Welcome to the CoGrammar Django II

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

- We would love your **feedback** on lectures: **Feedback on Lectures**

- If you are hearing impaired, please kindly use your computer's function through Google chrome to enable captions.

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

CoGrammar HyperionDev

Livestorm Tip

- **Livestorm Tip** 👉To allow your attendees to register faster, for example, for small internal meetings, don't require their first and last names. **Attendees without first and last names will then show up in the room as "Anonymous user 1", "Anonymous user 2", etc...** As a Team Member, you'll still be able to see their email address in the room and in your People dashboard.


SKILLS FOR LIFE
SKILLS BOOTCAMPS
Department for Education
CoGrammar
Django II

Learning Objectives

- Describe Python-based Django concepts including models, database migration, Django admin, forms/fields validation, and data handling.
- Develop and deploy one custom Django model with Python-based ORM.
- Execute database migrations using Django's Python commands.

Poll

1. What does Django's ORM (Object-Relational Mapping) allow you to do?

    i. Interact with the file system
    ii. Interact with the database using Python code
    iii. Create frontend UI components
    iv. Handle user sessions and cookies

Poll

2. What is Django primarily used for?

a. Developing mobile applications
b. Data analysis and visualisation
c. Building web applications and backend services
d. Machine learning and AI

Introduction

CoGrammar

Intuition

Imagine you're an avid traveller, always seeking new adventures and experiences. Instead of keeping track of your journeys in a physical journal, envision a Travel Diary web application where you can log in, document your trips, share recommendations, and connect with fellow travellers.

Python drives the functionality, Django organises the content, HTML/CSS crafts the interface, and databases (MySQL, SQLite ...) store your travel tales securely.

This example illustrates how these technologies converge to create an immersive, user-centric platform, highlighting the versatility and interconnectedness of modern web applications in our everyday experiences.

Django: Empowering Python for Web Development

- Django follows the “batteries-included” philosophy, offering features like authentication, ORM (Object-Relational Mapping), templating, and more out of the box.
- Built with the Model-View-Template (MVT) architectural pattern
- Widely used for building web applications, APIs, and content management systems (CMS)
- Allows developers to focus on writing application logic rather than boilerplate code.

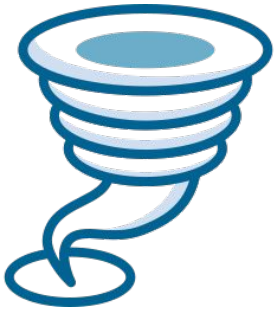
Use Cases for Django

- Front-End Development: Building User Interfaces
  - E-commerce websites with product listings, shopping carts, and checkout functionalities
  - Personal blogs with content management, commenting systems, and user profiles
  - Social networking platforms facilitating communication and interaction between users

Use Cases for Django

- Back-End Development: Powering the Engine
  - Microservices: Breaking down complex applications into smaller, independent services,
  - APIs (Application Programming Interfaces): Enabling communication between different applications
  - Django's REST framework for building APIs and its seamless integration with various front-end technologies.

Django in Comparison with Other Tools



Django Core Concepts

CoGrammar

Django Project

- Describes a Django web application
- The root directory of your application.
- The high-level container for your entire application
- Houses settings, configuration files, and overall application logic
- There is only one project per application
- A project can contain multiple apps.

Django Project

To start a project:

...\> django-admin startproject project_name

Django Project

Django project structure

- **project_name**/
  - manage.py
  - **project_name**/
    - __init__.py
    - settings.py
    - urls.py
    - asgi.py
    - wsgi.py

