

DSA

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Resources

Prerequisites of learning DSA

Before diving into the world of Data Structures and Algorithms (DSA), it's essential to have a solid foundation in certain prerequisites. These prerequisites will help you grasp the concepts and techniques more effectively. Here are some key prerequisites to consider:

1. Programming Language Proficiency

Having a good understanding of a programming language is crucial when learning DSA. It's recommended to be proficient in at least one programming language, such as C++, Java, Python, or any language of your choice. Understanding variables, loops, conditionals, functions, and object-oriented programming concepts will greatly benefit you throughout your DSA journey.

2. Basic Mathematics

DSA often involves solving problems using mathematical concepts. A basic understanding of mathematics is necessary to comprehend algorithms, analyze time and space complexity, and solve mathematical equations or formulas that may arise during the learning process. Brush up on topics like algebra, logarithms, combinatorics, and probability.

4. Problem-Solving Skills

Developing strong problem-solving skills is crucial for DSA. Practice solving algorithmic problems regularly to enhance your ability to break down complex problems into smaller, manageable steps. Analyze problem statements, identify patterns, and devise efficient solutions. Additionally, practice writing clean and readable code.



Here is a table of some of the top websites for learning DSA.

Website	Rating	Description
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Website	Rating	Description
LeetCode	4.8/5	Best website for practicing DSA questions, good user interface, the discussion section is awesome :)
GeeksforGeeks	4.7/5	A treasure for Computer Science students, one can get all the questions with their possible solutions and can also practice here.
Techie Delight	4.6/5	A simplistic website made only for learning DSA.
VisuAlgo	4.5/5	A website that visualizes data structures and algorithms through animation.
FreeCodeCamp	4.4/5	A website that offers free courses to learn data structures and algorithms in depth.



Here is a table of some of the best YouTube playlists for learning DSA according to the web search results:

Playlist	Popularity	Rating	Description
Data Structures and Algorithms by Caleb Curry ²	1.3M views	4.9/5	A comprehensive playlist that covers various topics such as arrays, linked lists, stacks, queues, trees, graphs, sorting, searching, and more.
Data Structures using Java by Telusko ¹	1.1M views	4.8/5	A playlist that provides tutorials from beginner to advanced levels on data structures using Java.
Data Structures Easy to Advanced Course by FreeCodeCamp ²	1M views	4.7/5	A full tutorial from a Google engineer that explains the core concepts and implementations of various data structures such as arrays, linked lists, hash tables, trees, heaps, graphs, and more.
Data Structures and Algorithms Full Course by Dinesh Varyani ²	0.9M views	4.6/5	A playlist that covers the basics of data structures and algorithms such as time complexity, recursion, sorting, searching, hashing, trees, graphs, dynamic programming, and more.
Data Structures by Mycodeschool ²	0.8M views	4.5/5	A playlist that teaches the fundamentals of data structures such as arrays, pointers, structures, linked lists, stacks, queues, trees, and more using C and C++.
Algorithms and Data Structures by FreeCodeCamp ²	0.7M views	4.6/5	A full course for beginners from Treehouse that covers the basics of algorithms and data structures such as binary search, recursion, sorting algorithms, stacks and queues, hash maps, sets, trees, and graphs.

Playlist	Popularity	Rating	Description
Gaurav Sen ³	0.7M views	4.9/5	A channel that covers various topics related to data structures and algorithms such as system design, competitive programming, interview preparation, and more.
Abdul Bari ³	0.6M views	4.7/5	A channel that teaches the concepts and implementations of various data structures and algorithms such as arrays, linked lists, stacks, queues, trees, graphs, sorting, searching, and more.
Rachit Jain ³	0.4M views	4.5/5	A channel that shares tips and tricks for mastering data structures and algorithms for competitive programming and interviews.
CS Dojo ²	0.4M views	4.6/5	A channel that explains the basics of data structures and algorithms such as binary search trees, heaps and heap sort algorithms, dynamic programming problems like knapsack problems and coin change problem etc.
Jenny's lectures CS/IT NET&JRF ²	0.3M views	4.7/5	A channel that covers the syllabus of data structures and algorithms for CS/IT NET&JRF exams such as arrays, stacks ,queues ,linked lists ,trees ,graphs ,sorting , searching etc.
VisuAlgo ³	0.3M views	4.8/5	A channel that visualizes data structures and algorithms through animation such as binary search tree operations ,BFS and DFS traversal ,Dijkstra's algorithm ,Huffman coding etc.
Techie Delight ²	0.2M views	4.6/5	A simplistic channel made only for learning DSA such as array problems ,string problems ,linked list problems ,stack problems ,queue problems etc.
Coding Simplified ²	0.2M views	4.5/5	A channel that simplifies the coding of data structures and algorithms using Java such as array programs ,linked list programs ,tree programs ,graph programs etc.
Coding Blocks ²³	0.2M views	4.7/5	A channel that provides live sessions on data structures and algorithms using C++ such as recursion basics ,dynamic programming introduction ,graph theory basics etc.
Love Babbar ³	0.2M views	4.8/5	A channel that provides guidance on how to prepare for data structures and algorithms interviews such as 450 DSA questions ,top 10 algorithms ,top 10 data structures etc.
CodeWithHarry ³	0.2M views	4.6/5	A channel that teaches data structures and algorithms using Python such as lists ,tuples ,sets ,dictionaries ,stacks ,queues ,trees etc.

