RoadMap to Competitive Coding

# Step 1 (Practice basic questions) - 30 days

* Choose a language (C++, Java, Python) and learn basic syntax.
* 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 ) in 30 days.

Questions Links - <https://www.codechef.com/problems/school/?itm_medium=navmenu&itm_campaign=problems> (beginner and easy section)

# Step 2 (Time complexity + basic Recursion) - 5 days

* Session - <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>

# Step 3 (STL/Collections + Contests) - 10 days

* Its 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>

Questions to practice -

* <https://www.hackerrank.com/challenges/cpp-maps/problem>
* <https://www.hackerrank.com/challenges/cpp-sets/problem>
* <https://www.hackerearth.com/problem/algorithm/shikhar-stl/>
* <https://www.codechef.com/problems/KJCP02>
* <https://www.codechef.com/problems/CSS2>
* <https://www.codechef.com/LRNDSA02/problems/NOTALLFL>
* <https://www.codechef.com/JUNE20B/problems/CHFICRM>
* <https://www.codechef.com/DEC14/problems/CAPPLE/>

# Step 4 (Topic Wise problems + Codeforces )

## Number Theory (15-20 days)

* Time to start learning topic wise
* **Number Theory playlist** 
  + **Number Theory Basics**

Session - <https://www.youtube.com/watch?v=XKd3voUwj04&list=PLhUBmaJES_g_SDTERARrkld6jHkIHHsHi&index=1>

* + **Sieve of Eratosthenes**

Session - <https://www.youtube.com/watch?v=XKd3voUwj04&list=PLhUBmaJES_g_SDTERARrkld6jHkIHHsHi&index=1>

<https://www.youtube.com/watch?v=Eq5ky-XcEYg&list=PLhUBmaJES_g_SDTERARrkld6jHkIHHsHi&index=3>

**Practice Problems**

[https://www.spoj.com/problems/APS/](https://www.youtube.com/redirect?redir_token=QUFFLUhqblVWRUxhemwwdlR0d0JGb0FsbC1KSGFFUEoyQXxBQ3Jtc0ttalduUzNsSmFBLWtSVEtOZHUyc1dCQjNDRHJjNUp0dTlEYzhnR092M1M2S3hERWpOLVlCRVc4dnh4a3U4eTlPbmtmZVpJbE9WMHBibldZdVFvWGZrSV9acXh6ckh4a2d4WnAwSi1COEdKdWE5QkJjRQ%3D%3D&q=https%3A%2F%2Fwww.spoj.com%2Fproblems%2FAPS%2F&v=Eq5ky-XcEYg&event=video_description)

[https://www.spoj.com/problems/AFS](https://www.youtube.com/redirect?redir_token=QUFFLUhqblJTdjRMRVJoNWZ5cVM1NFZUSUdNd3d3Ml9sd3xBQ3Jtc0traWVIR3JWdXh4ZEhSbncwazFEcFN2MDRud0RYeENpdHhQc01pcG9OZEdmTEVVaVVkNlVBQXVXamRmbW40T29ENnhiTHRvQ0NEYUI2ZzI3U2Y5TFUwaHBiV0FJOXVQNVdVQ2xUV3RsQTVwRVBFc1Nhbw%3D%3D&q=https%3A%2F%2Fwww.spoj.com%2Fproblems%2FAFS&v=Eq5ky-XcEYg&event=video_description)

[https://www.spoj.com/problems/NDIV/](https://www.youtube.com/redirect?redir_token=QUFFLUhqbm1JZ01rRWFUaUlZQW1sNzBSRWFVTkZMazl4d3xBQ3Jtc0ttMWxFZ0t0OEpub1VYZjM5QmRLRG9PZDdrREd6Q1NZM3N1QXlTbWpETVBGTjVZU1Y3VGs0clRrTDRqQnJIOEJRamswXzl5LTNqcTJyem5qcHE0a0lHNGUzY0xWRU1sRzd0VVhPR1R6RkY5V1RpLUIwOA%3D%3D&q=https%3A%2F%2Fwww.spoj.com%2Fproblems%2FNDIV%2F&v=Eq5ky-XcEYg&event=video_description)

