



Django Class Notes

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Flight Project 1 - Er diagram, Swagger, Debug Toolbar, Logger

Nice to have VSCode Extentions:

- Djaneiro - Django Snippets
- SQLite Viewer

Needs

- Python
- pip
- virtualenv
- .gitignore file
- .env file
- Postman

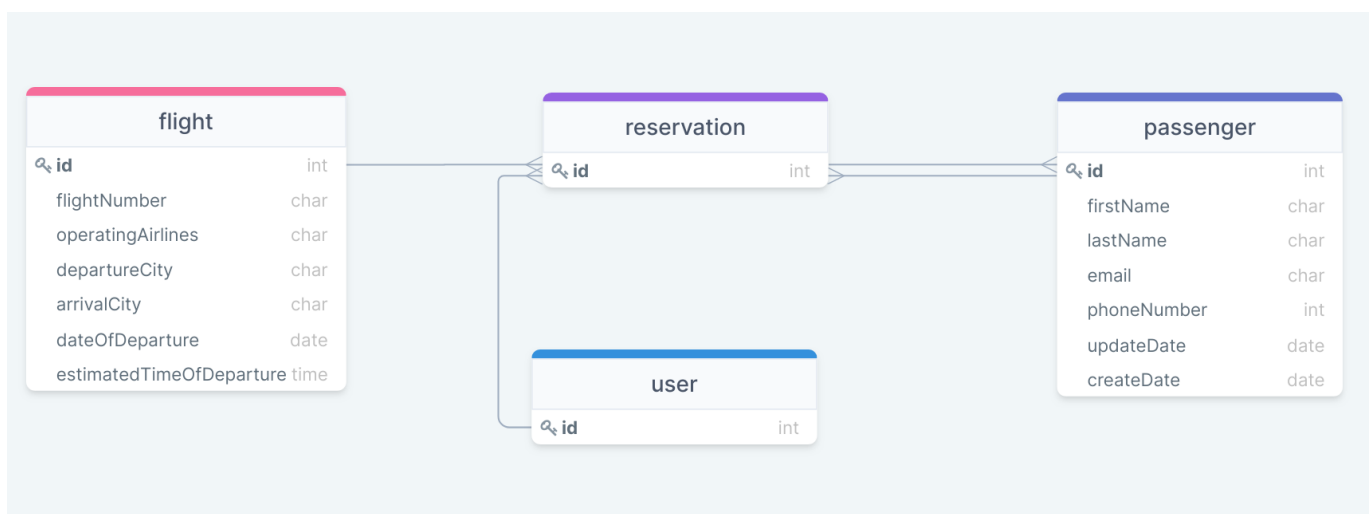
Summary

- Project Introduction
 - Slides
 - Business Requirements Document (BRD)
 - Entity Relationship (ER) Diagram
- Create project
- Secure your project
 - .gitignore

- decouple
- .env
- Publish your project to Github
 - Using VSCode
 - Using git commands
- PostgreSQL setup
- Django Rest Framework setup
- Install Swagger
- Install Debug Toolbar
- Separate Dev and Prod Settings
 - First Solution: Keeping local settings in "settings_local.py"
 - Second Solution: Separate settings file for each environment
 - Django Settings: Best practices

Project Introduction

- Explain project from slides on LMS [link](#)
- Explain Business Requirements Document - [BRD](#)
- Explain Entity Relationship (ER) Diagram and create the diagram on [DrawSQL](#)
- Show a sample finished ER Diagram for the project:



Create project

- Create a working directory, name it as you wish, cd to new directory.
- Create virtual environment as a best practice:

```
python3 -m venv env # for Windows or
python -m venv env # for Windows
virtualenv env # for Mac/Linux or;
virtualenv env -p python3 # for Mac/Linux
```

- Activate scripts:

```
.\env\Scripts\activate # for Windows
source env/bin/activate # for MAC/Linux
```

- See the (env) sign before your command prompt.

