  - Read and formulate preliminary solutions