AlgoTutor

MASTER IN DSA

IN JUST 21 DAYS

Data Structure

- Primitive
  - Int
  - Char
  - Bool
  - Float
  - Pointer
- Non-Primitive
  - linear
    - Static
      - Array
    - Dynamic
      - Linked list
      - Stack
      - Queue
  - Non-linear
    - Tree
    - Graph

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Introduction to Data Structures

Day 1

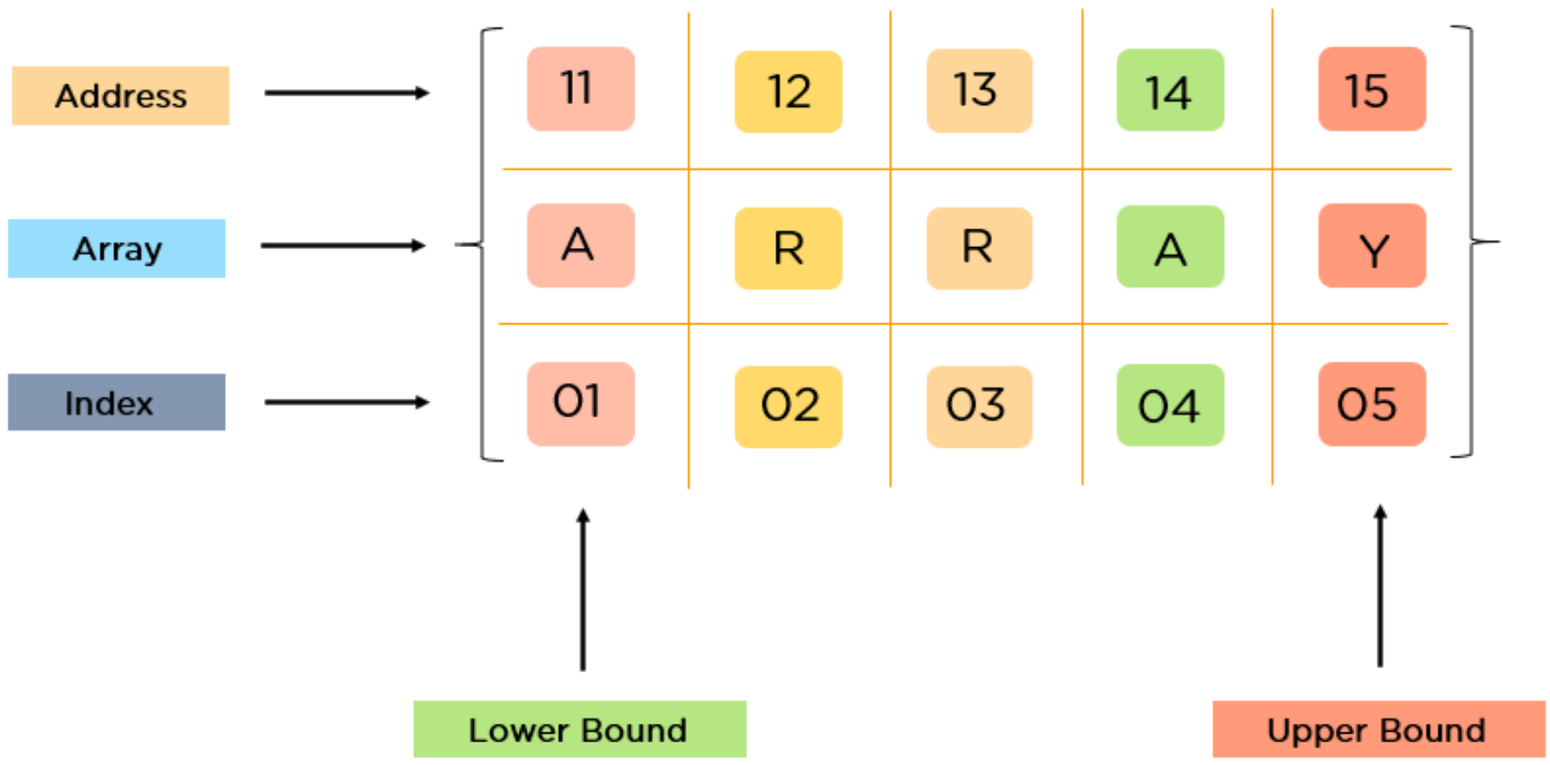
Understand the significance of (DSA).

