**And LIST OF TOPIC**

**(Codeforces-CF, Hackerearth-HE,)**

1. Prefix Sum, both 1D and 2D-(CF)
2. Sliding Window-(can be found in 2out of 5 contests)
3. Binary Search(2/5 contests)
4. GCD –( Euclidean & extended Euclidean)
5. Linear Diphantine equations(most of times direct problem comes)
6. Primes-primality test ,sieve(perform query operations on primes),segmented sieve ,finding prime factorization using sieve in logn time
7. Euler’s theorem, Fermat’s theorem, Wilson’s Theorem(gfg & HE)
8. Find x^n in logn
9. Modular Arithmetic
10. Modular Inverse
11. Modular Exponentiation
12. CRT
13. Factorial Modulo mod
14. Finding nCr and nPr for queries
15. Inclusion & Exclusion- it helps solve combinatorics problems and good problems can be found on CF
16. Constructive Algorithms
17. 2-pointer problems
18. Bit Manipulation
19. Power set of given array or a string using BIT
20. Number of Subarrays with XOR as 0(not an algorithm but a lot of problems will be variation of this problem so a must(coding blocks, hackerearth on bit manipulation)
21. Greedy Problems (CF)
22. Kadane’s Algorithm(many problems are a variation of it)
23. Job Sequencing and Activity Selection problems
24. Recursion-implement binary search and Modular Exponentiation using recursion
25. Merge Sort, Quick Sort and problems-Inversion Count
26. Backtracking
27. Meet in Middle Algorithm
28. Divide and conquer (CF)
29. Next Greater Element/Next Smaller Element using stack
30. Problems related to parenthesis
31. Histogram-concept is used in lot of problems
32. Problems related to heap/Priority Queue

**HARDER TOPICS**

**(CP-Algorithms:CPA)**

1. Hashing on Strings: understand when collision happens(CPA)(SPOJ & CF)
2. Rabin Karp, Prefix Function, KMP Algorithm, Z-function, Manacher’s Algorithm
3. Trees/Graphs(SPOJ,D & E on CF)
4. Euler Tour of Tree
5. Finding LCA using Euler Tour
6. Finding LCA using Binary Lifting
7. Distance between 2 nodes
8. Subtree Problems---tree
9. ----graph----Connected Components
10. Cycle Detection in a Graph
11. Biparite Check in Graph
12. SCC using Kosaraju’s Algorithm
13. Dijkstra’s Algorithm
14. Bellman Ford Algorithm
15. Floyd Warshall Algorithm
16. Bridges in Graph
17. Articulation Point in Graph
18. Minimum Spanning Trees using Kruskal’s Algorithm
19. Prim’s Algorithm
20. 0/1 BFS-must
21. Finding Bridges online---graph
22. ---graph----DP
23. Start with recursive DP
24. Understand Memoization
25. Atcoder’s Educational Contest on DP(26 problems)
26. SPOJ & CF problems on DP
27. Digit DP problems(CF blog)
28. DP with bitmasks
29. DP on trees(gfg and rajiv jain’s videos)
30. SOS DP (CF blog)
31. Disjoint set

19:00