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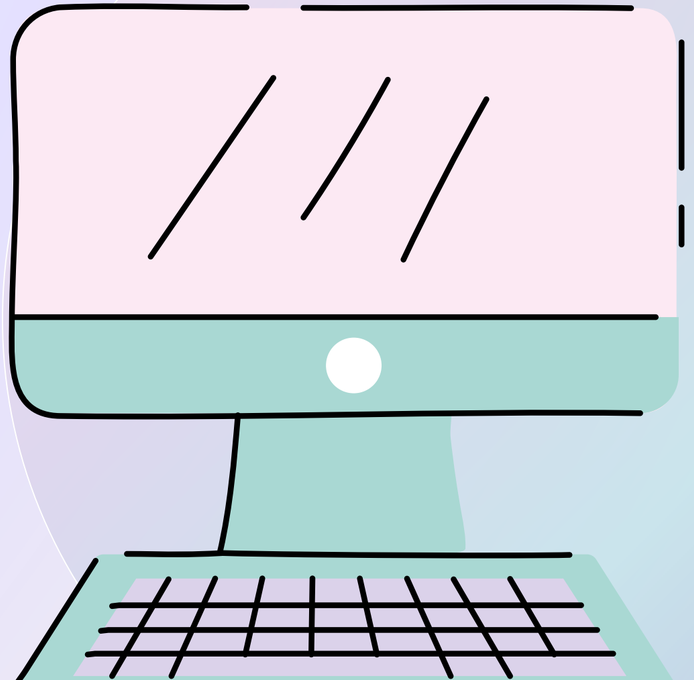
VIVEKANANDA INSTITUTE OF PROFESSIONAL STUDIES - TECHNICAL CAMPUS
Grade A++ Accredited Institution by NAAC
NBA Accredited for MCA Programme; Recognized under Section 2(f) by UGC;
Affiliated to GGSIP University, Delhi; Recognized by Bar Council of India and AICTE
An ISO 9001:2015 Certified Institution

Summer training Report

Data Structures and Algorithms(DSA) Summer Training

2025-2026

Presented by:
Name: Ishaan Jain
Enrollment No: 06117702722
Branch: Computer Science Engineering / B
Semester: 7th



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CODING BLOCKS
Code Your Way To Success

ABOUT THE COMPANY

- Founded in 2014 by industry experts.
- Focuses on coding education and skill development.
- Provides training in Data Structures, Algorithms, Web Dev, ML, and more.
- Known for practical, hands-on learning with real-world projects.
- Strong mentorship from experienced software engineers.
- Has both online and offline training programs.
- Large community of learners and alumni in top tech companies.

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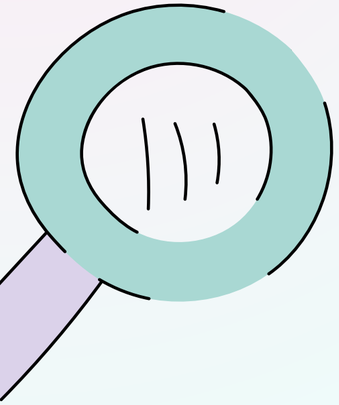
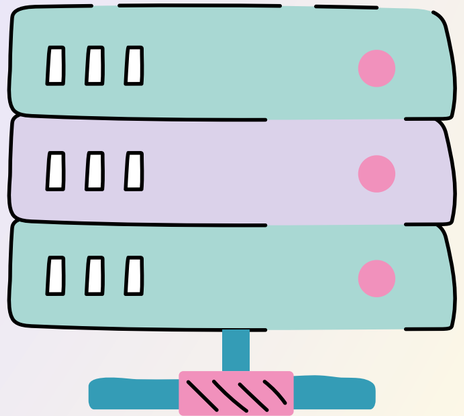
TRAINING HIGHLIGHTS



- **Completed curriculum covering:**
  - Arrays, Strings, Recursion
  - Linked Lists, Stacks, Queues
  - Trees, Graphs, Hashing
  - Sorting, Searching, Greedy, Dynamic Programming

- **Platforms used for practice:**
  - Coding Blocks IDE, LeetCode, HackerRank, Codeforces, CodeChef, CSES Problem Set