- Learn the importance of DSA in computer science and programming.
- Explore how DSA optimizes data organization and manipulation.

Day 2

Dive into arrays, their properties, and operations.

- Study arrays' properties and how they're stored in memory.
- Understand common operations like insertion, deletion, and searching.



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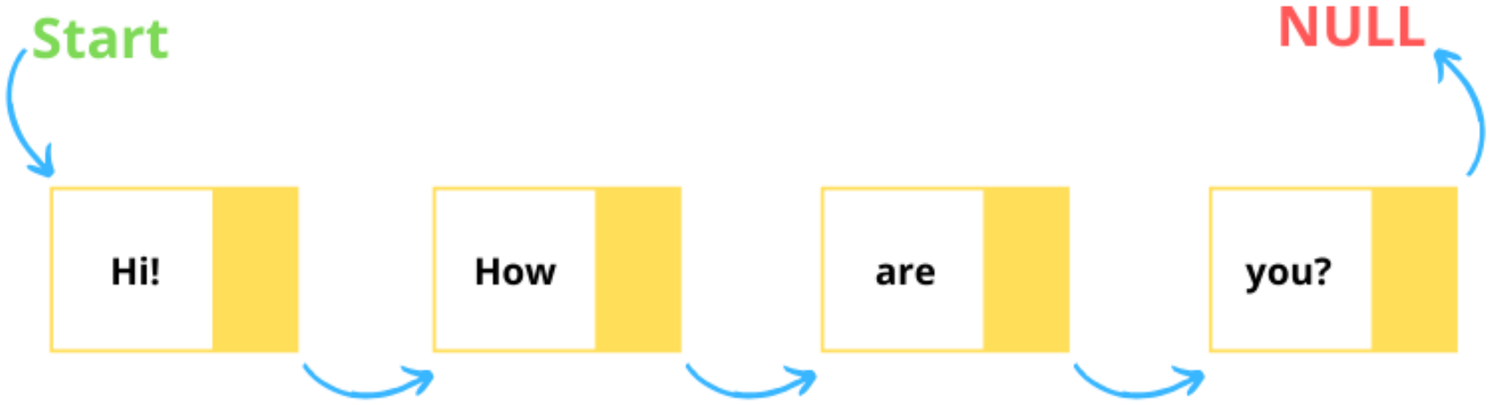
Day 3

Explore linked lists, their types, and implementations.

