Welcome to this CoGrammar Task Walkthrough: Task 14

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** throughout this session, should you wish to ask any follow-up questions.
- 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**

Enhancing Accessibility: Activate Browser Captions

Why Enable Browser Captions?

- Captions provide **real-time text for spoken content**, ensuring inclusivity.
- Ideal for individuals in noisy or quiet environments or for those with **hearing impairments**.

How to Activate Captions:

1. **YouTube or Video Players:**
   - Look for the CC (Closed Captions) icon and click to enable.
2. **Browser Settings:**
   - Google Chrome: Go to *Settings* > *Accessibility* > *Live Captions* and toggle ON.
   - Edge: Enable captions in *Settings* > *Accessibility*.

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:

Ian Wyles
Designated Safeguarding Lead

Simone Botes

Nurhaan Snyman

Rafiq Manan

Ronald Munodawafa

Tevin Pitts

Scan to report a safeguarding concern

or email the Designated Safeguarding Lead:
Ian Wyles
safeguarding@hyperiondev.com

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Skills Bootcamp Progression Overview

✅ Criterion 1 - Initial Requirements

Specific achievements within the first two weeks of the program.

To meet this criterion, students need to, by no later than **01 December 2024:**

- **Guided Learning Hours** (GLH)**:** Attend a minimum of 7-8 GLH per week (lectures, workshops, or mentor calls) for a total minimum of **15 GLH**.
- **Task Completion:** Successfully complete the **first 4 of the assigned tasks**.

✅ Criterion 2 - Mid-Course Progress

Progress through the successful completion of tasks within the first half of the program.

To meet this criterion, students should, by no later than **12 January 2025:**

- **Guided Learning Hours** (GLH)**:** Complete at least **60 GLH**.
- **Task Completion :** Successfully complete the **first 13 of the assigned tasks**.

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Task Walkthrough: Searching & Sorting Algorithms

Learning Outcomes

- Retrieve, sort, swap and search for items in a list.
- Give a detailed explanation of how the merge sort algorithm works.
- Transfer learnings to complete the Searching & Sorting tasks.

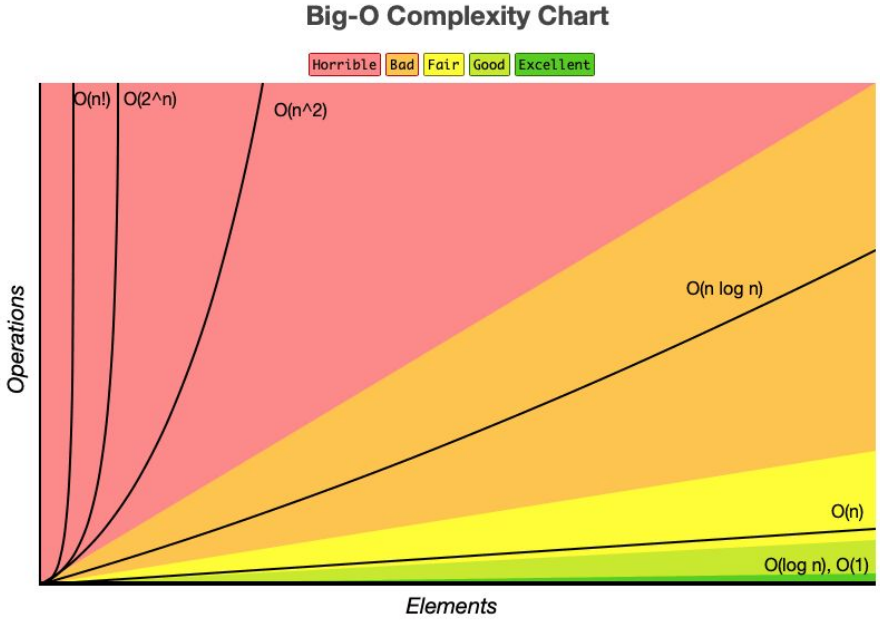
Searching Algorithms

- **Searching Algorithms**: Methods to find an element in a collection.
  - **Linear Search**: Sequentially checks each element until the desired element is found; best for small lists.
  - **Binary Search**: Efficiently searches in a sorted list by repeatedly dividing the search interval in half; requires sorted data.

Sorting Algorithms

- **Sorting Algorithms**: Methods to arrange elements in a specified order.
  - Bubble sort, insertion sort, merge sort, quick sort and more.
- **Time complexity**: Important to understand the efficiency of algorithms; typically expressed in Big O notation
- Real-world applications: Used in databases, searching through web pages, and more.

