Welcome to the CoGrammar

Recursion, Sorting and Searching

(Tutorial)

The session will start shortly...

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

Software Engineering Session Housekeeping

- 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**

Software Engineering Session Housekeeping cont.

- 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**

Skills Bootcamp
8-Week Progression Overview

Fulfil 4 Criteria to Graduation

✅ Criterion 1: Initial Requirements

- ***Guided Learning Hours (GLH):*** Minimum of 15 hours
- ***Task Completion:*** First 4 tasks

Due Date: 24 March 2024

✅ Criterion 2: Mid-Course Progress

- ***Guided Learning Hours (GLH):*** Minimum of 60 hours
- ***Task Completion:*** *First* 13 tasks

Due Date: 28 April 2024

Skills Bootcamp Progression Overview

✅ Criterion 3: Course Progress

- ***Completion:*** All mandatory tasks, including Build Your Brand and resubmissions by study period end
- ***Interview Invitation:*** Within 4 weeks post-course
- ***Guided Learning Hours:*** Minimum of 112 hours by support end date (10.5 hours average, each week)

✅ Criterion 4: Demonstrating Employability

- ***Final Job or Apprenticeship Outcome:*** Document within 12 weeks post-graduation
- ***Relevance:*** Progression to employment or related opportunity

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Learning Objectives & Outcomes

- Define recursion and identity a recursion problem
- Implement recursion for basic problems like factorial or binary search
- Predict stackoverflow from ill-formed recursion
- Understand basic searching algorithms and their associated complexities: Linear and Binary Search
- Understand based sorting algorithms and their associated complexities: Bubble and insertion sort

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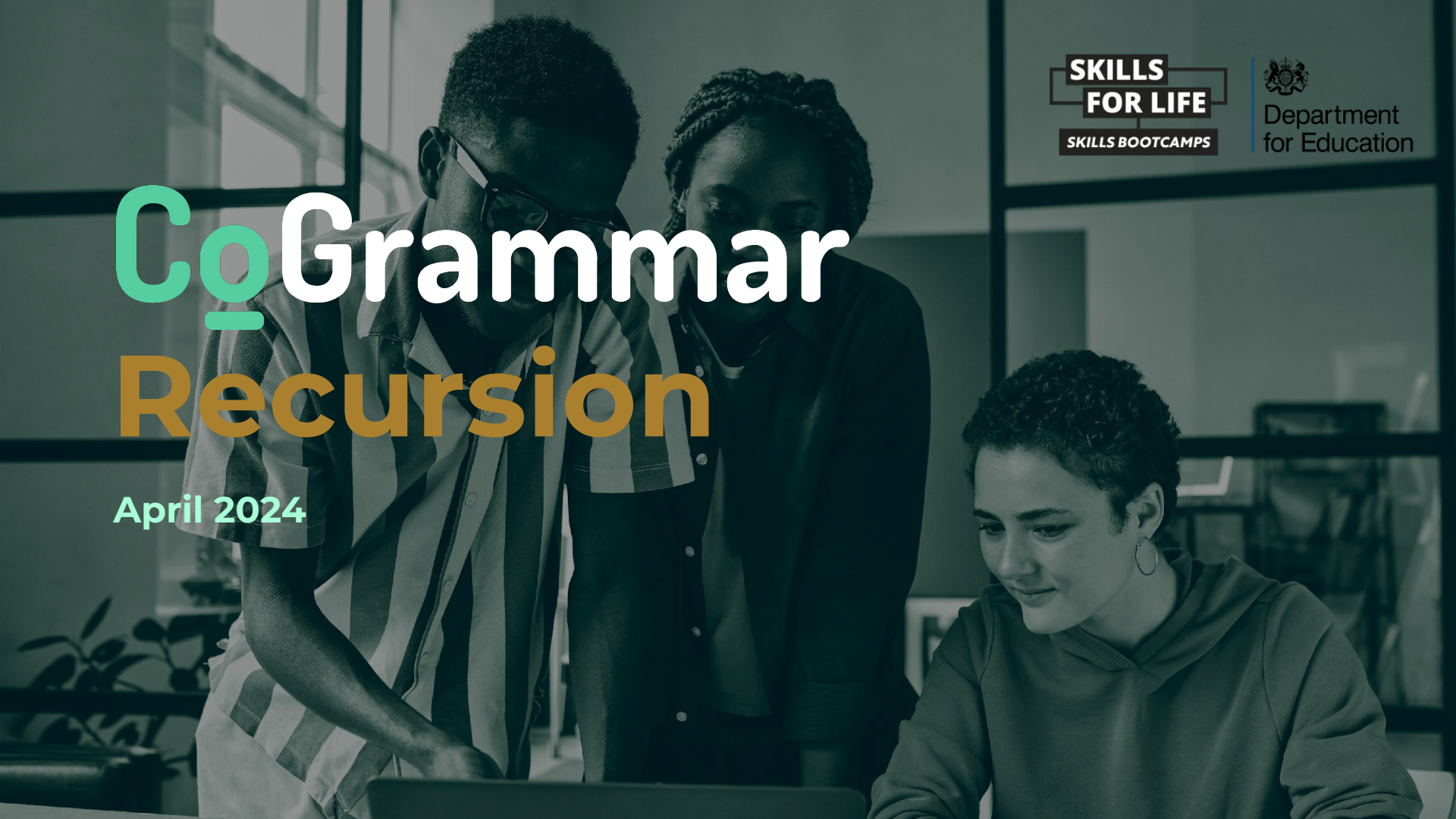
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What are Recursion and Iterations?