[https://www.spoj.com/problems/CUBEFR/](https://www.youtube.com/redirect?redir_token=QUFFLUhqa05SWW5KZWdyNEk2cFlwb0dJSVdISzIxWkx0UXxBQ3Jtc0tubURDNVRQWUlqUzNISjdNRVJnQ25ZcW5WTXFlM0FlRWJ2NHowVFRFckxybDBiRHFVVHptcE9hcTZib1pBQXBLSk9UUW9qVTdDeExHMmhKOHNtcF8tREZYaDJUWXZfZ2xDMl80akw2Q0JadnQtdmxZTQ%3D%3D&q=https%3A%2F%2Fwww.spoj.com%2Fproblems%2FCUBEFR%2F&v=Eq5ky-XcEYg&event=video_description)

[https://www.spoj.com/problems/NOSQ/](https://www.youtube.com/redirect?redir_token=QUFFLUhqbnctZW1hTzczMEw0Ym5sRThGMmhTajMzVGQ4QXxBQ3Jtc0tsT2xLaUg2YXdrSGRLODdKVHM3X0UwdHFmbzhmQnFjcWZLdnZyYjdtbElsSkplY0Z5aHViNkMwR2NmeHhkdEFKaFBlSlpUeEc4TWJNd29kLW82SEtNaTJzN2lnV3NIb2dCdXZPc1YzWmtuSm5kZXRxYw%3D%3D&q=https%3A%2F%2Fwww.spoj.com%2Fproblems%2FNOSQ%2F&v=Eq5ky-XcEYg&event=video_description)

<https://www.spoj.com/submit/TWOSQRS>

* + **ETF (Euler Totient Function)**

Sessions - <https://www.youtube.com/watch?v=XKd3voUwj04&list=PLhUBmaJES_g_SDTERARrkld6jHkIHHsHi&index=1>

<https://www.youtube.com/watch?v=d5FlCz4nRiU&list=PLhUBmaJES_g_SDTERARrkld6jHkIHHsHi&index=5>

Practice Problems -

<https://www.spoj.com/problems/ETF/>

<http://lightoj.com/volume_showproblem.php?problem=1007>

* + **Binary Exponentiation (Very Important)**

Session - <https://www.youtube.com/watch?v=UicoOgR4LVY>

Problems -

* Discussed in the above session
  + **Modulus Properties (Very Important)**

Session - <https://www.youtube.com/watch?v=zJwct7qnj2c>

## Bit Manipulation (5-10 days)

Session - <https://www.youtube.com/watch?v=md2Bn0zK6sc>

Practice Problems -

<https://www.hackerearth.com/problem/algorithm/chotu-and-sabrina-1/>

<https://www.spoj.com/problems/OLOLO/>

<https://www.spoj.com/problems/FRND/>

<https://www.codechef.com/problems/MARCHA1>

<https://www.spoj.com/problems/NR2/>

## Binary Search (7-10 days)

* + It’s a very important topic in CP as well as for interviews.