Django Rest Framework (DRF) setup

- Get the latest installation [DRF link](#)
- Install DRF:

```
pip install djangorestframework
```

- See installed packages:

```
pip freeze

# you will see:
asgiref==3.5.2
Django==4.1.2
djangorestframework==3.14.0
pytz==2022.4
sqlparse==0.4.3
tzdata==2022.4

# If you see lots of things here, that means there is a problem with your virtual
env activation.
# Activate scripts again
```

- Create requirements.txt same level with working directory, send your installed packages to this file, requirements file must be up to date:

```
pip freeze > requirements.txt
```

- Add 'rest_framework' to your INSTALLED_APPS setting.

```
INSTALLED_APPS = [
    # ...
    # Third party apps:
    'rest_framework',
```

```
# My apps:  
]
```

- Create project:

```
django-admin startproject main .  
# With . it creates a single project folder.  
# Avoiding nested folders
```

- Various files has been created!
- Check your project if it's installed correctly:

```
python3 manage.py runserver # or,  
python manage.py runserver # or,  
py -m manage.py runserver
```

Secure your project

.gitignore

- Add standard .gitignore file to the project root directory.
- Do that before adding your files to staging area, else you will need extra work to unstage files to be able to ignore them.

python-decouple

- To use python decouple in this project, first install it:

```
pip install python-decouple
```

- Update requirements.txt:

```
pip freeze > requirements.txt
```

- For more information look at [python-decouple documentation](#)
- Import the config object on settings.py file:

```
from decouple import config
```

- Create .env file on root directory. We will collect our variables in this file.

```
SECRET_KEY=t5o9...
```

- You can use [django secret key generator apps](#)
- Retrieve the configuration parameters in settings.py:

```
SECRET_KEY = config('SECRET_KEY')
```

- From now on you can send your project to the github, but double check that you added a .gitignore file which has .env on it.

Publish your project to Github

- The easiest way to publish your local project to github is using the VSCode extension.
 - Open Source Control page and click "Publish to Github".
 - Write a descriptive name and publish.
 - Push your code, set main as upstream (remote) branch name.
 - If you want, go to your Github page and change visibility or your project to "Public".
- Create a remote repo in your Github account first and follow descriptions on the page.

PostgreSQL setup

- To get Python working with Postgres, you will need to install the "psycopg2" module.

```
pip install psycopg2
```

- Update requirements.txt:

```
pip freeze > requirements.txt
```

- Change db on [settings.py](#) from dbsqlite3 to postgres:

```
DATABASES = {  
    "default": {  
        "ENGINE": "django.db.backends.postgresql_psycopg2",  
        "NAME": config("SQL_DATABASE"),  
        "USER": config("SQL_USER"),
```

```

    "PASSWORD": config("SQL_PASSWORD"),
    "HOST": config("SQL_HOST"),
    "PORT": config("SQL_PORT"),
    "ATOMIC_REQUESTS": True,
}
}

```

- Add db credentials to `.env` file.

Install Swagger

- Explain a [sample API reference documentation](#)
- Swagger is an open source project launched by a startup in 2010. The goal is to implement a framework that will allow developers to document and design APIs, while maintaining synchronization with the code.
- Developing an API requires orderly and understandable documentation.
- To document and design APIs with Django rest framework we will use drf-yasg which generate real Swagger/Open-API 2.0 specifications from a Django Rest Framework API. You can find the documentation [here](#).
- Installation:

```
pip install drf-yasg
```

- Update requirements.txt:

```
pip freeze > requirements.txt
```

- Add 'drf_yasg' to your INSTALLED_APPS setting.

```

INSTALLED_APPS = [
    # ...
    'django.contrib.staticfiles',
    # required for serving swagger ui's css/js files

    # Third party apps:
    'drf_yasg',
    # ...
]