- **Experienced hands-on problem solving, assessments & coding challenges**



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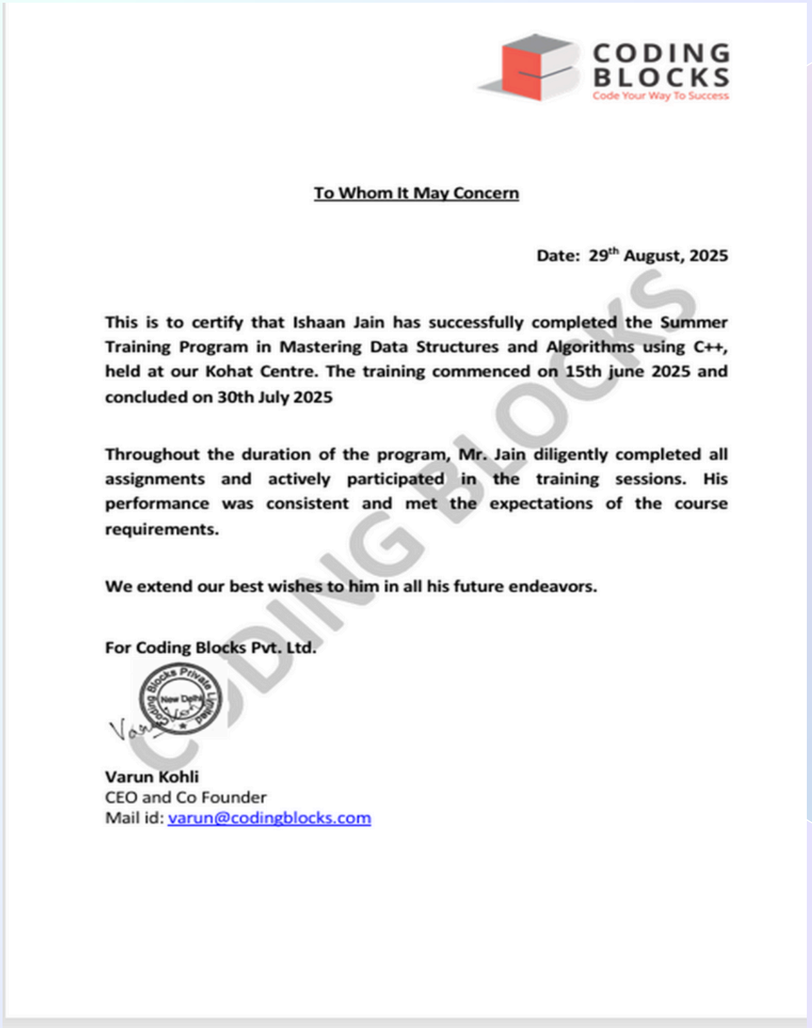
DSA Certification



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To Whom It May Concern

Date: 29th August, 2025

This is to certify that Ishaan Jain has successfully completed the Summer Training Program in Mastering Data Structures and Algorithms using C++, held at our Kohat Centre. The training commenced on 15th june 2025 and concluded on 30th July 2025

Throughout the duration of the program, Mr. Jain diligently completed all assignments and actively participated in the training sessions. His performance was consistent and met the expectations of the course requirements.

We extend our best wishes to him in all his future endeavors.

For Coding Blocks Pvt. Ltd.

Varun Kohli
CEO and Co Founder
Mail id: varun@codingblocks.com

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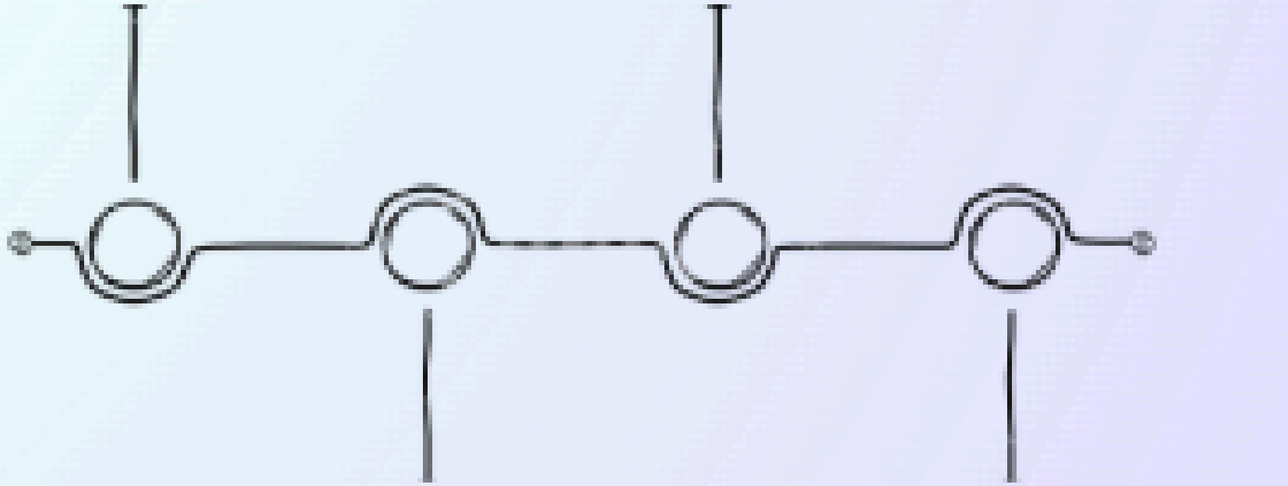
Training & Development Process

