Welcome to this CoGrammar Tutorial: Task Walkthrough

The session will start shortly...

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

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SKILLS FOR LIFE
SKILLS BOOTCAMPS

Department for Education

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Task Walkthrough: Object-Oriented Programming Inheritance | 2D Lists

October 2024

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**

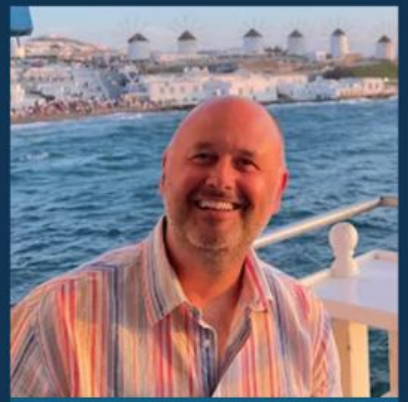
Software Engineering Session Housekeeping cont.

- 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**

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

Rafiq Manan

Charlotte Witcher

Nurhaan Snyman

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

To be eligible for a certificate of completion, students must fulfil three specific criteria. These criteria ensure a high standard of achievement and alignment with the requirements for the successful completion of a Skills Bootcamp.

✅ Criterion 1 - Meeting Initial Requirements

Criterion 1 involves specific achievements within the first two weeks of the program. To meet this criterion, students need to:

- Attend a minimum of 7-8 hours per week of guided learning (lectures, workshops, or mentor calls) within the initial two-week period, for a total minimum of 15 guided learning hours (GLH), by no later than 15 September 2024.
- Successfully complete the Initial Assessment by the end of the first 14 days, by no later than 15 September 2024.

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Skills Bootcamp Progression Overview

✅ Criterion 2 - Demonstrating Mid-Course Progress

Criterion 2 involves demonstrating meaningful progress through the successful completion of tasks within the first half of the bootcamp.
To meet this criterion, students should:

- Complete 42 guided learning hours and the first half of the assigned tasks by the end of week 7, no later than 20 October 2024.

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Skills Bootcamp Progression Overview

✅ Criterion 3 - Demonstrating Post-Course Progress

Criterion 3 involves showcasing students' progress after completing the course. To meet this criterion, students should:

- Complete all mandatory tasks before the bootcamp's end date. This includes any necessary resubmissions, no later than 22 December 2024.
- Achieve at least 84 guided learning hours by the end of the bootcamp, 22 December 2024.

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Advised Resources

- HyperionDev PDF notes
- Lectures: 30 September 2024 & 2, 3 October 2024 | Repeat on 4 & 5 October 2024
- Example code files
- Task walkthrough lecture
- Research

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Learning Outcomes

- Understand and implement Object-Oriented Programming concepts: Classes, objects, attributes, methods, inheritance and method overriding.
- Implement conditional logic for object instantiation.
- Explain how minesweeper-style algorithms work.
- Transfer your learnings to complete the tasks by the end of the session.

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OOP

- A **class** is a blueprint for creating objects, defining attributes and methods that objects from this class can use.
- An **object** is an instance of a class that contains actual values for the attributes defined by the class.
- **Attributes** are variables that belong to an object defined in the class's constructor using the __init__ method.
- **Methods** are functions defined inside a class that operate on instances of that class.
- A **constructor** is a special method that is automatically called when an object is created.
- **Inheritance** is a mechanism in object-oriented programming where a subclass inherits attributes and methods from a parent class.
- **Method overriding** occurs when a subclass provides a specific implementation of a method that is already defined in its parent class, allowing the subclass to customise or extend the behavior of that method.

Task Walkthrough: Auto-graded Task 1

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Auto-graded task 1

In this task, you will demonstrate your understanding of inheritance. Make a copy of the **task1_instructions.py** file and name it **practical_task_1.py.** Then, follow the instructions below.

- Add another method in the Course class that prints the head office location: Cape Town.
- Create a subclass of the Course `class` named `OOPCourse.`
- Create a constructor that initialises the following attributes with default values:
  - `description = “OOP Fundamentals”`
  - `trainer = "Mr Anon A. Mouse"`
- Create a method in the `OOPCourse` subclass named `trainer_details` that prints what the course is about and the name of the trainer by using the description and trainer attributes.
- Create a method in the `OOPCourse` subclass named `show_course_id` that prints the ID number of the course: `#12345`
- Create an object of the OOPCourse subclass called `course_1` and call the following methods
  - `contact_details()`
  - `trainer_details()`
  - `show_course_id()`
- These methods should all print out the correct information to the terminal.

