Programming Contest Problem Types

Hal Burch conducted an analysis over spring break of 1999 and made an amazing discovery: there are only 16 types of programming contest problems! Furthermore, the top several comprise almost 80% of the problems seen at the IOI. Here they are:

- Dynamic Programming
- Greedy
- Complete Search
- Flood Fill
- Shortest Path
- Recursive Search Techniques
- Minimum Spanning Tree
- Knapsack
- Computational Geometry
- Network Flow
- Eulerian Path
- Two-Dimensional Convex Hull
- BigNums
- Heuristic Search
- Approximate Search
- Ad Hoc Problems

The most challenging problems are Combination Problems which involve a loop (combinations, subsets, etc.) around one of the above algorithms - or even a loop of one algorithm with another inside it. These seem extraordinarily tricky to get right, even though conceptually they are ``obvious''.

If you can master solving just 40% of these problem types, you can almost guarantee a silver medal at the IOI. Mastering 80% moves you into the gold range almost for sure. Of course, `mastery' is a tough nut to crack! We'll be supplying a plethora of problems so that you can hone your skills in the quest for international fame.

译文：

程序设计竞赛问题类型

Hal Burch 通过在 1999 年春季的分析得出了这样的结论，竞赛的程序设计一般只有 16 种类型，它们分别是：

Dynamic Programming （动态规划）

Greedy （贪心算法）

Complete Search （穷举搜索）

Flood Fill （满水填充法）

Shortest Path （最短路径）

Recursive Search Techniques （回溯搜索技术）

Minimum Spanning Tree （最小生成树）

Knapsack （背包问题）

Computational Geometry (计算几何学)

Network Flow （网络流）

Eulerian Path （欧拉回路）

Two-Dimensional Convex Hull （二维凸包）

BigNums （大数问题）

Heuristic Search （启发式搜索）

Approximate Search （近似搜索）

Ad Hoc Problems （杂题/模拟法）

很少有人能真正掌握这其中绝大部分的方法，而对于一些包含了这些方法组合与循环的具有挑战性的综合问题，多数选手都无能为力，因为竞赛中的很多试题都需要选手当场作出分析，而不是套用固定的解题格式，这是竞赛的困难所在，也是它的魅力所在。

如果你能掌握 40 ％这些类型的问题，您几乎可以保证获得银牌的凯业。掌握

80 ％的你进入金牌几乎是肯定的。当然， '掌握'是一个难啃的骨头！我们将

提供大量的问题，以便您可以磨练你的技能，以寻求国际荣誉。