Complexity


Big-O Complexity Chart
Horrible
Bad
Fair
Good
Excellent
O(n!)
O(2^n)
O(n^2)
O(n log n)
O(n)
O(log n), O(1)
Operations
Elements

Searching & Sorting Task Walkthrough: Task 1

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Practical task 1

- Create a Python script called **album_management.py**.
- Design a class called `Album`. The class should contain:
  - A constructor which initialises the following instance variables:
    - `album_name` - Stores the name of an album.
    - `number_of_songs` - Stores the number of songs within the album.
    - `album_artist` -Stores the album's artist.
  - A `__str__` method that returns a string that represents an Album object in the following format:
    (*`album_name`, `album_artist`, `number_of_songs`*).
- Create a new list called `albums1`, add five `Album` objects to it, and print out the list.
- Sort the list according to the `number_of_songs` and print it out. (You may want to examine **the key parameter in the sort method**).
- Swap the element at position 1 (index `0`) of `albums1` with the element at position 2 (index `1`) and print it out.
- Create a new list called `albums2`.
- Add five `Album` objects to the `albums2` list, and print out the list.
- Copy all of the albums from `albums1` into `albums2`.
- Add the following two albums to `albums2`:
  - (Dark Side of the Moon, Pink Floyd, 9)
  - (Oops!... I Did It Again, Britney Spears, 16)
- Sort the albums in `albums2` alphabetically according to the album name and print out the sorted list.
- Search for the album *Dark Side of the Moon* in `albums2` and print out the index of the album in the albums2 list.

Be sure to place files for submission inside your **task folder** and click "Request review" on your dashboard.

Searching & Sorting Task Walkthrough: Task 2

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Practical task 2

In a newly created Python script called **merge_sort.py**:

- Modify the merge sort algorithm provided in the example usage section above to order a list of strings by string length from the longest to the shortest string.
- Run the modified Merge sort algorithm against 3 string lists of your choice. Please ensure that each of your chosen lists is not sorted and has a length of at least 10 string elements.

Be sure to place files for submission inside your **task folder** and click **"Request review"** on your dashboard.

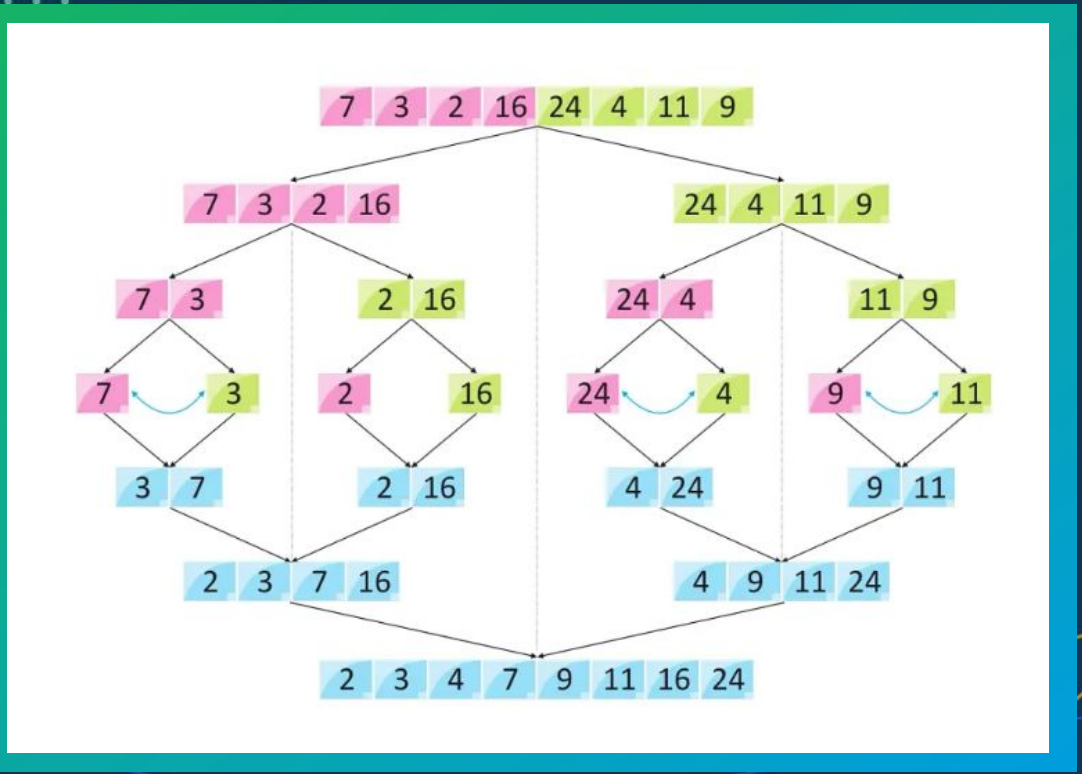

Image source:
https://medium.com/@ozgurmehmetakif/merge-sort-algorithm-ff52822f5608

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Searching & Sorting Task Walkthrough: Task 3

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Practical task 3

Using the following list: [27, -3, 4, 5, 35, 2, 1, -40, 7, 18, 9, -1, 16, 100]

- Create a Python script called **sort_and_search.py**. Consider which searching algorithm would be appropriate to use on the given list?
- Implement this search algorithm to search for the number 9. Add a comment to explain why you think this algorithm was a good choice.
- Research and implement the **Insertion sort** on this list.
- Implement a searching algorithm you haven't tried yet in this Task on the sorted listto find the number 9. Add a comment to explain where you would use this algorithm in the real world.

Be sure to place files for submission inside your **task folder** and click **"Request review"** on your dashboard.

Questions and Answers

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Thank you for attending

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