

# Exotic

Level Zero					
STL	String				
	Vector				
	Pair				
	Stack				
	queue				
	Priority_queue				
	dequeue				
	sort				
	reverse				
	Next_permutation				
	set				
	map				
	iterator				
Number theory	Prime Generation, Sieve and How to Optimize				
	Bit wise Sieve				
	Modular Arithmetic ( + - *)				
	Modular Inverse (/)				
	Big Mod ( $a^b \% p$ )				
	Prime Factorization				
	Number of Divisor				
	Sum of Divisor				
Graph	Graph Representations (Adjacency Matrix)				
	Graph Representations (Adjacency List using vector)				
	Breadth First Search BFS				
	Depth First Search DFS				
	Bi coloring				
	Topological Sorting				
	Articulation Point				
	Bridge				
	Strongly Connected Components SCC				
	Dijkstra and variations				
	Bellman Ford and variations				
	Floyd Warshall and variations				
	Kth Shortest Path				
	Minimum Spanning Tree ( Prims)				
	Minimum Spanning Tree ( Kruskal)				
	2-SAT				
DP	Longest Common Sub sequence LCS				
	Coin change				
	Edit Distance				
	Tree DP				
	LIS/LDS in $n \log n$				
Total Solve Problems	200+ in UVa, Codeforces, LightOJ, Topcoder, SPOJ and USACO				
After Complete	Participate on Codeforces, Topcoder regular contest (Div 2)				

[illegible]

Level two					
Game Theory	Nim				
	Grundy Number and Dp Formulation				
	Alpha Beta Pruning Minimax*				
	Blue Red Hackenbush				
	Minimum Weighted Bipartite Matching/Kuhn-Munacres/Hungarian/Chinese Postman				
	Green Hackenbush				
String Algorithms	Suffix Tree, Automata				
	KMP Matcher				
	Suffix Array Construction*				
	Longest Common Substring				
	Aho Chorasac Algorithm				
	Manacher's Algo				
	Hashing				
Miscellaneous	Meet In the Middle Approach				
	Konigs Theorem				
	Matrix Tree Theorem*				
	Joseph Problem (Using queue $n^2$ )				
	Joseph Problem (Using recursion $n$ )				
	Managing Biginteger				
	Permutations and Combinations				
	Tower of Hanoi, Variations				
	N Queens Problem				
	Hashing				
	Finding Nth Permutation				
	Huffman Coding				
	Traveling Salesman Problem (Backtracking with pruning)				
	Finding Determinant of a Matrix				
	Finding kth number from a sequence of unsorted numbers in $\log(n)$				
	Transforming Hexagonal grid, Triangular grid to 3d coordinate system				
	Matrix Multiplication				
	Solving Linear Recurrence with Matrix Exponentiation				
	Heavy-Light Decomposition				
Advance DP	All Light OJ Advance DP Problems				
Geometry	Convex Hull				
	Point inside Convex Polygon ( $\log(n)$ )				
	Picks Theorem, Number of Lattice Points inside a polygon				
	Binary Search				
	Ternary Search				
	Segment Segment Intersection				
	Area Of A Concave Polygon				
	Point Inside A Polygon (Convex and Concave)				
	Minimum Circle Covering all Points				
	Union of rectangle ( How to cluster, how to make it in $n\log n$ , bently )				
	Closest Pair				
Total Solve Problems	800+ in UVa, Codeforces, LightOJ, Topcoder, SPOJ and USACO				
Level three					

Number Theory/Math	Shanks Algorithm				
	Dilworth's theorem*				
	BurnsideLemma (http://petr-mitrichev.blogspot.com/2008/11/burnsides-lemma.html)				
	Wilson's Theorem*				
	Lucas Theorem*				
	Gauss Elimination				
Graph	Minimum Spanning Tree ( For Directed Graphs )				
	Euler Path (Construction and optimization)				
	Gomory-Hu Tree				
	Edge Cover				
	Largest Clique				
	IDA* Search Problem, 15 Puzzle				
	Group Theory				
	Hamiltonian Cycle				
	Min Weight Cycles in Graph				
	Stoer Wagner ( Finding the minimum cut of a graph )				
	Planar Graph Detection				
	Havel-Hakimi Algorithm (Construct graph given degree of nodes)				
	Maximum Matching(Blossom Shrinking)				
	Max cost-max flow(min cost flow for negative cycle)				
Geometry	Convex Hull 3D				
	Line Sweeping/Angle Sweep				
	Fitting a Rectangle inside Another				
	Polygon Intersection				
	Area of a 3d Polygon				
	Polygon Clipping*				
	Rotating Calipers*				
	Triangulation				
	Optimal BST				
	KD tree				
	Link-cut tree				
	Interval Tree				
	Quad tree				
	Complete USACO training system				
Total Solve Problems	1000+ in UVa, Codeforces, LightOJ, Topcoder, SPOJ and USACO				
Extra	Segment Trees, with lazy propagation				
	Heavy Light Decomposition				
	FFT				
	Tree Decomposition				
	Persistent Segment Tree				
	Palindromic Tree				
	DP Optimizations				
	SOS DP				
	MO's, MO's with update				
	DSU on Tree				