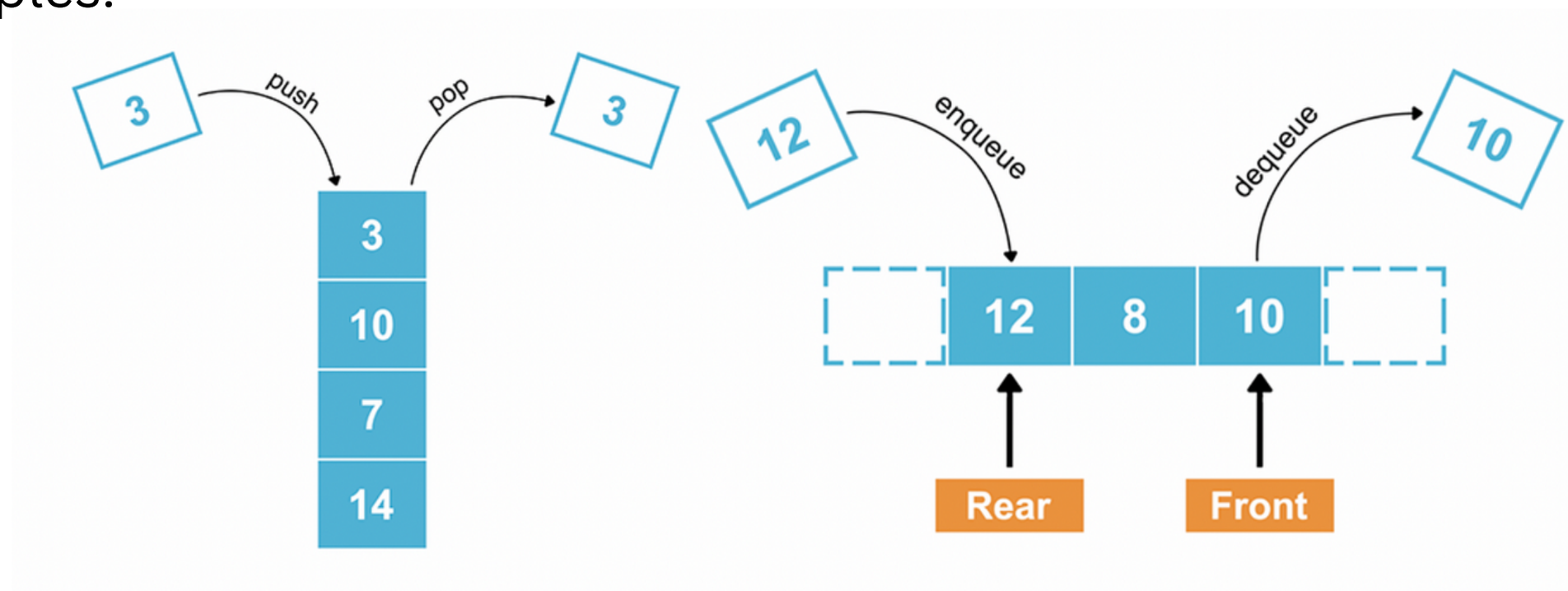
- Learn about singly and doubly linked lists.
- Implement linked lists and understand their pros and cons.



Day 4

Grasp the concepts of stacks and queues, along with their applications.

- Dive into stacks and queues, their operations, and real-world applications.
- Understand the LIFO (Last-In, First-Out) and FIFO (First-In, First-Out) principles.



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Day 5

Get familiar with trees, including tree traversal techniques and binary trees.

- Study hierarchical data structures like trees.
- Explore tree traversal techniques: in-order, pre-order, and post-order.

Day 6

Deepen your knowledge about binary search trees (BST) and their operations.

- Focus on binary search trees (BSTs) and their sorted data storage.
- Master operations like insertion, deletion, and searching in BSTs.

Day 7

Learn the fundamentals of heaps, such as min-heaps and max-heaps.

- Explore heap data structures, particularly min-heaps and max-heaps.
- Understand their role in priority queues and heap sort algorithms.

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Advanced Data Structures and Sorting Algorithms

