# Complete Java + DSA Bootcamp Syllabus

## NOTE

- All topics will contain problems from LeetCode Easy to Hard, explained in an easy-to-understand manner.

- Complete custom implementation of all Data Structures and Algorithms.

## Lectures

- [Complete Git & GitHub Course](https://youtu.be/apGV9Kg7ics)

- [Introduction to Programming](https://youtu.be/wn49bJOYAZM)

- [Types of languages](https://youtu.be/wn49bJOYAZM?t=171)

- [Memory management](https://youtu.be/wn49bJOYAZM?t=1488)

- [Flow of the program](https://youtu.be/lhELGQAV4gg)

- [Flowcharts](https://youtu.be/lhELGQAV4gg)

- [Pseudocode](https://youtu.be/lhELGQAV4gg?t=715)

- [Introduction to Java](https://youtu.be/4EP8YzcN0hQ)

- [Introduction](https://youtu.be/4EP8YzcN0hQ)

- [How it works](https://youtu.be/4EP8YzcN0hQ?t=93)

- [Setup Installation](https://youtu.be/4EP8YzcN0hQ?t=1486)

- [Input and Output in Java](https://youtu.be/TAtrPoaJ7gc)

- [Conditionals & Loops in Java](https://youtu.be/ldYLYRNaucM?t=88)

- [if-else](https://youtu.be/ldYLYRNaucM?t=88)

- [loops](https://youtu.be/ldYLYRNaucM?t=440)

- [Switch statements](https://youtu.be/mA23x39DjbI)

- [Data-types](https://youtu.be/TAtrPoaJ7gc?t=2800)

- [Coding best practices](https://youtu.be/waGfV-IoOt8)

- [Functions](https://youtu.be/vvanI8NRlSI)

- [Introduction](https://youtu.be/vvanI8NRlSI)

- [Scoping in Java](https://youtu.be/vvanI8NRlSI?t=2801)

- [Shadowing](https://youtu.be/vvanI8NRlSI?t=3584)

- [Variable Length Arguments](https://youtu.be/vvanI8NRlSI?t=4013)

- [Overloading](https://youtu.be/vvanI8NRlSI?t=4327)

- [Arrays](https://youtu.be/n60Dn0UsbEk)

- [Introduction](https://youtu.be/n60Dn0UsbEk)

- [Memory management](https://youtu.be/n60Dn0UsbEk?t=632)

- [Input and Output](https://youtu.be/n60Dn0UsbEk?t=1675)

- [ArrayList Introduction](https://youtu.be/n60Dn0UsbEk?t=4868)

- Searching

- [Linear Search](https://youtu.be/\_HRA37X8N\_Q)

- [Binary Search](https://youtu.be/f6UU7V3szVw)

- [Modified Binary Search](https://youtu.be/f6UU7V3szVw?t=2508)

- [Binary Search on 2D Arrays](https://www.youtube.com/watch?v=enI\_KyGLYPo)

- Sorting

- [Insertion Sort](https://youtu.be/By\_5-RRqVeE)

- [Selection Sort](https://youtu.be/Nd4SCCIHFWk)

- [Bubble Sort](https://youtu.be/F5MZyqRp\_IM)

- [Cyclic Sort](https://youtu.be/JfinxytTYFQ)

- [Pattern questions](https://youtu.be/lsOOs5J8ycw)

- [Strings](https://www.youtube.com/watch?v=zL1DPZ0Ovlo)

- [Introduction](https://www.youtube.com/watch?v=zL1DPZ0Ovlo)

- [How Strings work](https://youtu.be/zL1DPZ0Ovlo?t=216)

- [Comparison of methods](https://youtu.be/zL1DPZ0Ovlo?t=977)

- [Operations in Strings](https://youtu.be/zL1DPZ0Ovlo?t=1681)

- [StringBuilder in java](https://youtu.be/zL1DPZ0Ovlo?t=4199)

- [Maths for DSA](https://youtu.be/fzip9Aml6og)

- [Introduction](https://youtu.be/fzip9Aml6og?t=20)

- [Complete Bitwise Operators](https://youtu.be/fzip9Aml6og?t=95)

- [Range of numbers](https://youtu.be/fzip9Aml6og?t=4169)