WEEK – 1

Basics of Programming,
Operators, Functions,
Arrays , Binary Search, Sorting, Maximum
Subarrays, and Searching, Pointers , Algorithms
STL

WEEK – 3

Object Oriented Programming
Linked List, Stack, Queues
Binary Trees and Binary Search Trees
Heap , Hashmap, Graphs, Tries

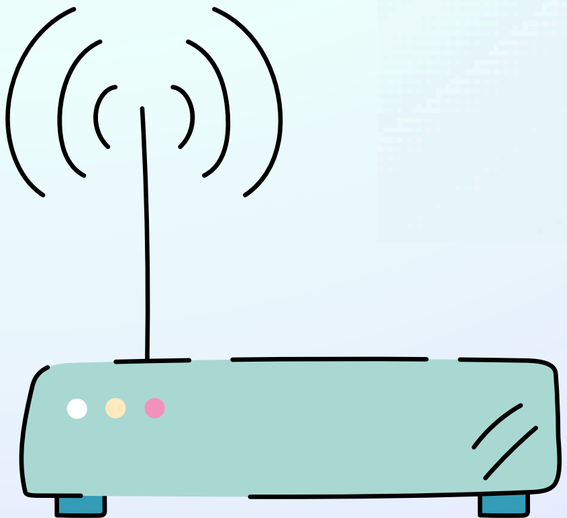


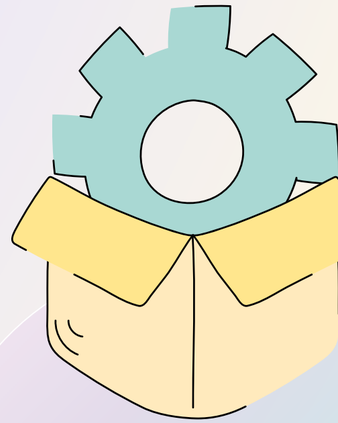
WEEK – 2

Time and Space Complexity
Object Oriented Programming
Bitmasking (AND, OR, XOR, and NOT)
Strings
Recursion Introduction
Backtracking

WEEK – 4

Dynamic Programming
Greedy Algorithms





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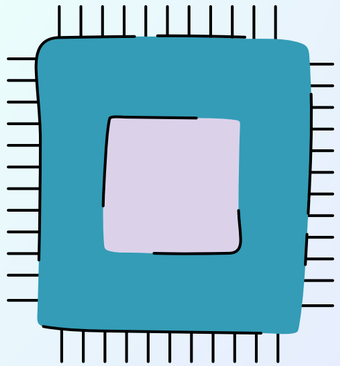
Tools & Technology Used

PROGRAMMING LANGUAGE

C++ was used as the primary language for implementing DSA



Platforms

HackerRnk, HackEarth, Leetcode, CodeForces, CodeCHef, CodignBlocks Portal were used to practice questions daily

IDE EDITORS

VS Code was used for coding practice and editing code efficiently

Version Control

- Git & GitHub were used for version control, allowing easy code tracking, sharing, and collaboration.

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The Hotel Management System

- **Type:** Console-based application developed during summer training.
- **Core Data Structures:**
  - **Linked List** → Room booking management.
  - **Stack** → Laundry services.
  - **Queue** → Restaurant reservations.
- **Purpose:** Demonstrates how different data structures are applied to solve real-world hotel operations efficiently.
- **Outcome:** Practical understanding of mapping DSA concepts to business scenarios.