Day 8

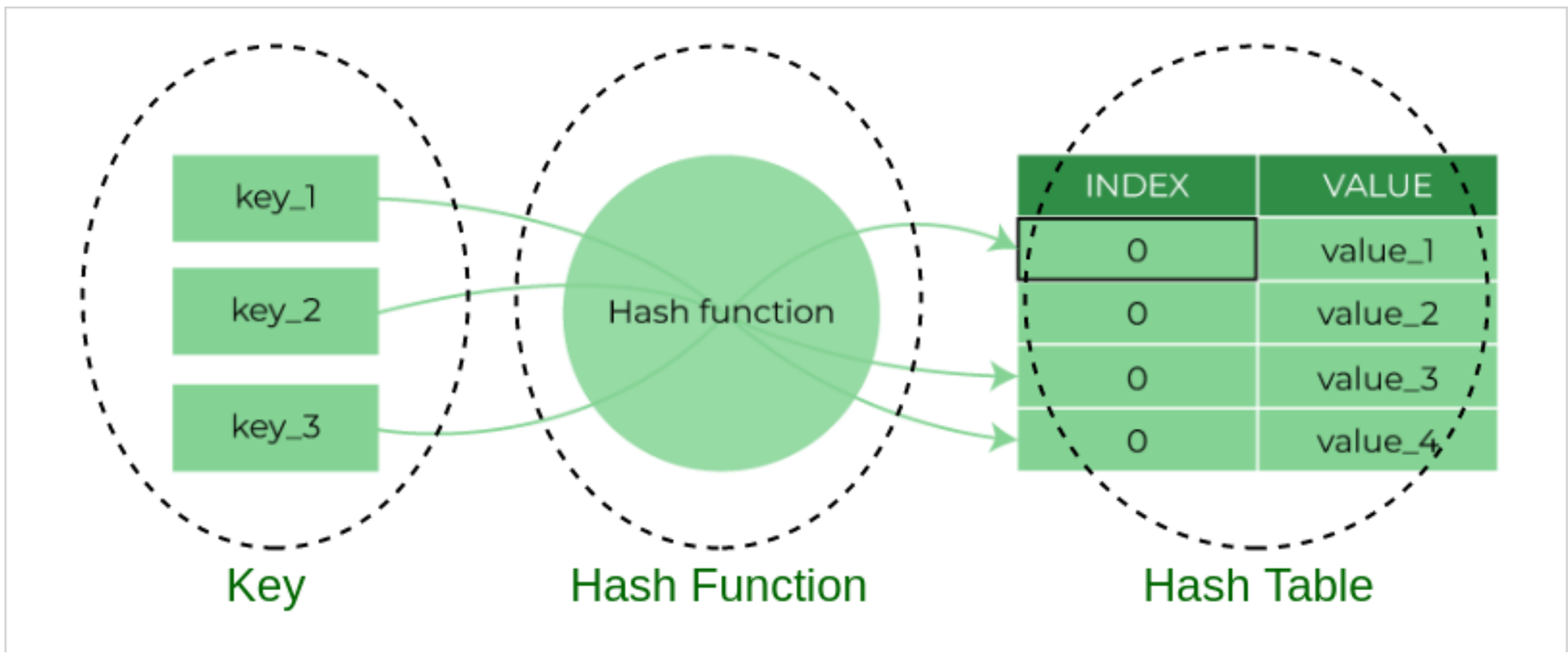
Study advanced trees like AVL trees and Red-Black trees.

- Learn about balanced trees, including AVL and Red-Black trees.
- Understand balancing operations and their importance in searching.

Day 9

Delve into hash tables and various collision resolution techniques.

- Explore hash tables, a key-value data structure.
- Study collision resolution methods like chaining and open addressing.



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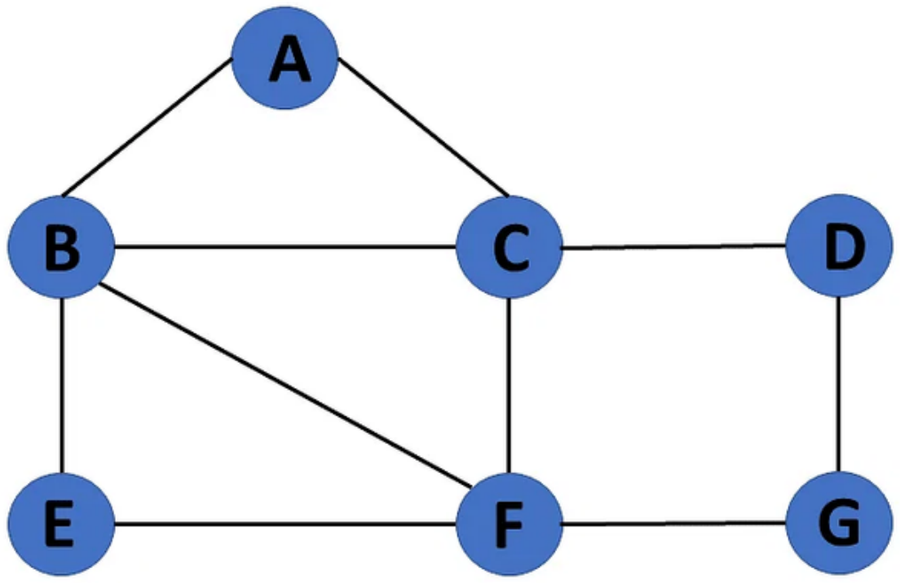
Day 10

Explore the world of graphs, graph representations, and basic graph algorithms.