Django Project

Run the project

- ...\> cd **project_name**
- ...\> py **manage.py** runserver

Django Project

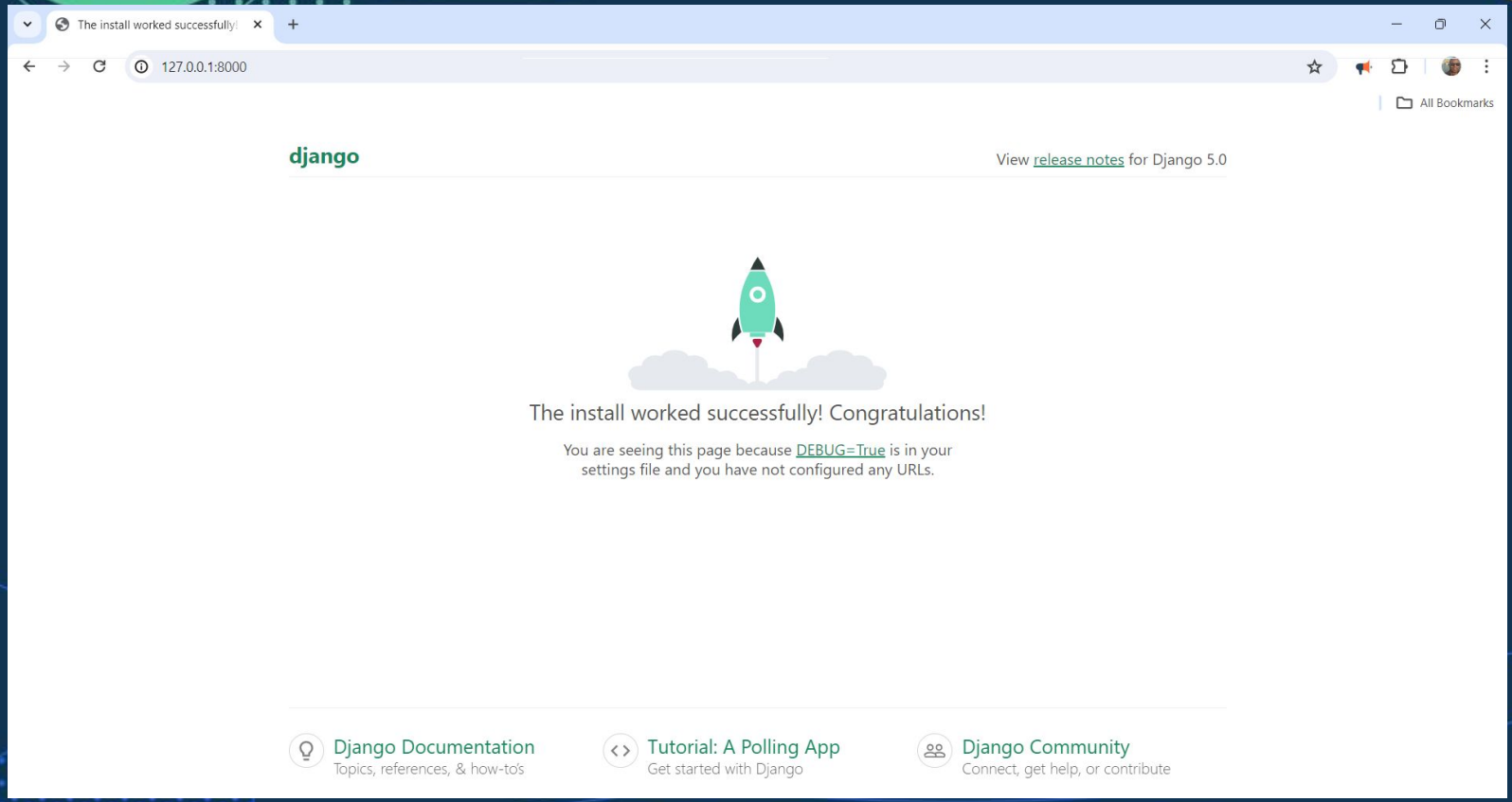
```
(django_venv) PS C:\Users\[redacted]\OneDrive - [redacted]\Documents\django_test> cd .\mysite\
(django_venv) PS C:\Users\[redacted]\OneDrive - [redacted]\Documents\django_test\mysite> py .\manage.py runserver
Watching for file changes with StatReloader
Performing system checks...

System check identified no issues (0 silenced).

You have 18 unapplied migration(s). Your project may not work properly until you apply the migrations for app(s): admin, auth, contenttypes
, sessions.
Run 'python manage.py migrate' to apply them.
May 20, 2024 - 15:04:04
Django version 5.0.6, using settings 'mysite.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CTRL-BREAK.
```

CoGrammar

Django App



CoGrammar

Django App

- Self-contained components within a project
- Contains models, views, templates, etc.
- Encapsulates related functionality
- Can be reused across projects
- Fundamental components in Django projects.
- Represents a distinct functionality or feature area of your application.
- Reusable for common functionalities

