1. **1.       Advanced Number Theory**
   1. Reference Tito’s  104-Number Theory Problems
   2. Special Numbers: Stirling , Harmonic Number, Fibonacci etc.

1. **2.       Backtracking + Pruning**
   1. Tricks
   2. IDFS(Iterative Depth First Search)
   3. A\* search Algorithm
   4. Dancing Link (Algorithm X)

1. **3.       Advanced Dynamic Programming**
   1. Standard Problems
   2. State Space Reduction
   3. DP on trees
   4. DP with Data Structure
   5. DP on Probabilities + Expected Value

1. **4.       Greedy**
   1. Reading Tutorial on TopCoder

1. **5.       Graph Theory**
   1. Variants DFS/BFS/SCC/Bridge/Articulation Point/Topo Sort/Biconnected Comp/
   2. Stable Marriage Problem
   3. 2-SAT
   4. Heavy Light Decomposition
   5. Directed Minimum Spanning Tree
   6. Variants Dijkstra / Floyd Warshall / Bellman Ford
   7. Euler Tour/Circuit and Hamiltonian Tour/Circuit

1. **6.       Advanced Mathematics**
   1. Probability + Expected Value
   2. Discrete and Continuous Probability
   3. Counting
   4. Inclusion Exclusion
   5. Group Theory/Burn Side Lemma
   6. Matrix Exponentiation
   7. Roots of Polynomial
   8. Gaussian Elimination
   9. Numerical Analysis
   10. Chinese Postman Problem

1. **7.       Game Theory**
   1. Variants Nim Thoery Problems
   2. Variants Grundy problems

1. **8.       Network Flow**
   1. MinCut Max Flow
   2. Bipartite Matching
   3. MinCost Max Flow
   4. Hungarian Algorithm
   5. Blossom BPM

1. **9.       Advanced Data Structure**
   1. Suffix Array
   2. Suffix Automata
   3. Aho Corasick
   4. Binary Indexed Tree
   5. Segment Tree
   6. Manachar Algorithm
   7. Line Sweep
   8. Splay Tree
   9. K-d tree
   10. Meet in the Middle

1. **10.   Hashing + Randomized Algorithm**
   1. Miller Rabin Karp Algorithm
   2. 2-D Pattern Matching
   3. String Matching
   4. Random with a fun

1. **11.   Regular Expression + Grammar Parsing**
2. **12.       Geometry**
   1. Variants Analytical Geometry
   2. Vector Concept
   3. Computational Geometry
   4. Graham Scan
   5. Area of Union Circle
   6. Point in Polygon
   7. Voronoi Diagram
   8. Line Sweep
   9. Pick’s Theorem
   10. Closest Pair of Points

1. **13.   Variants Binary Search + Ternary Search**

Top of Form

[L](https://www.facebook.com/notes/sust-programming-training-camp-2012/syllabus-of-advanced-training-camp/593760727317148)

Bottom of Form