```

- Here is the updated urls.py for swagger. In swagger documentation, those patterns are not up-to-date. Modify urls.py:

```

from django.contrib import admin
from django.urls import path

# Three modules for swagger:
from rest_framework import permissions
from drf_yasg.views import get_schema_view
from drf_yasg import openapi

schema_view = get_schema_view(
    openapi.Info(
        title="Flight Reservation API",
        default_version="v1.0.0",
        description="Flight Reservation API help your travelers find the perfect flight.",
        terms_of_service="#",
        contact=openapi.Contact(email="rafe@clarusway.com"), # Change e-mail on
this line!
        license=openapi.License(name="BSD License"),
    ),
    public=True,
    permission_classes=[permissions.AllowAny],
)

urlpatterns = [
    path("admin/", admin.site.urls),

    # Three url paths for swagger:
    path("swagger(<format>\\.json|\\.yaml)",
schema_view.without_ui(cache_timeout=0), name="schema-json"),
    path("swagger/", schema_view.with_ui("swagger", cache_timeout=0),
name="schema-swagger-ui"),
    path("redoc/", schema_view.with_ui("redoc", cache_timeout=0), name="schema-
redoc"),
]

```

- Migrate:

```

python3 manage.py migrate # or;
python manage.py migrate # or;
py manage.py migrate

```

- Run the server and test pages [swagger page](#) and [redoc page](#) of your project!

Install Debug Toolbar

- The Django Debug Toolbar is a configurable set of panels that display various debug information about the current request/response and when clicked, display more details about the panel's content.

- See the Django Debug Toolbar [documentation page](#).
- Install the package:

```
pip install django-debug-toolbar
```

- Update requirements.txt:

```
pip freeze > requirements.txt
```

- Add "debug_toolbar" to your INSTALLED_APPS setting:

```
INSTALLED_APPS = [  
    # Third party apps:  
    # ...  
    'debug_toolbar',  
    # ...  
]
```

- Add django-debug-toolbar's URLs to your project's URLconf:

```
from django.urls import include  
  
urlpatterns = [  
    # ...  
    path('__debug__/', include('debug_toolbar.urls')),  
]
```

- Add the middleware to the top:

```
MIDDLEWARE = [  
    'debug_toolbar.middleware.DebugToolbarMiddleware',  
    # ...  
]
```

- Add configuration of internal IPs to "settings.py":

```
INTERNAL_IPS = [  
    "127.0.0.1",  
]
```


Seperate Dev and Prod Settings

- When we start to deploy our Django application to the server or develop a Django application with the team, settings will be a serious problem.
- There is no built-in universal way to configure Django settings without hardcoding them. But books, open-source and work projects provide a lot of recommendations and approaches on how to do it best. Let's take a brief look at the most popular ones to examine their weaknesses and strengths.

First Solution: Keeping local settings in `settings_local.py`

- This is the oldest method. The basic idea of this method is to extend all environment-specific settings in the `settings_local.py` file, which is ignored by VCS.
 - Pros: Secrets not in VCS.
 - Cons: `settings_local.py` is not in VCS, so you can lose some of your Django environment settings. The Django settings file is a Python code, so `settings_local.py` can have some non-obvious logic. You need to have `settings_local.example` (in VCS) to share the default configurations for developers.

Second Solution: Separate settings file for each environment

- This is an extension of the previous approach. It allows you to keep all configurations in VCS and to share default settings between developers.
- In this case, you make a settings package with the following file structure:

```
settings/  
├── __init__.py  
├── base.py  
├── ci.py  
├── local.py  
├── staging.py  
├── production.py  
└── qa.py
```

- We prefer the second solution.
- In the "main" directory, create a new folder named "settings".
- Inside "settings" folder, create;
 - `__init__.py` which is the required file to create a python module.
 - `base.py` which will include common settings.

- `dev.py` which will include development specific settings.
- `prod.py` which will include production specific settings.
- Copy all the stuff inside `settings.py` to `base.py`. And delete `settings.py`.
- Separate dev and prod settings. Mutual settings will remain on base settings.
- Changes in base settings:

```
BASE_DIR = Path(__file__).resolve().parent.parent
# Added one more parent, because our base settings one directory more deeper!!!
```

- Separate DEBUG.
- Cut debug toolbar app from base and put to dev.
- Cut debug toolbar middleware from base and put to dev.
- Cut db and put to prod
- Add regular sqlite3 db to dev:

```
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
        'NAME': 'mydatabase',
    }
}
```