- [Prime numbers](https://youtu.be/lmSpZ0bjCyQ?t=57)

- [Sieve of Eratosthenes](https://youtu.be/lmSpZ0bjCyQ?t=850)

- [Newton's Square Root Method](https://youtu.be/lmSpZ0bjCyQ?t=1989)

- [Factors](https://youtu.be/lmSpZ0bjCyQ?t=3004)

- [Modulo properties](https://youtu.be/lmSpZ0bjCyQ?t=3980)

- [Number Theory](https://youtu.be/lmSpZ0bjCyQ?t=4405)

- [HCF / LCM](https://youtu.be/lmSpZ0bjCyQ?t=5110)

- [Euclidean algorithm](https://youtu.be/lmSpZ0bjCyQ?t=5520)

- [Recursion](https://www.youtube.com/playlist?list=PL9gnSGHSqcnp39cTyB1dTZ2pJ04Xmdrod)

- [Introduction](https://youtu.be/M2uO2nMT0Bk)

- [Flow of recursive programs - stacks](https://youtu.be/M2uO2nMT0Bk?t=2124)

- [Why recursion?](https://youtu.be/M2uO2nMT0Bk?t=2708)

- [Tree building of function calls](https://youtu.be/M2uO2nMT0Bk?t=3033)

- [Tail recursion](https://youtu.be/M2uO2nMT0Bk?t=4308)

- [Sorting](https://www.youtube.com/playlist?list=PL9gnSGHSqcnq-9CXLt9DsInytRMLoyZQ\_)

- [Merge Sort](https://youtu.be/iKGAgWdgoRk)

- [Quick Sort](https://www.youtube.com/watch?v=Z8svOqamag8&list=PL9gnSGHSqcnr\_DxHsP7AW9ftq0AtAyYqJ&index=27)

- [Backtracking](https://youtu.be/zg5v2rlV1tM)

- [N-Queens](https://youtu.be/nC1rbW2YSz0)

- [N-Knights](https://youtu.be/nC1rbW2YSz0?t=2342)

- [Sudoku Solver](https://youtu.be/nC1rbW2YSz0?t=3190)

- [Maze problems](https://www.youtube.com/watch?v=zg5v2rlV1tM)

- [Recursion String Problems](https://youtu.be/gdifkIwCJyg)

- [Recursion Google, Amazon Questions](https://youtu.be/9ByWqPzfXDU)

- [Recursion Array Problems](https://youtu.be/sTdiMLom00U)

- [Recursion Pattern Problems](https://youtu.be/ymgnIIclCF0)

- [Subset Questions](https://youtu.be/9ByWqPzfXDU)

- [Space and Time Complexity Analysis](https://youtu.be/mV3wrLBbuuE)

- [Introduction](https://youtu.be/mV3wrLBbuuE)

- [Comparisons of various cases](https://youtu.be/mV3wrLBbuuE?t=1039)

- [Solving Linear Recurrence Relations](https://youtu.be/mV3wrLBbuuE?t=6252)

- [Solving Divide and Conquer Recurrence Relations](https://youtu.be/mV3wrLBbuuE?t=4609)

- [Big-O, Big-Omega, Big-Theta Notations](https://youtu.be/mV3wrLBbuuE?t=2271)

- [Little Notations](https://youtu.be/mV3wrLBbuuE?t=2960)

- [Get equation of any relation easily - best and easiest approach](https://youtu.be/mV3wrLBbuuE?t=8189)

- [Complexity discussion of all the problems we do](https://youtu.be/mV3wrLBbuuE?t=3866)

- [Space Complexity](https://youtu.be/mV3wrLBbuuE?t=3330)

- [NP-Completeness Introduction](https://youtu.be/mV3wrLBbuuE?t=8695)

- [Object Oriented Programming](https://www.youtube.com/playlist?list=PL9gnSGHSqcno1G3XjUbwzXHL8\_EttOuKk)

- [Introduction](https://www.youtube.com/watch?v=BSVKUk58K6U)

- [Classes & its instances](https://youtu.be/BSVKUk58K6U?t=467)

- [this keyword in Java](https://youtu.be/BSVKUk58K6U?t=3380)

- [Properties](https://www.youtube.com/watch?v=46T2wD3IuhM)