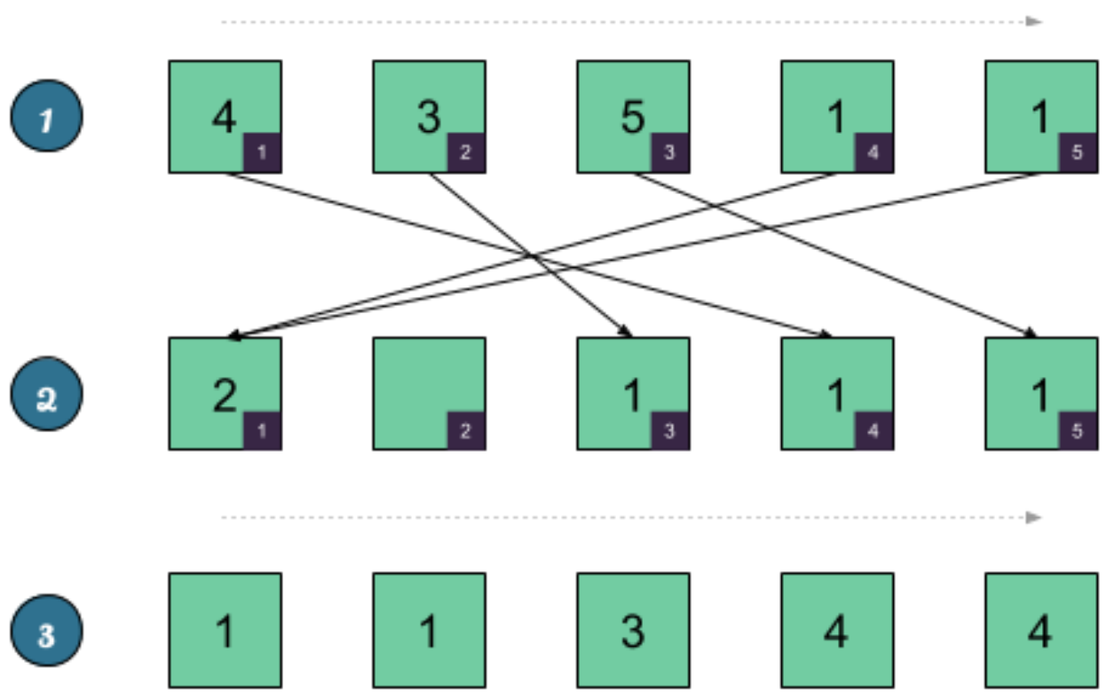
- Shift to graphs as a data structure.
- Learn how to represent graphs and basic graph traversal techniques.



Day 11

Learn sorting algorithms (Bubble Sort, Insertion Sort, Selection Sort).

- Begin your journey into sorting algorithms with simple ones.
- Understand the working principles of Bubble Sort, Insertion Sort, and Selection Sort.