Django App

To start a app (after starting a project):

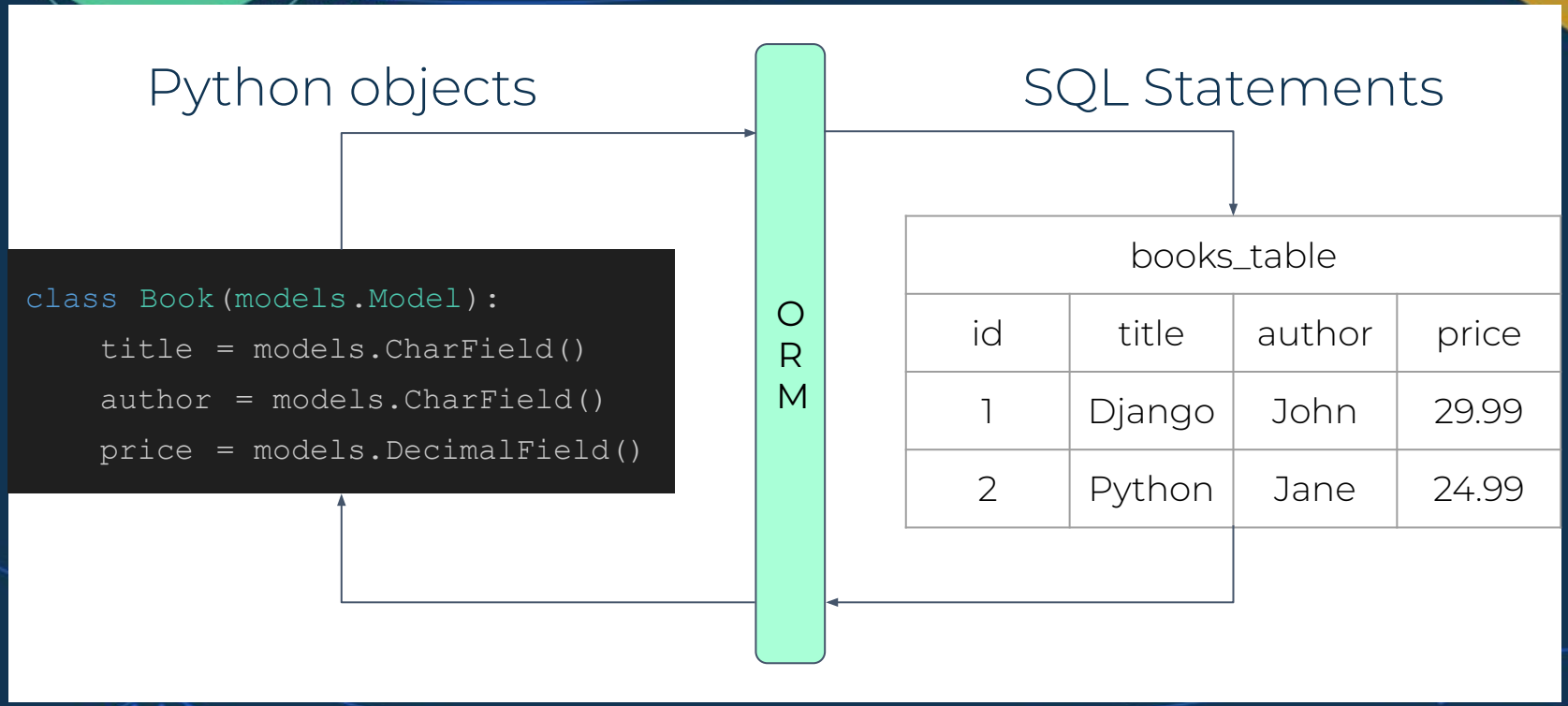
- ➔ ...\> cd **project_name**
- ➔ ...\> py manage.py startapp **my_app**

Django App

Django app structure

- ➔ **my_app**/
  - __init__.py
  - admin.py
  - apps.py
  - migrations/
    - __init__.py
  - models.py
  - tests.py
  - views.py

