Welcome to this CoGrammar Lecture:

Classes Part 2

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

Timeframe: First 2 Weeks
Guided Learning Hours (GLH): Minimum of 15 hours
Task Completion: First four tasks

Due Date: 24 March 2024

✅ Criterion 2: Mid-Course Progress

60 Guided Learning Hours

Data Science - **13 tasks**
Software Engineering - **13 tasks**
Web Development - **13 tasks**

Due Date: 28 April 2024

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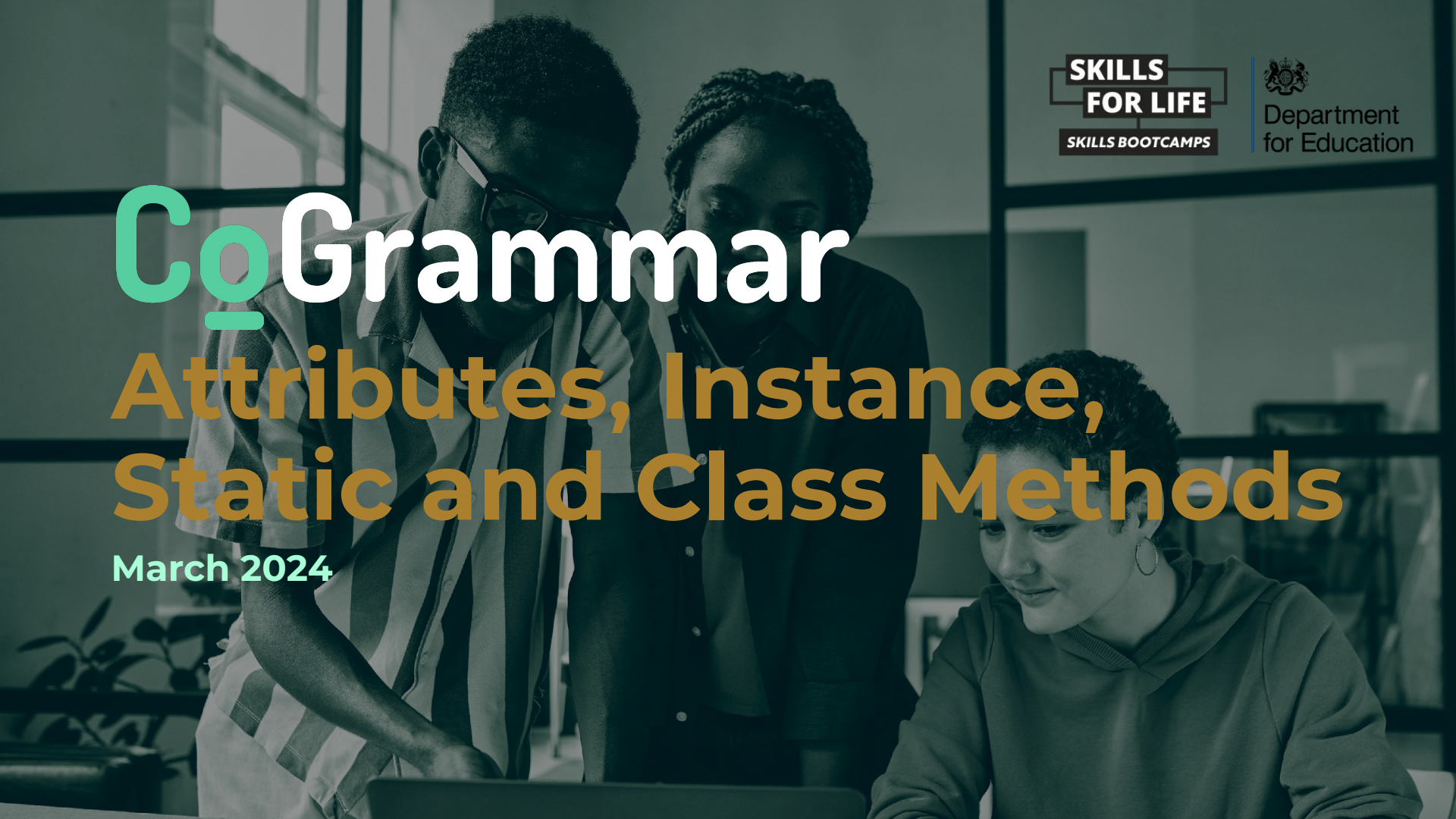

Attributes, Instance, Static and Class Methods

March 2024

Agenda

Classes (Recap)

