Welcome to this CoGrammar Tutorial:

Classes and Methods

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

- ***Guided Learning Hours (GLH):*** **60**
- ***Task Completion:*** 13 tasks

Due Date: 28 April 2024

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Text File IO and Exception-Handling

April 2024

Agenda

- Classes
- Attributes
- Instance
- Static and
- Class Methods

Classes

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Classes

- Classes are blueprints for creating objects. They define the properties and behaviors that objects of the class will have.

- Classes encapsulate data (**attributes**) and functionality (**methods**) into a single unit, facilitating code organization and reuse.

Classes

```
# Define the Car class
class Car:
    def __init__(self, brand, color):
        self.brand = brand
        self.color = color

    def drive(self):
        return f"The {self.color} {self.brand} is driving."
```

Attributes

- Attributes represent the state or characteristics of objects. They are the data associated with instances of the class and define what an object of that class looks like.
- Attributes can be variables that store data (instance variables) or methods (instance methods) that define behaviors.

```
# Define the Car class
class Car:
    def __init__(self, brand, color):
        self.brand = brand
        self.color = color
```

Methods

- **Methods** are functions defined within a class that define the behaviors or actions that objects of the class can perform.
- They operate on the data (**attributes**) associated with the class and provide the functionality to manipulate that data. Methods can be instance methods, static methods, or class methods.

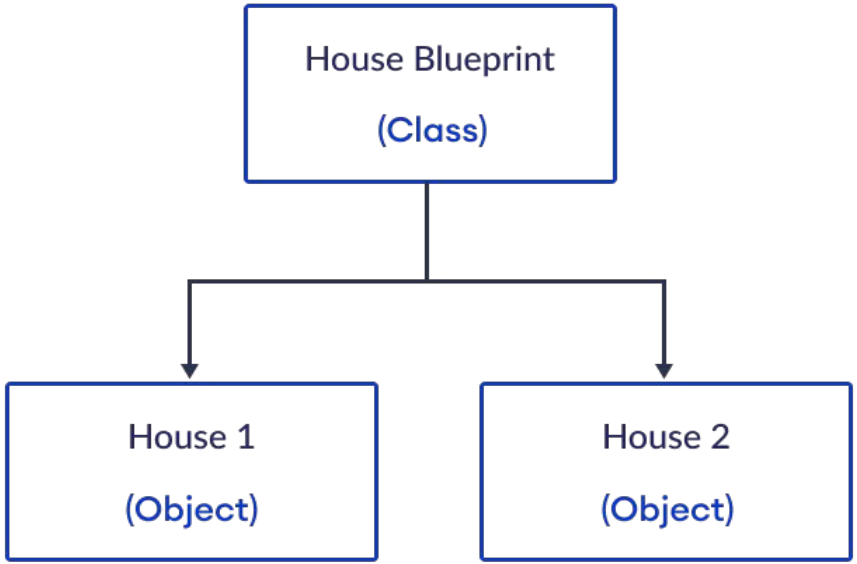
```
class Car:
    def drive(self):
        print("The car is driving.")
```

Objects

- An object is an instance of a class. It is a concrete realization of the class blueprint, possessing its own unique set of attributes and methods.
- When you create an object, you are essentially creating a specific instance of that class with its own data and behavior.

```
# Create an object (instance) of the Car class
my_car = Car("Toyota", "red")
```

Objects cont.



Static Methods

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Static Methods

- Static methods are like standalone functions that live within a class.
- They're handy for grouping together related functionality without needing to access specific instance or class data.
- You mark them with the `**@staticmethod**` decorator to let Python know they're special.

Static Methods Example

```
class Car:
    @staticmethod
    def honk():
        return "Beep beep!"

# Calling the static method
print(Car.honk())  # Output: Beep beep!
```

- We define a Car class with a static method **honk()**.
- The honk() method doesn't require access to any specific instance or class variables, so it's marked as a static method using the **@staticmethod** decorator.
- We can call the static method directly on the class itself (Car.honk()), and it returns "Beep beep!", simulating the sound of a car horn.

Class Methods

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Class Methods

- Class methods are like special functions that belong to the class itself.
- They're not tied to any particular instance but can do cool stuff with the class as a whole.
- You mark them with the `**@classmethod**` decorator and they get this fancy `**cls**` parameter which stands for the class itself. It's a neat way to work with class-level stuff.

Class Methods Example

```python
class Car:
    num_cars_sold = 0  # Class variable to keep track of the number of cars sold

    def __init__(self, brand):
        self.brand = brand
        Car.num_cars_sold += 1  # Increment the number of cars sold when a new car is created

    @classmethod
    def get_num_cars_sold(cls):
        return cls.num_cars_sold

# Creating instances of the Car class
car1 = Car("Toyota")
car2 = Car("Honda")

# Accessing the class method to get the number of cars sold
print(Car.get_num_cars_sold())  # Output: 2
```

Class Methods

- We define a Car class with a class variable **num_cars_sold** to keep track of the number of cars sold.
- Inside the **__init__** method (constructor), every time a new car object is created, we increment the num_cars_sold class variable.
- We define a class method **get_num_cars_sold()** using the **@classmethod** decorator, which returns the current number of cars sold.
- We create two instances of the Car class (car1 and car2).
- We then call the class method get_num_cars_sold() using the class name Car, and it returns the total number of cars sold, which is 2 in this case.

Let’s take a short break

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Summary

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Summary

1. **Classes** provide a way to structure and organize code, attributes represent the state of objects, and instance, static, and class methods define behaviors and operations associated with classes and objects.
2. **Static methods** are self-contained functions within a class that do not require access to instance or class variables.
3. **Class methods** operate on the class itself and receive the class as their first parameter, allowing them to access and modify class variables.
4. Both static and class methods provide ways to encapsulate functionality within a class and promote code organization and reusability.

Questions and Answers

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Thank you for attending

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