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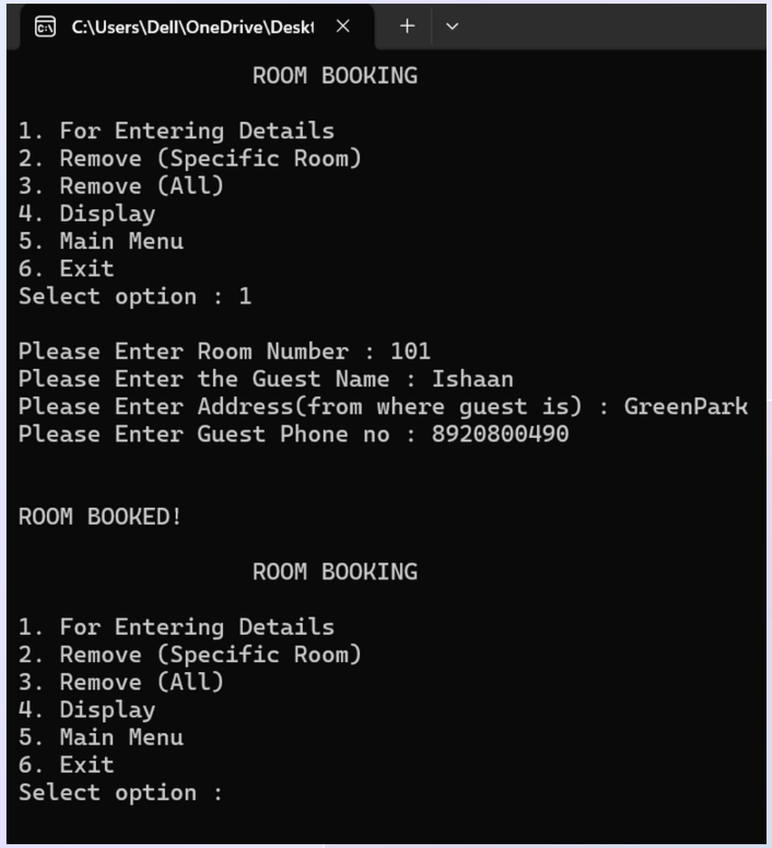
Room Booking System (Linked List)

- Add Guest Information: Register guests with room no., name, address, phone
- Remove Specific Booking: Cancel booking by room number
- Remove All Bookings: Clear all reservations
- Display All Bookings: View current reservations
- Room Validation: Room numbers 1–200

Why Linked List?

- Dynamic memory allocation for unlimited bookings
- Efficient insertion & deletion
- Sequential access for listing bookings



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Laundry Service System (Stack)

```
1. Give Clothes for Wash & Press (Push)
2. Deliver Clothes for Wash & Press (Pop)
3. Display
4: Main Menu
5. Exit
Select option : 1

Please Enter Room Number : 101
Please Enter No of Clothes : 5
                LAUNDRY

1. Give Clothes for Wash & Press (Push)
2. Deliver Clothes for Wash & Press (Pop)
3. Display
4: Main Menu
5. Exit
Select option : 3


ROOM NO: 101
No of Clothes: 5


                LAUNDRY

1. Give Clothes for Wash & Press (Push)
2. Deliver Clothes for Wash & Press (Pop)
```

- Accept Laundry: Add clothes for washing & pressing (PUSH)
- Deliver Laundry: Return processed clothes (POP)
- View Pending Orders: Display all pending laundry requests
- Quantity Validation: Max 50 clothes/order
- Room Validation: Room numbers 1–200

Why Stack?

- LIFO ensures most recent orders processed first
- Simple push/pop operations

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Restaurant Reservation System (Queue)

- Make Reservation: Book dining slots (room + meal preference)
- Complete Dining: Remove guests after dining (DEQUEUE)
- View Reservation Queue: Display pending reservations
- Menu Display:
- Breakfast: 8–11am
- Lunch: 12–3pm
- Hi Tea: 4–7pm
- Dinner: 8pm–2am

Why Queue?

- FIFO ensures fair service order
- First reservations served first
- Efficient waiting list management

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CONCLUSION

- Strengthened problem-solving skills through DSA practice.
- Implemented & analyzed key data structures (arrays, stacks, queues, trees, graphs, hash maps).
- Explored algorithms: searching, sorting, recursion, DP, greedy & graph methods.
- Gained hands-on coding experience on platforms like Coding Blocks IDE, LeetCode, HackerRank, etc.
- Improved time & space optimization in solutions.
- Built strong foundation in computational logic & competitive programming.