- **Recursion** is a programming technique where a function calls itself to solve a problem by breaking it down into smaller, similar subproblems.

- **Iteration** is a fundamental programming concept that involves repeating a set of instructions or a process multiple times until a specific condition is met.

Types of iterations

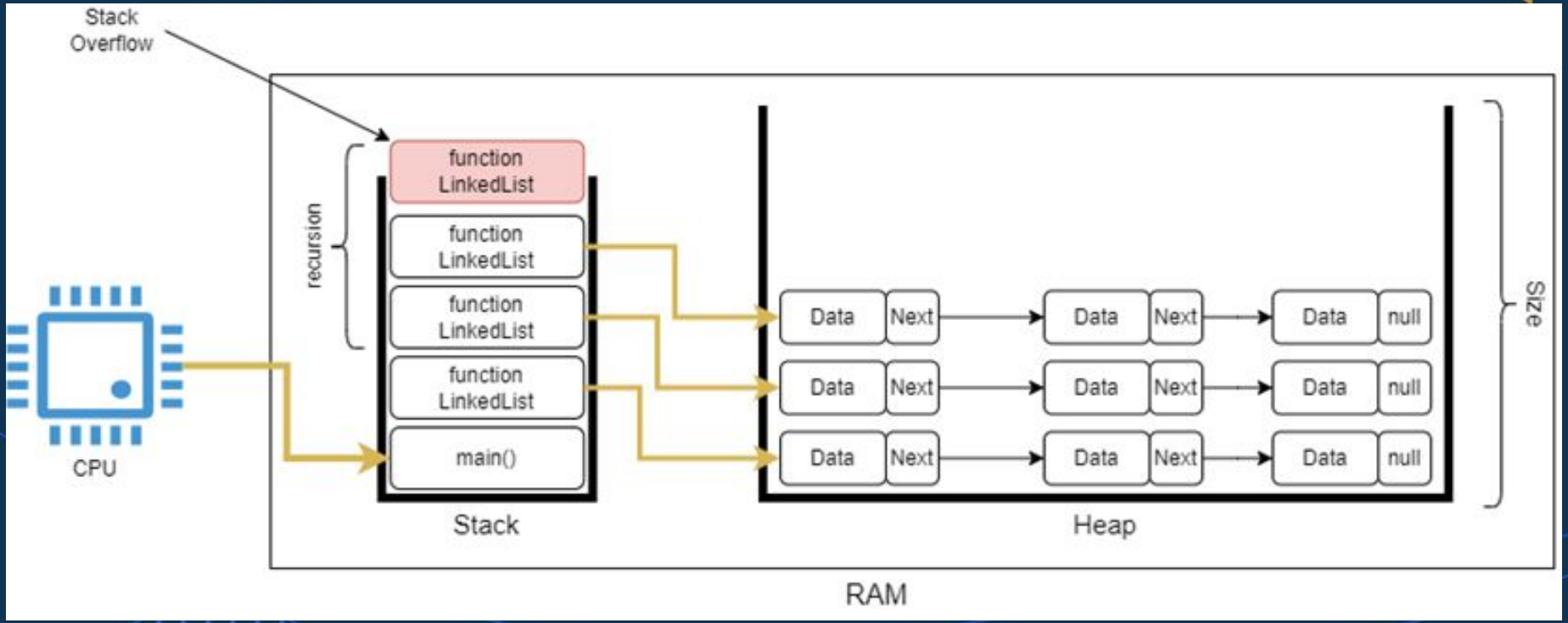
- Count-controlled Iterations
- Sentinel-controlled Iteration
- Condition-controlled Iterations

