**Exact Order to learn DSA**

**Basics and Number Theory:**

1. Basic syntax

2. STL library

3. Practice problems on A20J Ladders

4. Do a bunch of pattern printing problems.

5. Learn about the analysis of the time complexity, so that you can think of the expected complexity of a given problem.

6. Learn about linear search for basic traversal and implementing circular arrays

7. Palindrome and other numbers (perfect, armstrong....) For knowing how to do basic number problem

8. Simple Hashing problem

9. Prefix sum problems, both 1D and 2D

10. Sliding window technique

11. Binary search is a must

12. GCD of two numbers in Log N (Euclidean and Extended Euclidean Algorithms)

13. Linear Diphantine Equation

14. Checking prime in Sqrt(n) complexity

15. Segmented Sieve

16. Finding the Prime factorization of a number in log N per query

17. Euler Totient Function

18. Fermat little theorem

19. Finding x^n in Log n

20. Modular Arithmetic

21. Modular inverse of number

22. Modular Exponentiation

23. Chinese Remainder theorem

24. Factorial Modulo mod

25. Finding nCr and nPr for queries

26. Inclusion Exclusion Principle

**Algorithms:**

1. Learn about basic sorting algorithms

2. Do problems which are constructive and have swapping terms in it.

3. Solve problems related to 2-pointer approach

4. Read about Bit Manipulation(LShift, Rshift, set bit, MSB, LSB etc)

5. Power set of a given array or a string using BIT

6. Number of sub arrays with XOR as zero (not a algorithm but a must do problem)

7. Problems related to Greedy Algorithm tag

8. Kadane's Algorithms and problems related to them

9. Job Sequencing and Activity Selection Problem

**Recursion:**

1. Start with basic recursion problems like finding factorial

2. Implement Binary search

3. Implement Modular Exponentiation

4. Solve recursion problems like finding subset with given sum and others to get a strong grip

5. Learn about Merge sort and Quick sort

6. Solve problems related to Merge Sort

7. Do Backtracking Problems like sudoku and N queen, it will help you when you do DP Path problems

1. Meet in the Middle Algorithms and problems

2. A lot of problems on Divide Conquer Problems

3. Next greater Element/Next smaller element using stack

4. Problems related to parenthesis

5. Largest rectangular area in histogram (concept used in a lot of problems)

**Advanced Topics are the next.**