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Welcome to this session:

Coding Interview Workshop - Searching Algorithms

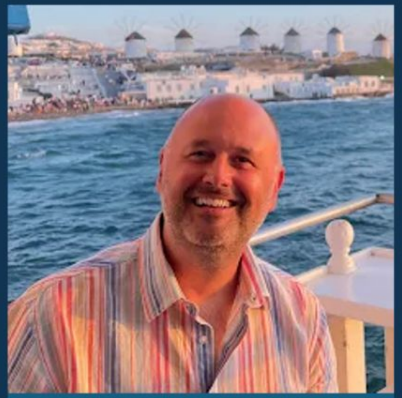
The session will start shortly...

Questions? Drop them in the chat.
We'll have dedicated moderators answering questions.

Safeguarding & Welfare

We are committed to all our students and staff feeling safe and happy; we want to make sure there is always someone you can turn to if you are worried about anything.

If you are feeling upset or unsafe, are worried about a friend, student or family member, or you feel like something isn't right, speak to our safeguarding team:



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- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly. **(Fundamental British Values: Mutual Respect and Tolerance)**
- No question is daft or silly - **ask them!**
- There are **Q&A sessions** midway and at the end of the session, should you wish to ask any follow-up questions. Moderators are going to be answering questions as the session progresses as well.
- If you have any questions outside of this lecture, or that are not answered during this lecture, please do submit these for upcoming Academic Sessions. You can submit these questions here: **Questions**

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- For all **non-academic questions**, please submit a query: ***www.hyperiondev.com/support***
- **Report a safeguarding incident: *www.hyperiondev.com/safeguardreporting***
- We would love your feedback on lectures: **Feedback on Lectures**
- If you are hearing impaired, please kindly use your computer's function through Google chrome to enable captions.

Learning Outcomes

- **Differentiate** between linear search, binary search, ternary search, and exponential search, and choose the optimal approach based on constraints.
- **Solve search-related problems** like rotated sorted array search and peak element detection.
- **Implement binary search variations** such as lower bound, upper bound, and search in infinite arrays.
- **Analyse the efficiency** of searching algorithms in different data distributions.

What is the time complexity of binary search in a sorted array?

A. O(n)
B. O(log n)
C. O(n log n)
D. O(1)

What does binary search return if the target element does not exist in the array?

A. -1
B. The nearest smaller value
C. Index 0
D. The last element

Lecture Overview

- Linear Search
- Binary Search
- Ternary Search
- Exponential Search
- Lower and Upper Bound

Search Algorithms

Algorithm	Description	Use Case
Linear Search	- Brute force method - Compare every element in array	- Unsorted arrays - O(n)
Binary Search	- Divide and conquer - Eliminate half the elements in the array	- Sorted arrays - O(log n)
Ternary Search	- Divide array into 3 parts instead of 2	- Unimodal functions
Exponential Search	- Double the range until upper bound > target - Binary search in range	- Infinite - Unbounded arrays

Practice searching

Let’s practice different searching algorithms by solving some classic problems.

Then we’ll do the following problems together:

- Search in a Sorted Rotated Array

What is the time complexity of Exponential Search?

A. O(log n)
B. O(n)
C. O(n log n)
D. O(1)

Which of these can be used to find the first element greater than or equal to target?

A. linear_search
B. lower_bound
C. binary_search
D. None

Homework

Practise the skills we've developed by completing the rest of the LeetCode questions:

- Practise speaking through your solutions and explaining how you approached each problem.
- In the next lecture we'll be covering the topic: "Sorting Algorithms"

Summary

- ★ Searching efficiently isn't just about using binary search—it's about choosing the right variant.
- ★ We explored linear, binary, ternary, and exponential search strategies.
- ★ Covered rotated sorted array and infinite arrays—common interview scenarios.

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Q & A SECTION

Please use this time to ask any questions relating to the topic, should you have any.

Thank you for attending

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