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Task Walkthrough: Auto-graded Task 2

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Auto-graded task 2

Create a file named **method_override.py** and follow the instructions below:

- Take user inputs that ask for the name, age, hair colour, and eye colour of a person.
- Create an Adult class with the following attributes and method:
  - Attributes: `name, age, eye_color,` and `hair_color`
  - A method called `can_drive()` which prints the name of the person and that they are old enough to drive.
- Create a subclass of the `Adult` class named `Child` that has the same attributes, but overrides the `can_drive()` method to print the person's name and that they are too young to drive.
- Create some logic that determines if the person is 18 or older and create an instance of the `Adult` class if this is true. Otherwise, create an instance of the `Child` class. Once the object has been created, call the `can_drive()` method to print out whether the person is old enough to drive or not.

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

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Task Walkthrough: Auto-graded Task 3

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Auto-graded task

Now it's time to see whether you're ready to apply what you've learned to some coding of your own! This is a challenging task, but worth persisting through as you'll gain valuable experience with 2D lists and nested loops.

1. Create a file named **minesweeper.py**.
2. Create a function that takes a grid of # and -, where each hash (#) represents a mine and each dash (-) represents a mine-free spot.
3. Return a grid where each dash is replaced by a digit, indicating the number of mines immediately adjacent to the spot, i.e., horizontally, vertically, and diagonally.

Example of an input:

```
[ ["-", "-", "-", "#", "#"],
  ["-", "#", "-", "-", "-"],
  ["-", "-", "#", "-", "-"],
  ["-", "#", "#", "-", "-"],
  ["-", "-", "-", "-", "-"] ]
```

Example of the expected output:

```
[ [1, 1, 2, "#", "#"],
  [1, "#", 3, 3, 2],
  [2, 4, "#", 2, 0],
  [1, "#", "#", 2, 0],
  [1, 2, 2, 1, 0] ]
```

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Questions and Answers

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Thank you for attending

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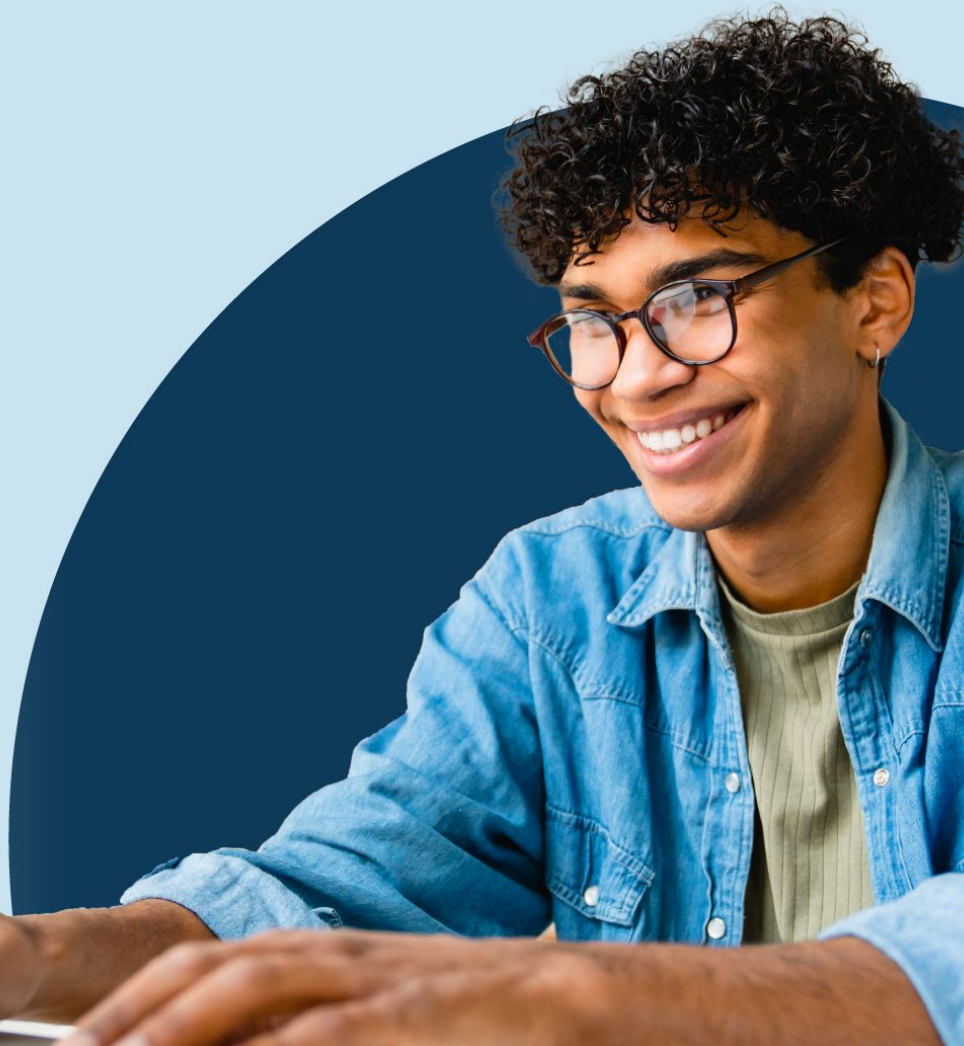

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