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Day 12

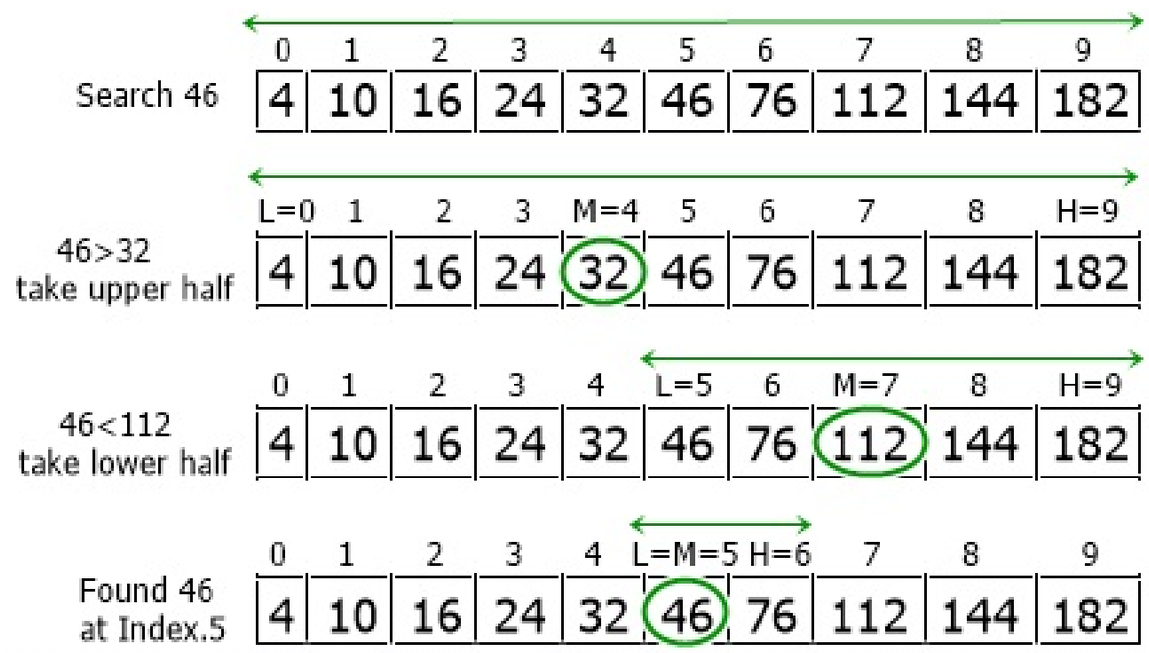
Master advanced sorting algorithms (Merge Sort, Quick Sort).

- Deepen your understanding of sorting with advanced algorithms.
- Study Merge Sort and Quick Sort and their efficiency.

Day 13

Discover searching algorithms (Linear Search, Binary Search).

- Shift to searching algorithms.
- Learn Linear Search and Binary Search and when to apply each.



Day 14

Apply your knowledge by implementing these data structures and algorithms.

- Practice your knowledge by implementing the data structures and algorithms covered in the first two weeks.
- Write code and run examples to gain hands-on experience.

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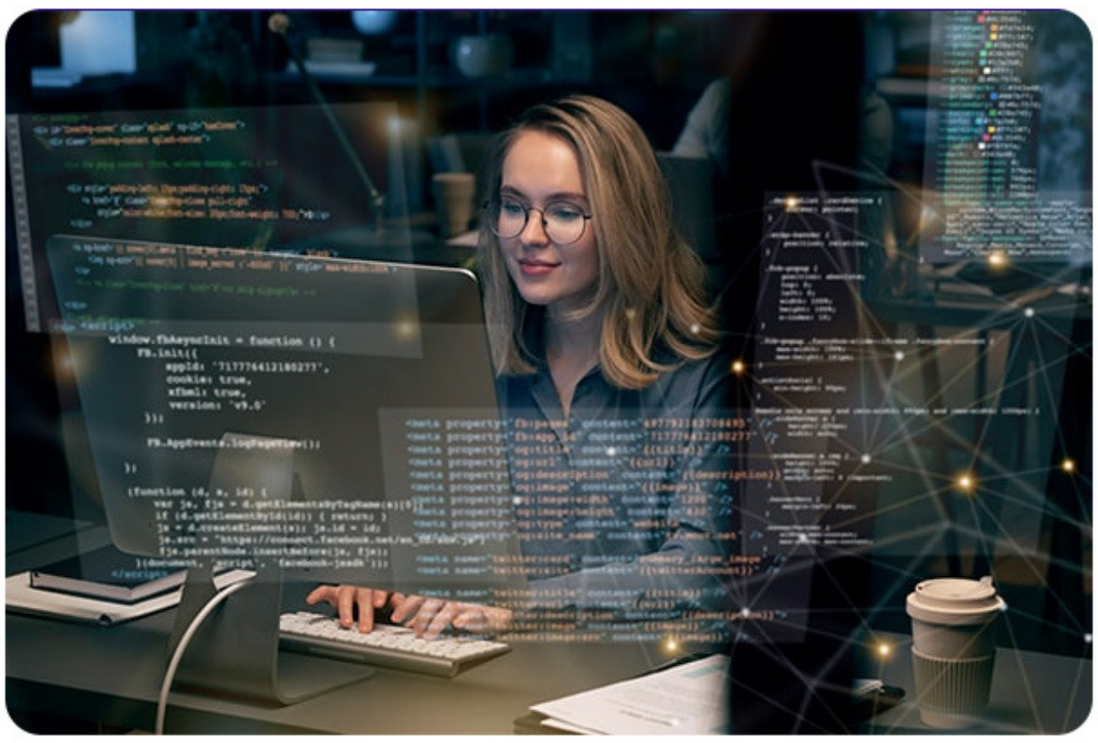
Take The First Step Towards Fulfilling a Career



