



CAMBRIDGE INSTITUTE OF TECHNOLOGY

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Report on Guest Lecture

Topic	Data Structures and Algorithms - An Industry Perspective
Course Name	Design and Analysis of Algorithms
Course Code	CS252
Course Instructor	Prof. Megha Sharma
Guest	Kailash Kumar P (Software Engineer at Target)
Date	08-05-2026

1. Introduction

A guest lecture was delivered by Mr. Kailash, **Software Engineer at Target** on the topic “**Data Structures and Algorithms - An Industry Perspective.**”

The session aimed to bridge the gap between academic understanding of Data Structures and Algorithms and their practical applications in the software industry.



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The lecture provided valuable insights into how DSA concepts are utilized in designing scalable, efficient, and high-performance real-world systems and applications.

2. Objective of the Lecture

The main objectives of the lecture were:

- To explain the importance of data structures, Algorithms in real-world software systems.
 - To demonstrate how theoretical concepts are applied in industry projects.
 - To help students understand performance optimization and Time Complexities.
 - To guide students on how mastering data structures impacts career growth in software engineering.
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3. Key Concepts Discussed

During the lecture, the speaker highlighted several important data structures and their industry use cases:

- How software systems often perform efficiently with a small number of users but face performance and scalability issues under heavy user loads.
 - The importance of optimization techniques such as load balancing and efficient system design to handle large-scale traffic and improve reliability.
 - The speaker's interview experience at Amazon and insights into the technical interview process followed in leading tech companies.
 - The concept of problem-solving patterns in DSA and how many coding problems can be solved efficiently by identifying the correct approach or algorithmic pattern.
 - The significance of choosing suitable data structures and algorithms to improve performance, reduce memory usage, and build scalable applications.
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4. Industry Applications of Data Structures

The lecture explained how data structures are used in:

- Backend systems to handle millions of requests efficiently.
 - Load balancing and request scheduling.
 - Real-time systems and large-scale distributed applications.
 - Real-world examples helped students understand how poor data structure choices can lead to latency issues and system bottlenecks.
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5. Insights for Students

Key takeaways from the lecture included:

- Strong fundamentals in data structures are essential for software engineers.
 - Data structures are not limited to coding interviews but are used daily in industry.
 - Understanding time and space complexity is critical when designing scalable systems.
 - A balance between DSA practice and project development is necessary for career growth.
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6. Outcomes Observed

- Students developed a better understanding of important Data Structures and Algorithms concepts and their practical relevance in the software industry.
- Students gained insight into how systems that perform efficiently for small user bases can face scalability challenges under heavy traffic conditions.
- The session created awareness about optimization techniques such as load balancing and efficient system design used in large-scale applications.
- Students improved their problem-solving and analytical skills by learning how coding problems can often be solved using specific algorithmic patterns and approaches.



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- Increased awareness was observed regarding technical interview preparation, industry expectations, and the hiring processes followed by leading companies such as Amazon.
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7. Summary of the Activity

The industry talk on *Data Structures and Algorithms - An Industry Perspective* was an engaging and insightful session that connected academic DSA concepts with their practical applications in the software industry. The speaker explained how systems that work efficiently for a small number of users may fail under heavy user loads, highlighting the importance of scalability and optimization techniques such as load balancing. The session also focused on problem-solving patterns in DSA and how identifying the right approach can simplify complex coding problems. In addition, the speaker shared valuable insights from his interview experience at Amazon, giving students a better understanding of industry expectations and technical interview processes. The talk successfully bridged theoretical concepts with real-world industry practices, making the session highly interactive and beneficial for students.

8. Conclusion

The industry talk on *Data Structures and Algorithms – An Industry Perspective* was a highly informative and intellectually enriching session that provided students with practical insights into the importance of DSA in modern software development. The discussion emphasized how efficient algorithms and optimized system design are essential for building scalable and high-performance applications capable of handling large user traffic. Concepts such as load balancing, optimization strategies, recursion, and algorithmic patterns were discussed in the context of real-world industry challenges.

The speaker also shared his professional and interview experiences at Amazon, offering valuable guidance on technical interviews, problem-solving approaches, and the skills expected by leading technology companies. By connecting academic learning with real-world applications and industry expectations, the session reinforced the importance of mastering Data Structures and Algorithms as a foundation for software engineering, system design, and career growth in the technology industry.



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9. Pictures