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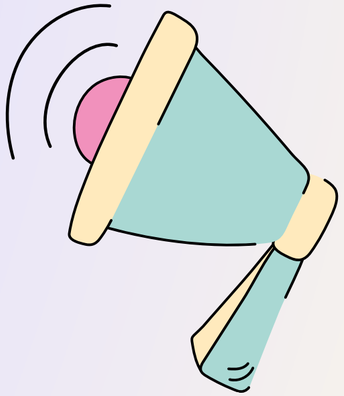
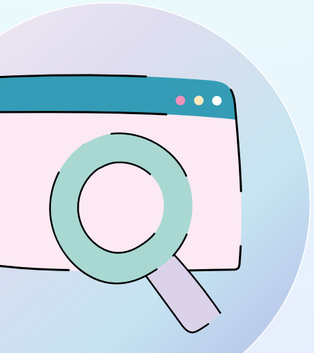
Key Learning Outcomes



1 Technical Skills

- Data Structures: Arrays, Linked Lists, Stacks, Queues, Trees, Heaps, Graphs, Hash Tables.
- Algorithms: Divide & Conquer, Dynamic Programming, Greedy, Backtracking.
- Complexity Analysis: Big O, Θ, Ω for time & space efficiency.
- Problem-Solving: Tackled problems across difficulty levels to improve speed & accuracy.
- Programming Practice: Wrote clean, modular, optimized code in C++/Java/Python.



2 Soft Skills

- Stronger logical reasoning & analytical thinking.
- Consistency & discipline through daily practice.
- Time management in contest-like scenarios.
- Improved debugging & error resolution.

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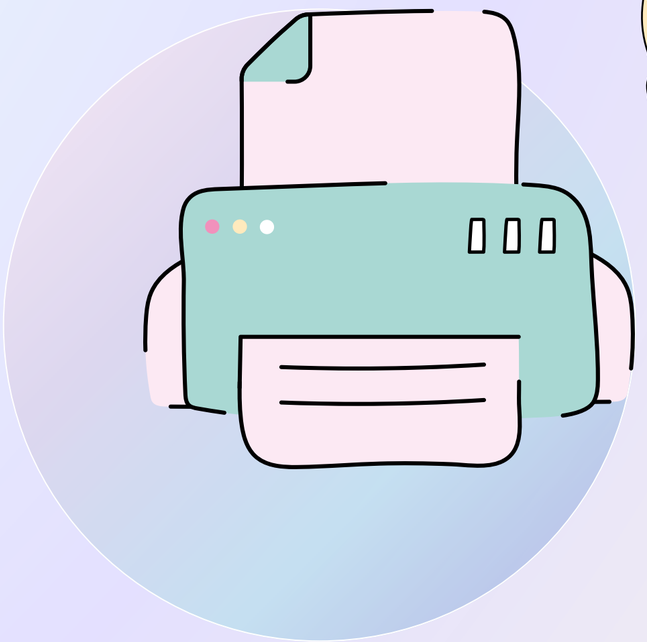
Future Enhancements and Limitations

1 Future Enhancements

- Advanced Topics: Suffix Arrays, Tries, Disjoint Sets, Network Flows, String Matching.
- System Design: Apply DSA concepts in scalable software & interview prep.
- Competitive Programming: More contests on Codeforces, CodeChef, LeetCode.
- Practical Projects: Pathfinding Visualizer, Recommendation System, Mini Compiler.
- Collaborative Learning: Group coding sessions, hackathons for peer learning.



2 Limitations

- Advanced topics (Segment Trees, Fenwick Trees, Flow Networks) only briefly covered.
- Real-world system design applications not explored.
- Limited competitive programming practice; needs speed optimization.

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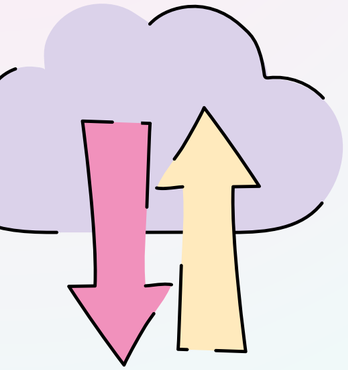

Thank You