Road to Competitive Programming

Let’s start the Journey Today

Learning a Language (Step-0)

- Choose C++,Java or Python
- Learn Basic syntax and constructs
  - Conditions
  - Looping
  - Arrays
  - Structures
  - Etc
- Solve very basic questions along with it

Time to Enter in World of CP (Step-1)

- **Strategy**
  - Start practicing questions online
  - Solve very very simple questions on any website (CodeChef, Hackerrank, HackerEarth)
  - Take a target of 50 questions to solve(very easy one) .

- **Link**
  https://www.codechef.com/problems/school/?itm_medium=navmenu&itm_campaign=problems

- **Duration**
  - 30 days

Time Complexity (Step-2)

- **Strategy**
  - https://www.youtube.com/watch?v=Xi6RqhgeHjs&list=PLhUBmaJES_g-41r_z-kMGWqQ4Iz-z7Oyo&index=3

  - https://www.youtube.com/watch?v=ztYFFdsGwUg&list=PLhUBmaJES_g-41r_z-kMGWqQ4Iz-z7Oyo&index=5

- **Duration**
  - 5 days

STL + Contests (Step-3)

- **Strategy**
  - Time to level up your coding by learning tools basically STL in c++ and Collections in Java.
  - Also start giving online coding contests (At least codechef long+short and codeforces DIVs)
  - Learn the STL from here -

  Session 1 - https://www.youtube.com/watch?v=Bm7Msg2Osu4
  Session 2 - https://www.youtube.com/watch?v=YnB-2CK2c7k

- **Duration**
  - 5 days

- Practice Questions -
  - https://docs.google.com/document/d/1N4--AK1rC45rjY-o0JFUwz1jRRc56w_QLurYCimH2Mc/edit#

Topic Wise Problems + Contests (Step-4)

- **Strategy**
  - Start practicing problems Topic wise.
  - Keep giving contests along with it.

- **Duration**
  - Will discuss in further slides

- **Topics to Cover**
  - Number Theory
  - Bit Manipulation
  - Binary Search
  - Greedy
  - Graph Theory
  - DP

Number Theory (Step-4.a)

- **Subtopics**
  - Number Theory Basics
  - Sieve of Eratosthenes
  - ETF (Euler Totient Function)
  - Binary Exponentiation
  - Matrix Exponentiation
  - Modulus ProperTies
- **Duration**
  - 15-20 days

Bit Manipulation (Step-4.b)

- **Subtopics**
  - Bit Operators
  - Subset Generation using bitmasking
  - Sessions
    - https://www.youtube.com/watch?v=JOONXgz0zeM
- **Duration**
  - 7-10 days
- **Practice Questions -**
  - https://docs.google.com/document/d/1N4--AK1rC45rjY-o0JFUwz1jRRc56w_QLurYCimH2Mc/edit#

Binary Search (Step-4.c)

- **Subtopics**
  - Discrete Binary Search
  - Sessions
    - https://www.youtube.com/watch?v=JOONXgz0zeM
    - https://www.youtube.com/watch?v=jg0HOWm7OZc
- **Duration**
  - 7-10 days
- **Practice Questions -**
  - https://docs.google.com/document/d/1N4--AK1rC45rjY-o0JFUwz1jRRc56w_QLurYCimH2Mc/edit#

Graph Theory (Step-4.d)

- **Subtopics**
  - BFS + DFS
  - Dijkstra + Topological
  - Disjoint Set Union
  - Complete Syllabus
    https://drive.google.com/file/d/1H4NB3ITmeimAJcJmj8AGcMxaRQ9qCnL4/view
  - Sessions
    https://docs.google.com/document/d/1N4--AK1rC45rjY-o0JFUwz1jRRc56w_QLurYCimH2Mc/edit#
- **Duration**
  - 20 days

Dynamic Programming (Step-4.d)

- **Subtopics**
  - Practice Standard Questions
  - Start practice problems - Best way learn DP
  - No shortcut
  - Problems to practice - https://docs.google.com/document/d/1N4--AK1rC45rjY-o0JFUwz1jRRc56w_QLurYCimH2Mc/edit#
- **Duration**
  - 25 days

Trees and LinkedLists (Step-5)

- **Subtopics**
  - Linked Lists
  - BST
  - Trie Tree
  - Places to practice - Interview Bit, GFG, Recently asked interview questions.
- **Duration**
  - 25 days

Advanced Data Structures and Algorithms

- **Subtopics**
  - Segment Tree
  - Binary Indexed Tree
  - DP + bitmasking, Digit DP
  - Suffix Array
  - etc
- **Duration**
  - Jab tak hai jaan

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