Playlist	Popularity	Rating	Description
Aditya Verma ³	0.2M views	4.9/5	A channel that explains the concepts of data structures and algorithms using C++ such as recursion and backtracking ,dynamic programming ,binary search ,sliding window etc.
CodeNCode ³	0.1M views	4.7/5	A channel that focuses on competitive programming and data structures and algorithms such as number theory ,graph theory ,string algorithms ,geometry algorithms etc.
Striver ³	0.1M views	4.8/5	A channel that helps in cracking data structures and algorithms interviews such as top interview questions ,mock interviews ,DSA sheet etc.

Roadmap:

Start:

1.1: In order to kickstart your journey in mastering Data Structures and Algorithms (DSA), I highly recommend enrolling in the "Intro to Data Structures and Algorithms" course offered by Udacity. This course provides a solid foundation and understanding of key concepts in DSA using Python.

Intro to Data Structures and Algorithms | Free Courses | Udacity

Take Udacity's Intro to Data Structures & Algorithms course for an introduction to common data structures and algorithms in Python. Learn online with Udacity.



<https://www.udacity.com/course/data-structures-and-algorithms-in-python--ud51>

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While following this course, it is recommended to solve 3 to 4 problems daily and 7 to 8 problems on weekends on platforms like LeetCode and HackerRank.

1.2: Now that you have completed the initial phase, I highly recommend familiarizing yourself with the basic syntax of Java. You can refer to any resource of your choice to grasp the essentials. Once you feel comfortable with Java syntax, it's time to boost your motivation by solving some basic Java problems on platforms like HackerRank.

After gaining confidence in Java, I strongly advise enrolling in the course **Algorithms, Part I**. This course will provide you with a comprehensive understanding of fundamental algorithms. It is highly regarded and recommended for learning the core principles of DSA.

Algorithms, Part I

Offered by Princeton University. This course covers the ... Enroll for free.

C https://www.coursera.org/learn/algorithms-part1?irclickid=XjkzefSvAxyNWYwyi1SQIze6UkFx0PWTW0nEwk0&irgwc=1&utm_medium=partners&utm_source=impact&utm_campaign=3294490&utm_content=b2c

The image shows a course card from Coursera. At the top right is the Princeton University logo. Below it, the course title "Algorithms, Part I" is displayed in a large, bold, black font. Underneath the title, the word "coursera" is written in a smaller, white, sans-serif font. In the top left corner of the card, there is a small blue circular icon containing a white letter 'C'. To the right of the 'C' are five yellow stars followed by the text "4.9 (10K) | 1.1M Students".



While following this course, it is highly recommended to solve 2 to 3 problems daily and diligently complete all the exercises. Consistent practice is key to reinforcing your learning and building a solid foundation in DSA.

Once you have completed the aforementioned resources, it's time to dive into more complex concepts. Explore various YouTube channels listed in the table of resources section, which provides in-depth explanations of advanced DSA topics. Choose a channel that resonates with your learning style and preferences.

After gaining knowledge of these complex concepts, it's crucial to apply them in practice. Head over to LeetCode, a popular platform for coding interviews, and start solving easy to medium-level problems. This will help you reinforce your understanding and develop problem-solving skills.

