Practical 1

APPLICATION DEVELOPMENT FRAMEWORKS

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Aim :

- **Introduction to MVC and MVT architecture.**
- **Comparative Study on MVC and MVT.**
- **Explore the Django application structure.**

Also added comparison of various web development frameworks.

Introduction to MVC and MVT architecture

1. Model View Controller (MVC) :

It is a software design pattern that is used to implement user interfaces and gives emphasis on separating data representation from the components which interact and process the data.

It has 3 components and each component has a specific purpose:

- This **Model** is the central component of this architecture and manages the data, logic as well as other constraints of the application.
- The **View** deals with how the data will be displayed to the user and provides various data representation components.
- The **Controller** manipulates the Model and renders the view by acting as a bridge between both of them.

2. Model View Template (MVT) :

This is yet another design pattern similar to MVC. It is also used for implementing web interfaces and applications but in contrast to MVC, the controller part is taken care for us by the framework itself.

It has 3 components and each component has a specific purpose:

- This **Model** similar to MVC acts as an interface for your data and is basically the logical structure behind the entire web application which is represented by a database such as MySql, PostgreSQL.
- The **View** executes the business logic and interacts with the Model and renders the template. It accepts HTTP request and then return HTTP responses.
- The **Template** is the component which makes MVT different from MVC. Templates act as the presentation layer and are basically the HTML code that renders the data. The content in these files can be either static on dynamic.

Comparative Study on MVC and MVT

Model View Controller (MVC)	**Model View Template (MVT)**
MVC has controller that drives both Model and View.	MVT has views for receiving HTTP request and returning HTTP response.
Highly Coupled	Loosely coupled
Changes are difficult	Changes are easy
It doesn’t involve mapping of URLs.	URL pattern mapping takes place.
Flow is clearly defined thus easy to understand	Flow is sometimes harder to understand as compared to MVC.
We have to write all control specific code.	Controller part is managed by framework itself.
Ex: ASP.NET, Spring MVC, etc.	Django uses MVT pattern.

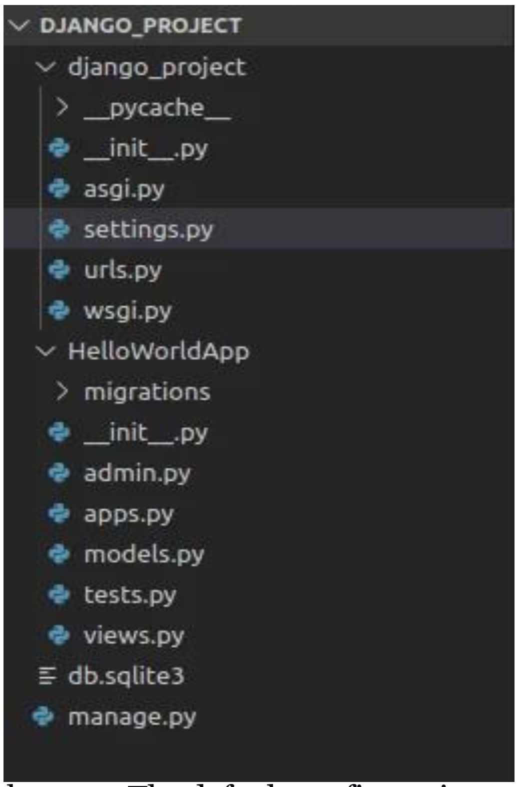
Comparison of various web development frameworks

Parameter	Django	React	Laravel	Flutter	Spring
Performance	Moderate	Fast	High	High	Moderate
Language	Python	Javascript	PHP	Dart	Java
Security	High	High	Medium	High	High
Framework	Front end	Front end	Front end	Front end	Backend
Release Date	2005	2013	2011	2017	2003
Open Source	Yes	Yes	Yes	Yes	Yes
Architecture	MVT	MVC	MVC	MVC	MVC
PROS	• Secure • Flexible • Scalabl e	• Extensive tool set	• Fast building cycle • Large community on Github	• Needs less code • Lest reload • response	• Flexible nature
CONS	Monolithic Not the fastest one	No clear documentati on	Execution problem	Contains lmited library	Complex to learn

Parameter	Ruby on Rails	Vue.js	Angular	Express JS
Performance	Slow	Fast	Moderate	Slow
Language	Ruby	Javascript	Javascript	Java script
Security	High	High	High	Medium
Framework	Back End	Frontend	Frontend	Backend
Release Date	2004	2014	2010	2010
Open Source	Yes	Yes	Yes	Yes
Architecture	MVC	CBA	MVC	MVC
PROS	• Preferred for Prototyping. • Rapid app development	• Easy to discover errors • Clear documentation	• Quick development approach	• Flexible • Simple
CONS		It is way to flexible	Difficult to learn	Obstructive error message

Django App Structure

- **Django App Structure :**



```
DJANGO_PROJECT
  django_project
    __pycache__
    __init__.py
    asgi.py
    settings.py
    urls.py
    wsgi.py
  HelloWorldApp
    migrations
    __init__.py
    admin.py
    apps.py
    models.py
    tests.py
    views.py
  db.sqlite3
  manage.py
```

1. _init_.py
This file has the same functionality just as in the _init_.py file in the Django project structure. It remains empty and is present just to indicate that the specific app directory is a package.

2. admin.py
- As the name suggests, this file is used for registering the models into the Django administration.
- The models that are present have a superuser/admin who can control the information that is being stored.
- This admin interface is pre-built and we don't need to create it.

3. apps.py
This file deals with the application configuration of the apps. The default configuration is sufficient enough in most of the cases and hence we won't be doing anything here in the beginning.

4. models.py
- This file contains the models of our web applications (usually as classes).
- Models are basically the blueprints of the database we are using and hence contain the information regarding attributes and the fields etc of the database.

5. views.py
This file is a crucial one, it contains all the Views(usually as classes). Views.py can be considered as a file that interacts with the client. Views are a user interface for what we see when we render a Django Web application.

6. urls.py
Just like the project **urls.py** file, this file handles all the URLs of our web application. This file is just to link the Views in the app with the host web URL. The settings **urls.py** has the endpoints corresponding to the Views.

7. tests.py
This file contains the code that contains different test cases for the application. It is used to test the working of the application.

** END **