Session - 1

<https://www.youtube.com/watch?v=JOONXgz0zeM>

Session - 2

<https://www.youtube.com/watch?v=jg0HOWm7OZc>

Practice Problems -

<https://www.spoj.com/problems/AGGRCOW/>

<https://www.spoj.com/problems/EKO>

<https://www.spoj.com/problems/PIE>

<https://www.spoj.com/problems/ABCDEF/>

<https://www.interviewbit.com/problems/painters-partition-problem/>

<https://www.spoj.com/problems/SUMFOUR/>

<https://leetcode.com/problems/count-complete-tree-nodes/>

<https://www.spoj.com/problems/BALLOT/>

<https://www.geeksforgeeks.org/n-th-root-number/>

## Graph Theory (20 days)

* + Detailed Syllabus -

<https://drive.google.com/file/u/2/d/1H4NB3ITmeimAJcJmj8AGcMxaRQ9qCnL4/view>

Session 1

<https://www.youtube.com/watch?v=HXh0kn3TL5g>

Session 2 + practice problems

* <https://www.youtube.com/watch?v=VM6EGekmwuA>
* [https://www.spoj.com/problems/CAM5/](https://www.youtube.com/redirect?v=VM6EGekmwuA&event=video_description&redir_token=QUFFLUhqa2FSRlh2Y0E1N1Z2VjVtYnlWX1hJc2NzSFVZd3xBQ3Jtc0tsMXBRb0lHUGRhN3A1b1FUY0VzMEY4QnlocjZUTkxGb29HU1FLd1ZDczAyTEVfcjJqU3lqZGxGQ1hneC1YWEdmTnVzVVoyYmZkYWNJbndMdHAxLUl1enFkVHFoVFpTTHRvMnZlWWpMZEl3SlhFYjBpQQ%3D%3D&q=https%3A%2F%2Fwww.spoj.com%2Fproblems%2FCAM5%2F)
* [https://www.spoj.com/problems/PT07Y/](https://www.youtube.com/redirect?v=VM6EGekmwuA&event=video_description&redir_token=QUFFLUhqazRFN3Jtd2djZmc5TE9JNXlfejRJYW4yOENOd3xBQ3Jtc0tsMGhBT19zNmVweHZ5S1V4VHR4b1dKbklwYmtSNksxLXEwOUR0MjkySHdBUkRIdUdWWUFacDUzVWt5VjdvbmZ0LURacjBYNkdIaTVka1RidlVnYm4xc1JuVF9QdDRQOWNwYkhDb3dFMEhDc1k0a3dmUQ%3D%3D&q=https%3A%2F%2Fwww.spoj.com%2Fproblems%2FPT07Y%2F)
* [https://www.spoj.com/problems/PT07Z/](https://www.youtube.com/redirect?v=VM6EGekmwuA&event=video_description&redir_token=QUFFLUhqbGNZSGlBeGhDcnB2bTBaTEVIYTJVVGx2Z3N4QXxBQ3Jtc0tuWFB5b2xyTGhxVEZXakhTUVpHV2tXZWtfeF9QNjd6ZTBzUE1PR003em5Rdl9LRWlCSzZxNmhVamU5NUU5M3o4bV9WZVJiREQ2Y0lQc1JjQ0lUZ18tSzZmLWRqSkJubkVPVHlINmpGQTVoaVNLUjFTTQ%3D%3D&q=https%3A%2F%2Fwww.spoj.com%2Fproblems%2FPT07Z%2F)
* [https://www.spoj.com/problems/PPATH/](https://www.youtube.com/redirect?v=VM6EGekmwuA&event=video_description&redir_token=QUFFLUhqblJSR0RZSzdNU1ZWMHg0Wno3TmtDYXpkcEhkUXxBQ3Jtc0tuV3RPNDBjMEkwUUNtZ3JUQ3A4eWlwZi15enVvc01ZUW11UlZ6YXdCNXV2WVUwdVllcUtKQUVaSnhQS19CZ1JzVlJXX3B4ZW4wUDhjbDlKZmxJNGFZMTdRWW5YbnZMT2tlZDBoRlRCanNDbEhJYVF0TQ%3D%3D&q=https%3A%2F%2Fwww.spoj.com%2Fproblems%2FPPATH%2F)
* <https://codeforces.com/problemset/problem/520/B>

Session 3

<https://www.youtube.com/watch?v=LQ4Gr7Imn0U>

Practice Problems

* <https://www.geeksforgeeks.org/find-the-ordering-of-tasks-from-given-dependencies/>
* Leaf nodes pluck problem
* <https://codeforces.com/contest/510/problem/C>

## Dynamic Programming (25 days)

Practice Problems

* <https://www.codechef.com/problems/SPIDY2>
* <https://www.spoj.com/problems/BYTESM2/>
* <https://www.spoj.com/problems/MISERMAN/>
* <https://www.spoj.com/problems/FARIDA/>
* <https://www.spoj.com/problems/MCOINS/>
* <https://www.spoj.com/problems/NOCHANGE/>
* <https://www.spoj.com/problems/CRSCNTRY/>
* <https://www.spoj.com/problems/COINS/>
* <https://www.spoj.com/problems/PARTY/>
* <https://www.spoj.com/problems/ABA12C/>
* <https://www.spoj.com/problems/MIXTURES>
* <https://www.spoj.com/problems/DIEHARD/>
* <https://www.spoj.com/problems/GSCANDY/>
* <https://www.spoj.com/problems/LISA/>
* <https://www.spoj.com/problems/MARTIAN/>
* <https://www.spoj.com/problems/MKBUDGET/>
* <https://www.spoj.com/problems/MMAXPER/>
* <https://www.spoj.com/problems/MAIN72/>
* <https://www.spoj.com/problems/MAXWOODS/>
* <https://www.spoj.com/problems/LKS/>
* <https://www.spoj.com/problems/EDIT/>
* <https://www.spoj.com/problems/ADVEDIST/>
* <https://www.spoj.com/problems/ROCK/>
* <https://www.spoj.com/problems/TWENDS/>

# Step 5 (Trees and LinkedLists)

* + Interview bit
  + GeeksForGeeks
  + Karumanchi Books
  + Recently Asked Interview Questions

# Step 6 (Advance DataStructures and Algorithms)

* + Segment Trees
  + Trie Tree
  + Suffix Array
  + Digit DP
  + DP+Bitmasking

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