- Cut internal IPs to dev because this setting is about debug toolbar
- Final `base.py` will be:

```
"""
Django settings for main project.

Generated by 'django-admin startproject' using Django 4.1.2.

For more information on this file, see
https://docs.djangoproject.com/en/4.1/topics/settings/

For the full list of settings and their values, see
https://docs.djangoproject.com/en/4.1/ref/settings/
"""

from pathlib import Path
from decouple import config
```

```

# Build paths inside the project like this: BASE_DIR / 'subdir'.
BASE_DIR = Path(__file__).resolve().parent.parent
# Added one more parent!!!

# Quick-start development settings - unsuitable for production
# See https://docs.djangoproject.com/en/4.1/howto/deployment/checklist/

# SECURITY WARNING: keep the secret key used in production secret!
SECRET_KEY = config('SECRET_KEY')

ALLOWED_HOSTS = []

# Application definition

INSTALLED_APPS = [
    'django.contrib.admin',
    'django.contrib.auth',
    'django.contrib.contenttypes',
    'django.contrib.sessions',
    'django.contrib.messages',
    'django.contrib.staticfiles',

    # Third party apps:
    'rest_framework',
    'drf_yasg',

    # My apps:
]

MIDDLEWARE = [
    'django.middleware.security.SecurityMiddleware',
    'django.contrib.sessions.middleware.SessionMiddleware',
    'django.middleware.common.CommonMiddleware',
    'django.middleware.csrf.CsrfViewMiddleware',
    'django.contrib.auth.middleware.AuthenticationMiddleware',
    'django.contrib.messages.middleware.MessageMiddleware',
    'django.middleware.clickjacking.XFrameOptionsMiddleware',
]

ROOT_URLCONF = 'main.urls'

TEMPLATES = [
    {
        'BACKEND': 'django.template.backends.django.DjangoTemplates',
        'DIRS': [],
        'APP_DIRS': True,
        'OPTIONS': {
            'context_processors': [
                'django.template.context_processors.debug',
                'django.template.context_processors.request',
                'django.contrib.auth.context_processors.auth',
                'django.contrib.messages.context_processors.messages',
            ],
        },
    ],
]

```

```

    },
    },
]

WSGI_APPLICATION = 'main.wsgi.application'

# Password validation
# https://docs.djangoproject.com/en/4.1/ref/settings/#auth-password-validators

AUTH_PASSWORD_VALIDATORS = [
    {
        'NAME':
'django.contrib.auth.password_validation.UserAttributeSimilarityValidator',
    },
    {
        'NAME': 'django.contrib.auth.password_validation.MinimumLengthValidator',
    },
    {
        'NAME': 'django.contrib.auth.password_validation.CommonPasswordValidator',
    },
    {
        'NAME':
'django.contrib.auth.password_validation.NumericPasswordValidator',
    },
]

# Internationalization
# https://docs.djangoproject.com/en/4.1/topics/i18n/

LANGUAGE_CODE = 'en-us'

TIME_ZONE = 'UTC'

USE_I18N = True

USE_TZ = True

# Static files (CSS, JavaScript, Images)
# https://docs.djangoproject.com/en/4.1/howto/static-files/

STATIC_URL = 'static/'

# Default primary key field type
# https://docs.djangoproject.com/en/4.1/ref/settings/#default-auto-field

DEFAULT_AUTO_FIELD = 'django.db.models.BigAutoField'

```

- Final `dev.py` will be:

```

from .base import INSTALLED_APPS, MIDDLEWARE, BASE_DIR

DEBUG = True

THIRD_PARTY_APPS = [
    "debug_toolbar",
]

INSTALLED_APPS += THIRD_PARTY_APPS

THIRD_PARTY_MIDDLEWARE = [
    'debug_toolbar.middleware.DebugToolbarMiddleware',
]

MIDDLEWARE += THIRD_PARTY_MIDDLEWARE

DATABASES = {
    "default": {
        "ENGINE": "django.db.backends.sqlite3",
        "NAME": BASE_DIR / "db.sqlite3",
    }
}

INTERNAL_IPS = [
    "127.0.0.1",
]