Iterations vs Recursions

In a recursion, a function calls itself until it reaches a **base condition**. It's often used for problems that can be broken down into similar sub-problems.

Iteration, on the other hand, repeats a set of instructions in a loop until a **condition is met**.

Stackoverflow



Let’s get coding!

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Questions and Answers

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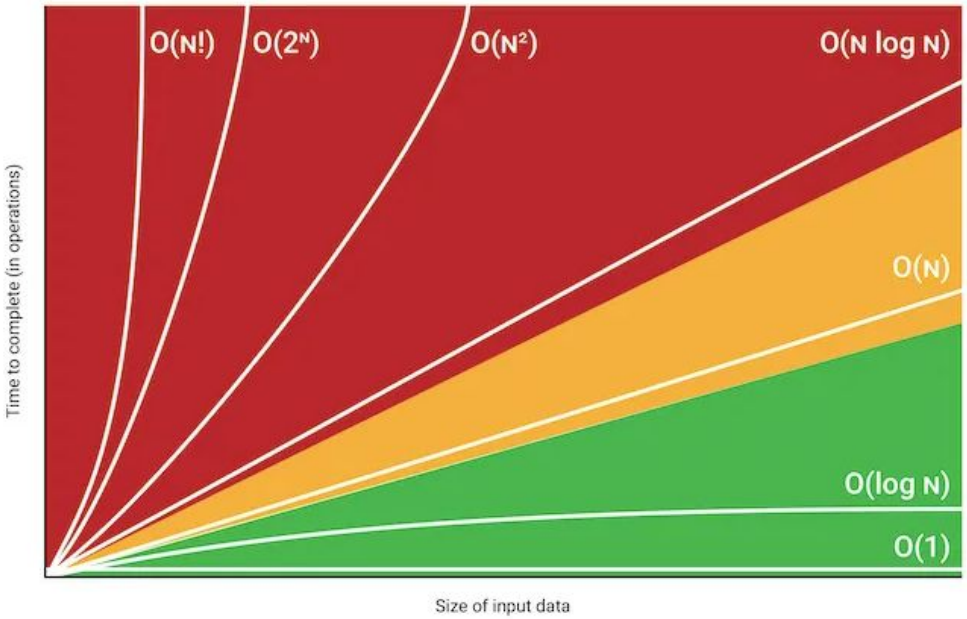
Data Structures and Algorithms

- A **data structure** is a specialized format for organizing, processing, retrieving and storing data.
  Eg: Tree, List, Stacks, Queues

- An **algorithm** is a set of commands that must be followed for a computer to perform calculations or other problem-solving operations.
  Eg: Searching, Sorting

Order of Complexity



Sorting Algorithms Definition

A Sorting Algorithm is used to rearrange a given array or list of elements according to a comparison operator on the elements.

Sorting Algorithms

Bubble sort is a simple sorting algorithm that repeatedly steps through the list, compares adjacent elements, and swaps them if they are in the wrong order, continuing until the list is sorted.

Sorting Algorithms

Insertion sort is a sorting algorithm that builds the final sorted array one item at a time by repeatedly taking the next element and inserting it into the correct position in the already sorted part of the array.

Sorting Algorithms

Selection sort is a sorting algorithm that repeatedly selects the minimum element from the unsorted portion of the array and swaps it with the first unsorted element, gradually building up a sorted array from left to right.

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Searching Algorithms Definition

Searching algorithms are essential tools in computer science used to locate specific items within a collection of data.

Searching Algorithms

Linear search is a simple search algorithm that sequentially checks each element in a list until the target element is found or the end of the list is reached.

Searching Algorithms

Binary search is a search algorithm that efficiently locates a target value within a sorted array by repeatedly dividing the search interval in half and comparing the target value to the middle element, eliminating half of the remaining elements each time.

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Thank you for attending

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