- Attributes
- Instance
- Static
- Class Methods

Classes

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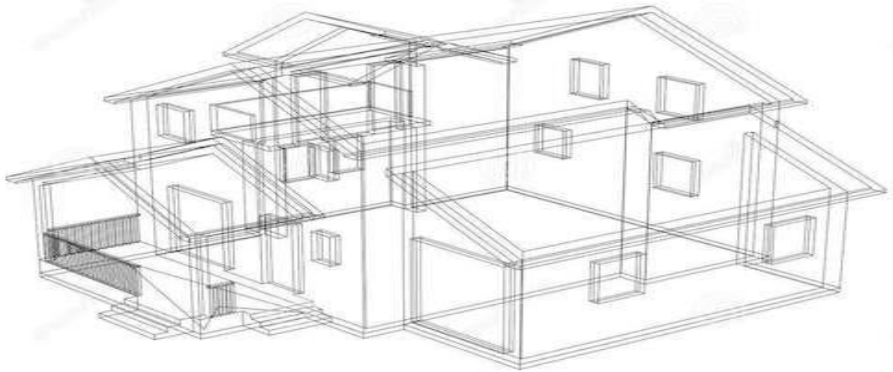
Classes Recap

A class is a blueprint or template for creating objects. It defines the attributes and methods that all objects of that class will have.



Attributes

- Attributes are values that define the characteristics associated with an object.

- They define the state of an object and provide information about its current condition.
- For a class named ‘House’, some relevant attributes could be:
  - number_of_bedrooms
  - year_built

Methods (Behaviours)

- Methods, also known as behaviours, define the actions or behaviours that objects can perform
- They encapsulate the functionality of objects and allow them to interact with each other and the outside world.
- For a class named ‘House’, some relevant method could be:
  - set_location(): Allows updating the location of the house

Instance Methods

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What are Instance Methods ?

Instance methods are like actions or behaviours that specific objects can perform. They have access to the object's data and are defined within the class. By using instance methods, we can model how objects interact and behave in our programs, making object-oriented programming a powerful way to structure our code.

Instance Method Example

```python
class Student:
    def __init__(self, name):
        self.name = name

    def study(self):
        print(f"{self.name} is studying hard!")

# Creating a student object
student1 = Student("Alice")

# Calling the instance method
student1.study()
```

What are Static Methods ?

Static methods are like standalone functions that are associated with a class. They're useful for organising utility functions that are related to the class but don't depend on individual object instances. By using static methods, we can group together related functionalities within a class and make our code more organised and modular.

Static Method Example

```python
class MathUtil:
    @staticmethod
    def add(x, y):
        return x + y

# Calling the static method
result = MathUtil.add(3, 5)
print(result)  # Output: 8
```

Class Methods

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What are Class Methods ?

- In object-oriented programming, a class method is like a special function that belongs to the class itself, rather than to any specific object created from the class. It's a way for classes to define functions that operate on the class itself, rather than on individual objects.

- Class methods are like functions that operate on the class itself, rather than on individual objects. They're useful for defining functionalities that affect the entire class, such as modifying class attributes or performing operations that involve the class as a whole.

Class Methods Examples

```python
class MathUtil:
    @classmethod
    def calculate_average(cls, num_list):
        total = sum(num_list)
        return total / len(num_list)

# Using the class method
numbers = [10, 20, 30, 40, 50]
average = MathUtil.calculate_average(numbers)
print(average)  # Output: 30.0
```

Best Practices

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Naming Conventions

- Python classes use the CamelCase naming convention
- Each word within the class name will start with a capital letter.
- E.g. Student, WeightExercise

```
class Student:
```

```
class WeightExercise:
```

Naming Conventions

- Give your classes meaningful and descriptive names
- Other users should already have an idea what your class is for from the name.

BAD

```
class CNum:
```

GOOD

```
class ContactNumber:
```

Single Responsibility

- Make sure your classes represent a single idea.
- If we have a person class that can have a pet we won't add all the pet attributes to the person class. We will rather create a new class.

```
class Person:

    def __init__(self, name, surname, pet_name, pet_type):
        self.name = name
        self.surname = surname
        self.pet_name = pet_name
        self.pet_type = pet_type
```

Single Responsibility

```python
class Person:

    def __init__(self, name, surname):
        self.name = name
        self.surname = surname

class Pet:

    def __init__(self, name, type):
        self.name = name
        self.type = type
```

Docstrings

- We can document our classes and class methods using docstrings in the same manner we used them with functions.
- Our class docstrings will contain a short description of the class and it's attributes.
- A method docstring will contain a short description of the methods followed by it's parameters and what will be returned.

Docstrings cont.

```
class Person:
    """
    Class representing a person.

    Attributes:
        name (str): Name of person
        surname (str): Surname of person
    """
    def __init__(self, name, surname):
        """
        Initialise class attributes.

        Parameters:
            name (str): Name of person
            surname (str): Surname of person
        """
        self.name = name
        self.surname = surname
```

Questions and Answers

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Thank you for attending

SKILLS FOR LIFE
SKILLS BOOTCAMPS

Department for Education

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