Participate in Every Contest going around

→ help to increase real contest

→ No fear of Rating

Practicing in A2OJ ladder

have can do both learn & practice

Each on alternate days.

Solve problem of Algo in CF in decreasing order page. , or Spoj to solve same or even HackerEarth a bunch.

Balance Practice & learning Algo

I

- Pattern Printing Problems.
- Linear search for basic traversal and implements Circular Ar (Articles at GFG)
- Pallindrom number and other (perfect square, armstrong etc. (Simple hashing problem. frequency counting).
- Simple Hashing Problem
- Prefix Sum Probems, both 1D and 2D (on codeforces problem).
- Sliding window technique (imp)

II Basic of Number theory.

- Binary search is must (2/3 contest on an avg)
- GCD of two numbers in Log N.
- Linear Diophantine eqn
- Primes checker, Seive of Erathones, segmented seive.
- factorial of number (Prime factors)
- Euler totient function
- Fermatt's little theorem (Hacker Earth)

III Tougher version of Number theory

- Find x^n in logn
- Modular Arithmetic
- Modular Inverse of a Number
- Modular Exponention
- Chinese Reminder Theorem
- Factorial modulo mod
- Finding NCr and nPr for Queries
- Inclusion Exclusion Principle (for contest) Hacker Earth problem, CF tags, not dp tags problem

Learn Basic Sort algorithm

(iv) ↳ constructive and swapping term problems.

↳ Solve two pointer approach

↳ Bit Manipulation (all steps)

→ Power Set of a given Array of a String using Bit manipulation

→ Number of Subarrays with XOR as Zero (not an algo, but must do)

(Hackerearth tutori and Coding Blocks)

(Hacker earth problems)

(v) problems related Greedy Algo (Tag)

→ Kadane's Algo (Solve lot prob)

→ Job Sequencing & Activity Selection prob

→ CF → Greedy tag.

(vi) Recursion (Start Solving lot of basics recursion problem, finding factorial, Sum of digits, and so on.)

→ Implement Binary Search.

→ Modulo Expo. using recurs.

→ Solve recursion problem finding Subsets with given Sum and other String group.

Learn about Merge & quick Sort

↳ Solve problem related to merge sort, (Problem count inversion using merge sort)

↳ Do Backtracking problem like Sudoku and N queen, it will help to Dynamic Prog problem

for recursion refer to leetcode & gfg's practice.

(VII) → Meet in Middle Algo and problem

→ Divide & conquer problem (lot from CF)

→ Next Greater / Next Smaller using stack (Parenthesis problem)

→ Problem related to permutations.

→ Largest Rectangular Area in Histogram (concept used in lot of problems)

→ Problems related to Heap (priority queue)

Lot time consume

DONT Compare

Prn focus on learn

A2OJ, Contests.

(VIII)

String Algorithm

- Hashing on string (Solve problem & understand where collision happens)

CP algo blog, SPOJ, codegym,

- Rabin Karp's Algo
- Prefix Algo
- KMP "
- Z function "
- Manacher's Algo

Go through Blog's

Solve in different platform.

- Tree / Graph representation
  - Traversal in Graph BFS/DFS
  - Diameter of tree, height, level of tree.
  - Euler tour of tree
  - Find LCA using Euler Tour (Lowest Common Ancestor)
  - ~~Find~~ Find, Find LCA in Binary lifting.
  - Distance Between two nodes
  - Subtree problem

SPOJ DE problem on Codeforces

Graphs

- connected components
- Topological sort
- Cycle detection in a graph
- Bipartite check in graph
- Strongly connected component (SCC) using Kosaraju's Algo
- Dijkstra Alg
- Bellman ford Alg
- Floyd warshall

(25 to 30 problems) SPOJ and Codeforces Hackerearth

CP Algo Hackerearth Blogs

CP Algo

- Bridge in a Graph
- Articulation points
- Minimum spanning tree using Kruskal
- Prims Algo
- 0/1 BFS

must

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DP
(X)

Don't write iterative DP, avoid video for iterative DP :~
try to memoise solution.

→ Get strong recursion before Dynamic Programming
→ Understand Memoization (GFG Article, CF Blog)
→ Initially solve all common existing DP problem like LCS, Knapsack! Wide series of few
(DP playlist)

→ Atcoder ~~Coat~~ Educational Contest on Dynamic Prog
26 problem — Solve each

→ Solve Problem specifically on (SPOJ)

→ Then good ~~for~~ (Codeforces) — = wonderful Blog and Solve it

→ Digit Dynamic Prog. (CF Blog)
— Solve bunch of problem in Blog
→ DP with Bitmasking and Solve problem.
→ DP on trees (Two article of GFG)
(I can't join video)
→ SOS DP (CF Blog)
→ Do Lot of practice.

(XI) Disjoint Sets (using all optimization) (CP algo)
→ o ~~offline~~ Queries
↳ using Disjoint (Solution
(Colorful Array from spoj)

↳ Kruskal Algo using Disjoint

↳ Sparse table (working how was segment tree)

↳ Fenwick tree (Read about range update trick also)

↳ Binary lifting fenwick tree
(Practice prob in Codeforces)

↳ Problem of fenwick tree

(XII) Matrix Exponentiation (problems)
- Sqrt Decomposition technique (GFG, CP algo, CF blog)
- update and Query operation
- Mo's algo (Powerful Array from Codeforces)
(CF Blog)
→ Mo's algo on trees.
(Imp) → Segment trees (Range Queries and point update)
→ Lazy propagation on Segment tree

Advance → Last two of long challenge and A to E of cookoff

→ Sprague - Grundy theorem (Gaurav Sen)
→ Flow and Related Problem (CP algo)
→ Heavy Light Decomposition (Path problem on tree)
(Anudeep at Quora)
→ Convex Hull Algo
(Mean's Blog)
→ FFT/NTT .

Participant Conflict

→ Give due center / slightly greater your capacity on that day

→ Alternative day Algorithm problem

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START WITH BRUTE FORCE (min Ques - 100)

Maths

Algebra → ☆

Combanitorics →

Numerical Methods →

Linear Algebra →

Geometry →

Graph Theory (basic) → ☆

Graph theory (Advance) →

Data Structure (Basic) → ☆☆

Data Structure (Advance) →

Bit Manipulation →

String manipulation →

Recursion → ☆

Backtracking →

Disjoint Set → ☆

Game Theory →

Dyanamic Programing →

Greedy Approch →

☆ → little Knowledge

☆☆ → great Knowledge

☆☆☆ → Knowledge with practice a lot.

→ need to be done first.