**0 to CF Expert (15 Topics – 15 Weeks)**

**Topic 1**

* 1. Basics of language
  2. Online Judges
  3. Online and onsite contests

**Topic 2 (Number Theory)**

2.1 Modular Arithmetic

2.2 Sieve

2.3 Prime factorization (Number of divisors, Sum of divisors)

2.4 GCD, LCM

**Topic 3 (Sorting)**

3.1 Bubble sort

3.2 Radix sort

3.3 Merge sort

**Topic 4 (Searching)**

4.1 Binary Search

4.2 Ternary Search

4.3 Meet in the middle

**Topic 5 (Bit Manipulation)**

5.1 Bigmod using bitwise operation

5.2 Bitwise optimizations

5.3 Bitmasking

**Topic 6 (String)**

6.1 Basic string operations

6.2 String matchings and related problems

**Topic 7 (Greedy)**

7.1 Task scheduling

7.2 Greedy Problems using binary or ternary search

7.3 Kaden’s Algorithm

7.4 Fractional Knapsack

7.5 Two pointers

**Topic 8 (Geometry)**

8.1 Precision Problems

8.2 Euclidian Geometry

8.3 Binary and ternary search

**Topic 9 (Data Structure)**

9.1 Stack, Queue, Vector

9.2 Set, Map

9.3 Priority queue

**Topic 10 (Dynamic Programming)**

10.1 Basic DP

10.2 0/1 Knapsack

10.3 Coin Change

**Topic 11 (Graph)**

11.1 BFS

11.2 Shortest path in 0/1 Graph

11.3 DFS

11.4 Cycle Finding

11.5 Topological Sort

**Topic 12 (Math)**

12.1 Probability

12.2 Expected value

12.3 Coprime

12.4 Inclusion Exclusion

**Topic 13 (Graph – 2)**

13.1 Floyd warshal algorithm

13.2 Dijkstra algorithm

**Topic 14 (Recursion)**

14.1 How to think recursive way

14.2 Variations