ORM: Bridging Python and Databases



Models

- Represent database tables as Python classes
- Define structure of the data, including fields and behaviors
- Use models to interact with the database
- Automatic creation of database tables
- Each model maps to a single database table

```
from django.db import models

class Blog(models.Model):
    title = models.CharField(max_length=100)
    content = models.TextField()
    published_date = models.DateTimeField(auto_now_add=True)
```

Forms and Data Handling

- Forms handle user input in Django applications.
- They define the fields users can interact with and validate the submitted data.
- Forms make collecting and processing user input secure and efficient.

```
from django import forms
from .models import Blog

class BlogForm(forms.ModelForm):
    class Meta:
        model = Blog
        fields = ['title', 'content']
```

Data Migration

- Django migrations track changes to your models.
- When you modify a model, migrations create instructions to update the database schema.
- Track changes and roll back if needed
- Automatically generate SQL for database changes
- This ensures your database reflects your latest data structure.
- Version control for your database
- Help maintain data integrity during schema changes

Data Migration: Workflow

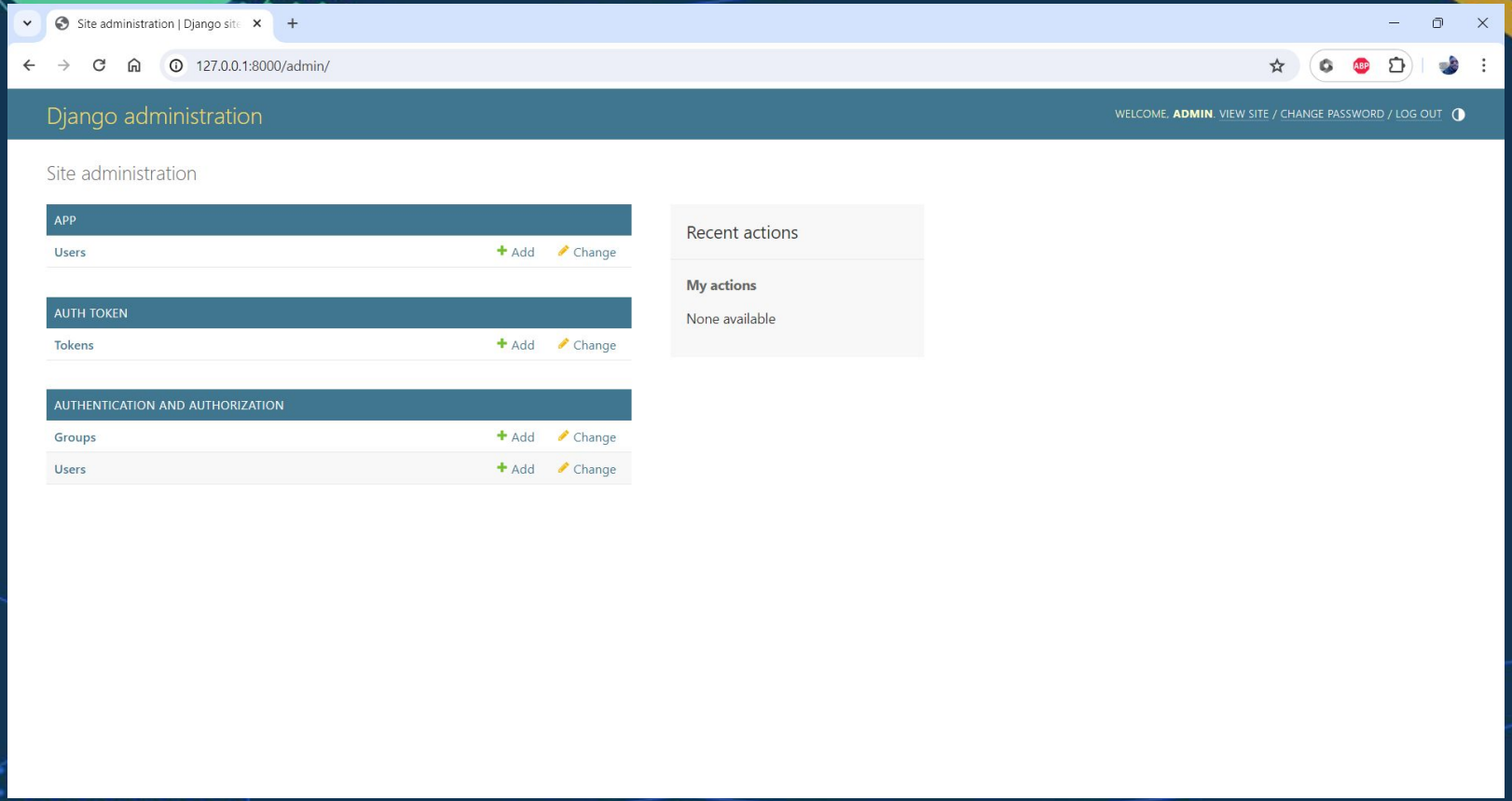
To start a app (after starting a project):