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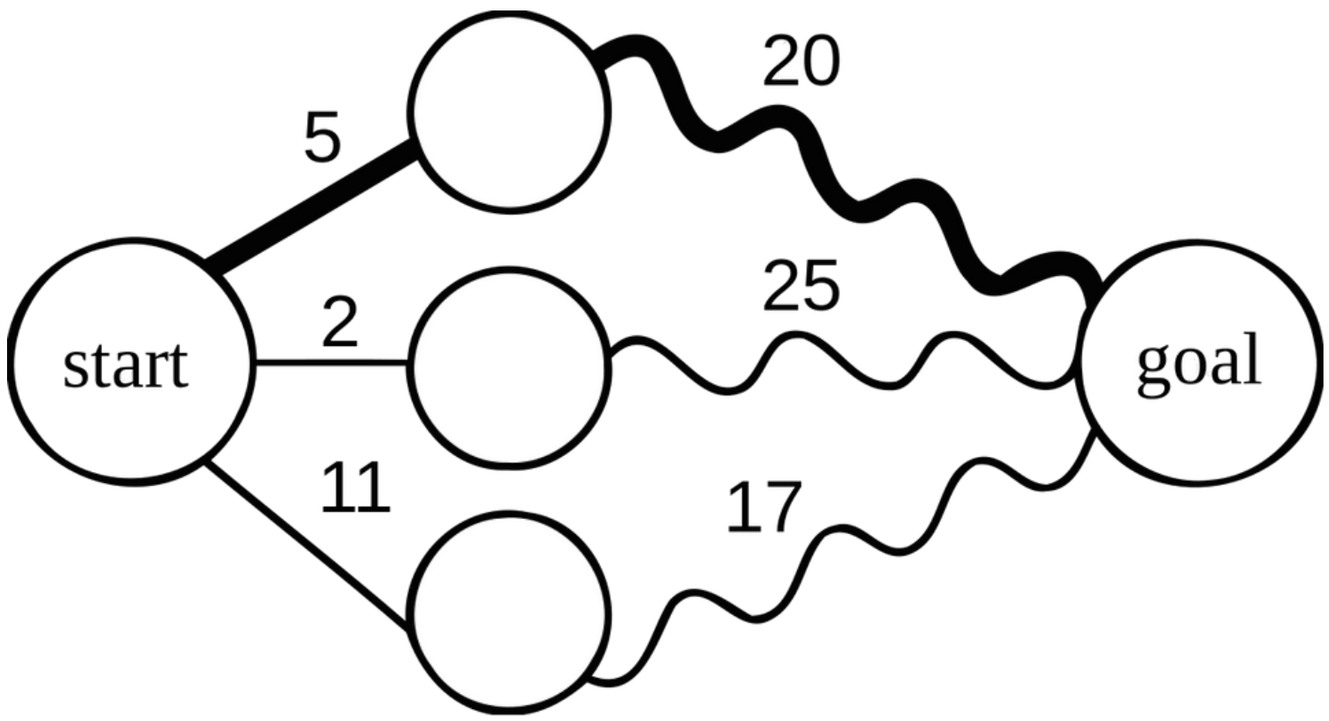
Algorithm Design and Problem Solving