- [Inheritance](https://youtu.be/46T2wD3IuhM?t=146)

- [Abstraction](https://youtu.be/46T2wD3IuhM?t=7102)

- [Polymorphism](https://youtu.be/46T2wD3IuhM?t=4226)

- [Encapsulation](https://youtu.be/46T2wD3IuhM?t=7022)

- [Overloading & Overriding](https://youtu.be/46T2wD3IuhM?t=4834)

- [Static & Non-Static](https://youtu.be/\_Ya6CN13t8k?t=1137)

- [Packages](https://youtu.be/\_Ya6CN13t8k?t=182)

- [Access Control](https://youtu.be/W145DXs8fFg)

- [Interfaces](https://youtu.be/rgHZa7-Dibg?t=1510)

- [Abstract Classes](https://youtu.be/rgHZa7-Dibg?t=68)

- [Annotations](https://youtu.be/rgHZa7-Dibg?t=3438)

- [Singleton Class](https://youtu.be/\_Ya6CN13t8k?t=4240)

- [final, finalize, finally](https://youtu.be/46T2wD3IuhM?t=6317)

- [Object Cloning](https://youtu.be/OY2lPr8h93U?t=4352)

- [Object Class](https://youtu.be/W145DXs8fFg?t=1943)

- [Generics](https://www.youtube.com/watch?v=OY2lPr8h93U)

- [Exception Handling](https://youtu.be/OY2lPr8h93U?t=3405)

- [Collections Framework](https://youtu.be/9ogGan-R1pc?t=49)

- [Vector Class](https://youtu.be/9ogGan-R1pc?t=668)

- [Lambda Expression](https://youtu.be/OY2lPr8h93U?t=2894)

- [Enums](https://youtu.be/9ogGan-R1pc?t=909)

- Linked List

- [Introduction](https://youtu.be/58YbpRDc4yw)

- [Singly + Doubly + Circular LinkedList](https://youtu.be/58YbpRDc4yw)

- [Fast and slow pointer](https://youtu.be/70tx7KcMROc)

- [Cycle Detection](https://youtu.be/70tx7KcMROc)

- [Reversal of LinkedList](https://youtu.be/70tx7KcMROc)

- [Linked List + Recursion](https://youtu.be/70tx7KcMROc)

- Stacks & Queues

- Introduction

- Interview problems

- Push efficient

- Pop efficient

- Queue using Stack and Vice versa

- Circular Queue

- Trees

- Introduction

- Binary Trees

- Binary Search Trees

- DFS

- BFS

- AVL Trees

- Segment Tree

- Heaps

- Introduction

- Theory

- Priority Queue

- Heapsort

- Two Heaps Method

- k-way merge

- Top k elements

- Interval problems

- HashMap

- Introduction

- Theory - how it works

- Comparisons of various forms

- Limitations and how to solve

- Map using LinkedList

- Map using Hash

- Count Sort

- Radix Sort

- Chaining

- Probing

- Huffman-Encoder

- Top K elements problems

- Subarray Questions: Sliding window, Two Pointer, Kadane's Algorithm

- Graphs

- Introduction

- BFS

- DFS

- Working with graph components

- Minimum Spanning Trees

- Kruskal Algorithm

- Prims Algorithm

- Dijkstra’s shortest path algorithm

- Topological Sort

- Bellman ford

- A\* pathfinding Algorithm

- Dynamic Programming

- Introduction

- Recursion + Recursion DP + Iteration + Iteration Space Optimized

- Complexity Analysis

- 0/1 Knapsack

- Subset Questions

- Unbounded Knapsack

- Subsequence questions

- String DP

- Greedy Algorithms

- Tries

### Advanced concepts apart from interviews

- Fast IO

- File handling

- Bitwise + DP

- Extended Euclidean algorithm

- Modulo Multiplicative Inverse

- Linear Diophantine Equations

- Matrix Exponentiation

- Mathematical Expectation

- Catalan Numbers

- Fermat’s Theorem

- Wilson's Theorem

- Euler's Theorem

- Lucas Theorem

- Chinese Remainder Theorem

- Euler Totient

- NP-Completeness

- Multithreading

- Fenwick Tree / Binary Indexed Tree

- Square Root Decomposition