

USACO Platinum Preparation

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1 Introduction

Platinum is the highest tier of the USA Computing Olympiad, and 150-200 American high schoolers regularly compete in their four seasonal contests. A strong performance in these contests is crucial to being considered for USACO camp.

The Platinum level poses a different challenge from the lower tiers of the competition. While the Gold level focuses on a narrow subset of techniques and data structures (mainly DP, BFS, DSU/minimal spanning trees), almost all competitive programming topics are fair game for the Platinum level. However, by looking at past contests, we can determine which topics come up most frequently and are the most important to study. They include:

- Segment trees (range queries, coordinate compression/line sweeps)
- Advanced DP techniques
- Tree techniques (centroid decomposition, DSU merge small-to-large trick, heavy-light decomposition)

These three topics (think of them as more like broad categories) have appeared regularly on Platinum contests, and I would consider these as the most important algorithms/data structures. Every contest will probably have at least one problem that falls into one of these three classifiers. If anything, they're a good place to start if you don't know what to study.

Of course, there many other algorithms and techniques such as string algorithms, bi-connected components, and square-root decomposition that may not appear frequently, but are expected to be well-known tools in any high level Platinum competitor's arsenal. In addition, there are countless algorithms that haven't ever appeared before that could be readily included in the next contest. The point is that just studying common algorithms will not be enough to regularly score high on contests. USACO problems are almost never straight-foward; they commonly require acute observations and strong implementation skills in addition to algorithmic knowledge. This motivates my proposal of a three-pronged plan to improve contest performance ¹. The areas of focus are:

¹Note: My plan is partly inspired by a lecture given during the 2018 UCF Competitive Programming camp.

1. Algorithms/data structure knowledge
2. Problem solving aptitude
3. Implementation and debugging skills

Many Platinum competitors are strong at implementation and can quickly pick up new algorithms. The topic that is the most people struggle with and is hardest to train is problem solving skills. We will discuss these general areas in more detail.

2 General improvement methods

2.1 Textbook Knowledge