Day 15

Grasp dynamic programming and its core concepts.

- Start learning dynamic programming, a problem-solving technique.
- Understand overlapping subproblems and optimal substructure.



Day 16

Understand the magic of greedy algorithms and where to apply them.

- Explore greedy algorithms and their applications.
- Identify situations where greedy approaches lead to optimal solutions.

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Day 17

Hone your problem-solving skills with practice on platforms like LeetCode and HackerRank.

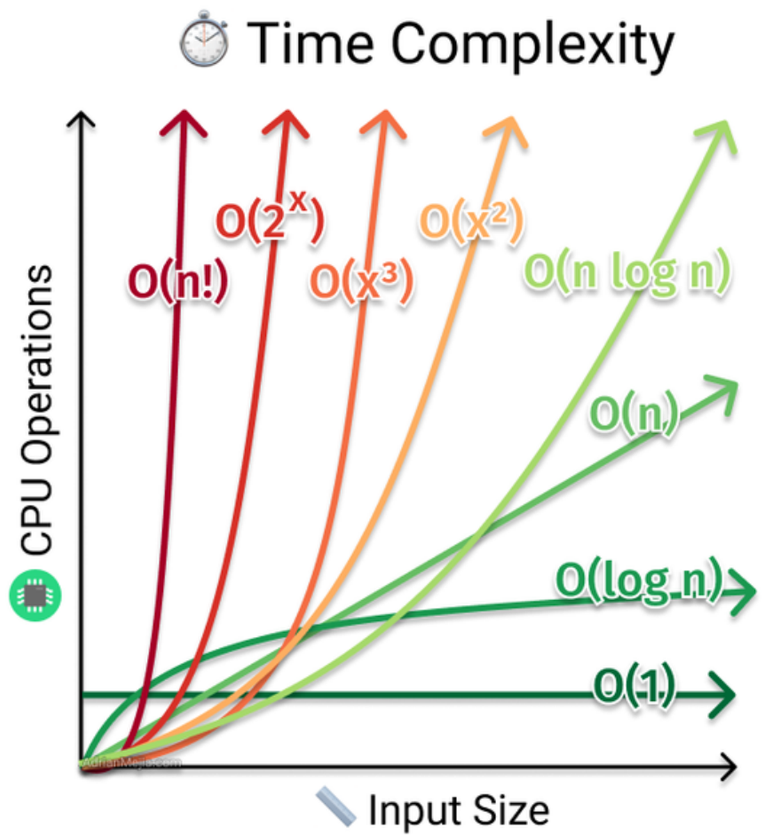
- Apply your skills on online platforms.
- Solve DSA problems on platforms like LeetCode and HackerRank.

LeetCode HackerRank

Day 18

Tackle more challenging problems, analyze time and space complexities.

- Take on complex problems and analyze their time and space complexities.
- Optimize your problem-solving skills.



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Day 19

Continue solving complex problems, refining your skills.

- Keep working on challenging problems.
- Refine your problem-solving skills by exploring different problem categories.

Day 20

Review what you've learned and address any weak areas.

- Review your entire DSA journey.
- Identify weak areas and revisit topics that need reinforcement.

Day 21

Recap your journey, take mock tests, and prepare for coding interviews.

- Recap your 21-day journey.
- Take mock tests to simulate coding interviews and ensure you're well-prepared.

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+91-7260058093

info@algotutor.io