To make steady progress, aim to increase your daily problem-solving ability. Challenge yourself to solve a few problems each day, gradually increasing the difficulty level as you grow more comfortable. Consistency is key here. Regular practice will sharpen your DSA skills and build confidence.

Informative videos:

These are some videos that are very much recommended to watch:

How to Practice Data Structures and Algorithms?

What are some of the best ways to practice data structures & algorithms and have fun during your interview preparation journey? Watch this video to find out!

▶ https://youtu.be/ddl_rCCtwkI



Leetcode is NOT enough. Trust me, I solved 541 Leetcode problems.

1. How to use Leetcode effectively?
2. How to learn Data Structures and Algorithms?
3. How to use Leetcode solutions?

▶ <https://youtu.be/-zDry7Jkq8o>



How I mastered Coding Interviews to crack Google

1. How to crack coding interviews?
2. How to prepare for coding interviews?
3. How to learn Data Structures and Algorithms?

▶ <https://youtu.be/a5Z7pZgVfcQ>



The art of thinking like a programmer: Algorithmic Mindset

"How to learn coding efficiently", this is a question that haunts many self taught programmers. In this video, I will answer this question and some others. For example:

▶ <https://youtu.be/QHdJscEpxaU>



Why Good Programmers FAIL Coding Interviews

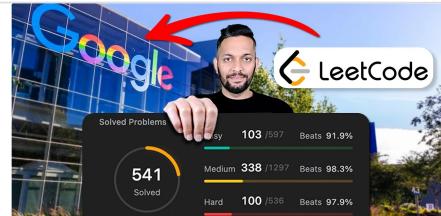
1. How to crack coding interviews?
2. How to prepare for coding interviews?
3. How to learn Data Structures and Algorithms?

▶ <https://youtu.be/NW6CPOmlV2M>



1. How to use Leetcode effectively?
2. How to learn Data Structures and Algorithms?
3. How to use Leetcode solutions?

▶ <https://youtu.be/xF554Tlzo-c>



How I mastered Data Structures and Algorithms

1. How to learn Data Structures and Algorithms?
2. The best course to learn Data Structures and Algorithms in Java and Python
3. How to crack coding interview?

▶ <https://youtu.be/s2mYsPWzLjg>



How I started coding from 0 and cracked Google | Best Free Resources for Coding
Enrol in the Live DSA batch <https://bit.ly/44Y5z71>

▶ <https://youtu.be/NxvS-Uzjueg>

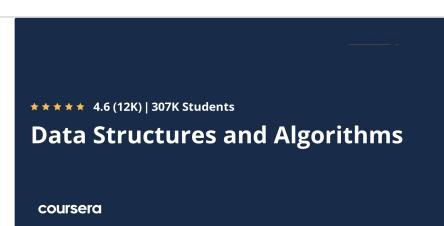


In the end, I would recommend you to choose one specialization from the following two:

Data Structures and Algorithms

Offered by University of California San Diego. Master ... Enroll for free.

⌚ <https://www.coursera.org/specializations/data-structures-algorithms#courses>



Algorithms

Offered by Stanford University. Learn To Think Like A ... Enroll for free.

⌚ <https://www.coursera.org/specializations/algorithms>





Note: 📚 Remember, learning DSA is not solely about understanding theoretical concepts. It is an art 🎨 that involves the practical application of these concepts, utilizing the best techniques 💡, and leveraging background knowledge, including greedy algorithms. The key to success lies in consistent practice.

Make it a daily habit to solve 4-5 problems on platforms like LeetCode. This regular practice will sharpen your problem-solving skills ✅, reinforce your understanding of DSA principles 🧠, and help you become adept at applying them in real-world scenarios. By consistently tackling problems, you'll train your mind to think analytically and devise efficient solutions.

While solving problems, don't just focus on finding the correct answer; strive to understand the underlying algorithms and data structures that form the backbone of each solution.

Analyze the time and space complexity of your code ⏳, and look for ways to optimize it further. Engaging in this deeper level of thinking will enhance your problem-solving abilities and solidify your grasp of DSA concepts.

Remember, mastery over DSA is achieved through persistent effort. Embrace the challenge 💪, stay motivated 💯, and keep pushing yourself to tackle increasingly complex problems. As you progress, you'll witness your skills and confidence grow, enabling you to conquer any DSA-related challenge that comes your way.

Shoaib Ul Haq (Computer Science student with a passion for AI and a keen interest in exploring the fascinating world of robotics)