Welcome to this CoGrammar Task Walkthrough: Task 12

The session will start shortly...

Questions? Drop them in the chat.

Task Walkthrough: 2D Lists

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

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

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Scan to report a safeguarding concern

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

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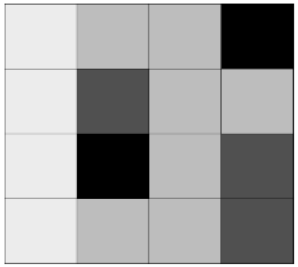
Learning Outcomes

- Describe 2D-Lists
- Know syntax for generating and indexing 2D lists
- Explain how minesweeper-style algorithms work.
- Transfer your learnings to complete the tasks by the end of the session.

2D Lists

- How does a list become two-dimensional?
  - Create a list, where each element is a list.



236	189	189	0
236	80	189	189
236	0	189	80
236	189	189	80

```
grayscale_image = [
[236, 189, 189, 0],
[236, 80, 189, 189],
[236, 0, 189, 80],
[236, 189, 189, 80]]
```

How to Create a 2D List

- number_of_rows = 3
  number_of_columns = 2
- empty_grid = [[None] * number_of_columns for _ in range(number_of_rows)]

- Creates a 2 x 3 list, all elements are the value None.

How to Iterate over a 2D List

- for row in my_2d_list: # outer loop for rows
    for col in row: # inner loop for columns
        # Do something.

Indexing a 2D List

- grayscale_image = [[236, 189, 189, 0],
  [236, 80, 189, 189],
  [236, 0, 189, 80],
  [236, 189, 189, 80]]

  last_pixel = grayscale_image[3][3]

Task Walkthrough: Auto-graded Task

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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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