- ➔ ...\> python manage.py **makemigrations**
- ➔ ...\> python manage.py **migrate**

Django Admin

- Provides a web-based interface to your application's data.
- Built-in admin interface
- Automatically generates admin interface for registered models
- Allows CRUD (Create, Read, Update, Delete) operations on data
- Provides user authentication and authorization out of the box

Django Admin



CoGrammar

Final Assessment

CoGrammar

Poll

1. Which Django command is used to start a new Django project?

   a. django-admin startapp
   b. django-admin startproject
   c. python manage.py startproject

Poll

2. What is the correct syntax to create a Django model named Book with fields **title**?
Book is defined as such “class Book(models.Model):”

   a. title = models.CharField(max_length=100)
   b. title = models.TextField()
   c. title = models.CharField()

Let’s get coding!

CoGrammar

Agenda

1. Create a Django Project
2. Create a Django app
3. Implement Model and Logic
4. Implement forms, data handling
5. Retrieve data from both Template view

Lesson Conclusion and Recap

CoGrammar

Lesson Conclusion and Recap

- **Django Core Concepts:** Fundamentals of Django, including models, views, templates, and forms, which form the backbone of web application and backend development.
- **Database Management:** Django's migration system facilitates database management by synchronising changes in models with the database schema.
- **Admin Interface:** Django's admin interface, a powerful tool for managing application data through a user-friendly interface, without writing custom views or forms.
- **Forms and Validation:** The importance of custom forms in Django for handling user input, validation, and data submission, ensuring data accuracy and security.

Homework or Follow-up Activities

CoGrammar

Homework or Follow-up Activities

Objective: Practise writing and deploying apps with Django

1. **Easy**
    a. Remove the photo item. It is not useful. Just keep the following:
        i. Name, email, password, mobile_number, date_of_birth
    b. Make sure that the phone number is actually a number. That field is not validated. It can take any character. Hint: Check the password field.
    c. Add a column that would be associated to each user, to provide their age given their date of birth.

Homework or Follow-up Activities

2. **Mid-Hard**
    a. Let's assume that you are the CEO of a startup. Your main idea is to collect data from estate agent companies around London, say company A, B and C for a start.
    b. Your solution will happen in 2 folds:
        i. You provide a webpage where customers can log on and be recommended the best property to buy for their budget. On the front end, the web page.
        ii. You will need to make money.
            1. That would happen through premium services, like showing more than one house if the fee is paid. This is still the frontend,
            2. Now, banks need your solution. Create an API endpoint for the same service, billing them per request.

Homework or Follow-up Activities

Instructions:

- Make use of Django's tutorial to get started!
- The assumption here for exercise 2:
  - You will create your population in terms of the people who will register through the Django form. Get all the required and validated data, name, age, home address ...
  - The houses will also be fictitious. Create enough variation in prices and location such that it is random enough
  - You will use the Django REST framework for the rest endpoints. Please use the provided code, used during the practical.

References

- https://www.django-rest-framework.org/
- https://docs.djangoproject.com/en/5.0/intro/tutorial01/
- https://medium.com/dsc-umit/mvc-vs-mvt-architectural-pattern-d306a56dce55
- https://www.linkedin.com/pulse/decoding-design-patterns-comparative-analysis-mvc-mvt-ahmed-el-banna-pzefe/
- https://code.visualstudio.com/docs/python/tutorial-django

Thank you for attending

SKILLS FOR LIFE
SKILLS BOOTCAMPS

Department for Education

CoGrammar