Coding Flow

Learn Language (C++/JAVA)

Basic

1: Pattern printing problems

2: Analysis of time complexity

3: Linear Search problems

4: Circular array using simple array

5: Palindrome, Perfect number, armgs

6: Simple Hashing problems, freq count

7: Prefix Sum Problems 1D/2D - solve problems

8: Sliding window technique (1/5)

Intermediate

1: Binary Search problems (2/5)

2: Find GCD of 2 numbers in LogN (Euclidean and Extended euclidean algo)

3: Linear Diphantine Equation

4: Prime in Sqrt(n) complexity

5: Seive of Eratosthenes

6: Segmented Seive

7: Finding the prime factorization of a number in logn per query

8: Euler Totient function

9: Fermet Little theorem

10: Wilson's theorem - HE

Number Theory

1: Finding x^n in LogN

2: Modular Arithmetic

3: Module Inverse of a number

4: Chinease remainder theorem

5: Factorial Modulo Mod

6: Finding nCr & nPr in queries

7: Inclusion Exclusion principle -HE

8: Modular Exponentiation

Some Advanced

1: Learn about basic sorting Algorithms (Bubble, Selectiom, Insertion)

2: Constructive and having swap terms in it

3: Solve problems related to Two Pointer Approach

4: Bit Manupulation problems(Left shift,Right shift, Set bit, MSB LSB etc) (Hackerearth as good tuts)

5: Power set of a given array or string using BIT

6: Number of subarray with XOR as ZERO (Not alogirithm, but a must do problem)

7: Problems related to Greedy Algoriths Tag - CF

8: Kadane's Algorithms and problem related to them

9: Job sequesnce and activity selection problem

Recursion (All Basic)

1: Recurssion probelms like finding factorial

2: Implement Binary search using recursion

3: Implement modular exponent

4: Solve recursion problem like finding subset with given sum and other problems

Advanced

1: Learn Merge Sort & Quick sort algorithms - count inversion

2: Do backtracking problems like Sudoku and N-Queen problem (Help in DP path problems)

3: Meet in the middle algo and problem

4: Divide & Conquer problesm on Codeforces

5: Find next greater / Next samller element using stack

6: problesm related to paranthesis using stack

7: Largest rectangular area in Histogram

8: Probleam related to Heap (Priority Queue)

Practice Hard on above problems

More Advanced Don't GiveUP (1-4 hr in a problem)

1: Hashing on strings, know when collision happens (cpalgorithm site)

2: Rabin karp algo(it uses hashing)

3: Prefix function

4: KMP Algo

5: Z-Function

6: Manacher's Algo (Solve bunch of problem in above topic)

Trees – SPOJ - CF

1: Tree / Graph representation

2: DFS/BFS traversal in tree /graph

3: Diameter of a tree/Height

4: Euler Tour of tree

5: Finding LCA using Euler Tour and using Binary Lifting

6: Distance b/w two nodes

7: Subtree Problems (Solve prob on above tree prob)

Graph

1: Connected Components

2: Topological sort

3: Cyclic detection in graph

4: Bipartite check in graph

5: Shotest Connected Component using Kosaraju's alog

6: Dijkarta's Algo

7: Bellmanford Algo

8: Floyd warshall algo (Solver more problems on above topic - Hackerearth/Codeforce)

9: Bridge in Graph

10: Articulation point in graph

11: Minimum spanning tree & kruskal algo

12: Prim's Alog

13: 0/1 BFS in linear time (cpalgo)

14: Finding bridges online (Solve prob)

Dynamic Programming

1: Start with Recusion & Memoization with strong knowledge. - AND MEMORIZE SOLUTION

2: Knapsack and LCS prob solve

3: Solve AtCoder Educational contest on DP 26/26 solve

4: MUST Solve problem from SPOJ(specially), then Codeforces.

5: Understand how we write recurrence for Digit DP(CF blog)

6: Read DP with bitmasks and solve on hackerearth

7: DP in trees (Rachit jain video)

8: SOS DP - CF

Practice More(NOT EASY)

More

1: Disjoint Set(Using all optimizations)

2: Offline Quesries using Disjoint Set

3: Kruskal's Alog

4: Sparse Table (Not Imp)

5: Fenwick Tree (Read Update Trick also) - refer video tuf

6: Binary Lifting on fenwick tree (More Solve prob)

And More

1: Matrix Exponentiation

2: Sqrt Decomposition -gfg

3: Update and query operations

4: Mo's Algo (Codeforce blog must)

5: Mo's Algo on Trees

6: Segment Tree (Most Imp topic - Range queries and point updates)

7: Lazy propogation in segment tress

This help you to E- level problems on Codeforces as least

At Last

1: Sprague-Grundy Theorem -Gaurav Sen video

2: Flows and related prob

3: Heavy light decomposition - refer Anudeep blog at google

4: Convex Hull Alog - blog on CF

5: FFT/NTT

Learn all basic algos on Hackerearth.