```

- `prod.py` will be:

```

from decouple import config

DEBUG = False

# Database
# https://docs.djangoproject.com/en/4.1/ref/settings/#databases
DATABASES = {
    "default": {
        "ENGINE": "django.db.backends.postgresql_psycopg2",
        "NAME": config("SQL_DATABASE"),
        "USER": config("SQL_USER"),
        "PASSWORD": config("SQL_PASSWORD"),
        "HOST": config("SQL_HOST"),
        "PORT": config("SQL_PORT"),
        "ATOMIC_REQUESTS": True,
    }
}

```

- `__init__.py` will be:

```

from .base import *

ENV_NAME = config("ENV_NAME")

if ENV_NAME == "PROD":

    from .prod import *

elif ENV_NAME == "DEV":

    from .dev import *

```

- Modify `.env` file with environment name, postgres and debug variables:

```
ENV_NAME=DEV
```

LOGGING

Python programmers will often use `print()` in their code as a quick and convenient debugging tool. Using the [logging framework](#) is only a little more effort than that, but it's much more elegant and flexible. As well as being useful for debugging, logging can also provide you with more - and better structured - information about the state and health of your application.

- A Python logging configuration consists of four parts:
 - Loggers
 - Handlers
 - Filters
 - Formatters

Loggers

A logger is the entry point into the logging system. Each logger is a named bucket to which messages can be written for processing.

A logger is configured to have a log level. This log level describes the **severity of the messages** that the logger will handle. Python defines the following log levels:

- **DEBUG**: Low level system information for debugging purposes
- **INFO**: General system information
- **WARNING**: Information describing a minor problem that has occurred.
- **ERROR**: Information describing a major problem that has occurred.
- **CRITICAL**: Information describing a critical problem that has occurred.

Handlers

The handler is the engine that determines what happens to each message in a logger. It describes a particular logging behavior, such as writing a message to the screen, to a file, or to a network socket.

Filters

A filter is used to provide additional control over which log records are passed from logger to handler.

Formatters

Ultimately, a log record needs to be rendered as text. Formatters describe the exact format of that text.

- An example logger can be:

```
LOGGING = {
    "version": 1,

    # Set this to True then all loggers from the default configuration will be
    # disabled.
    "disable_existing_loggers": True,

    # Formatters describe the exact format of that text of a log record.
    "formatters": {
        "standard": {
            "format": "[%(levelname)s] %(asctime)s %(name)s: %(message)s"
        },
        'verbose': {
            'format': '{levelname} {asctime} {module} {process:d} {thread:d}
{message}',
            'style': '{',
        },
        'simple': {
            'format': '{levelname} {message}',
            'style': '{',
        },
    },

    # The handler is the engine that determines what happens to each message in a
    # logger.
    # It describes a particular logging behavior, such as writing a message to the
    # screen,
    # to a file, or to a network socket.
    "handlers": {
        "console": {
            "class": "logging.StreamHandler",
            "formatter": "standard",
            "level": "INFO",
            "stream": "ext://sys.stdout",
        },
        'file': {
            'class': 'logging.FileHandler',
            "formatter": "verbose",
            'filename': './debug.log',
        },
    },
}
```

```

        'level': 'INFO',
    },
},

# A logger is the entry point into the logging system.
"loggers": {
    "django": {
        "handlers": ["console", 'file'],

        # log level describes the severity of the messages that the logger
        # will handle.
        "level": config("DJANGO_LOG_LEVEL", "INFO"),

        'propagate': True,
        # If False, this means that log messages written to django.request
        # will not be handled by the django logger.
    },
},
}

```

- Put this setting to the base.py. If your project requires different settings on dev and prod environment, separate this setting also.
- Add DJANGO_LOG_LEVEL variable to `.env`.
- Test logging.

Django Settings: Best practices

- Keep settings in environment variables.
- Write default values for production configuration (excluding secret keys and tokens).
- Don't hardcode sensitive settings, and don't put them in VCS.
- Split settings into groups: Django, third-party, project.
- Follow naming conventions for custom (project) settings.

This is the end of initial setup. Send this setup to your Github repo. You can use it in your projects.

☺ **Happy Coding!** 

