Flask Tutorial

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Learning Goals

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1. Learn what is Flask, and some basic Flask concepts
2. Learn the Model View Control (MVC) pattern
3. Learn basic Docker

Flask Introduction

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Other frameworks out there

- Ruby on Rails
- Django (Python)
- Java Spring
- Symfony (PHP)

Who uses Flask?

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Uber

What do I need know?

What do I need know?

- Very basic Python
  - Variables, functions, indentation, lists, maps (dictionaries), if-then-else, for loops, class (OO programming), import libraries
- Terminal commands: `ls`, `cd`, `pwd`...
- Basic HTML
- CSS (optional)
- SQL

Flask Concepts

The App Variable

- Our app is an instance of the `Flask` class
- `__name__` is a default configuration telling that the files of the project are in the current directory

```
1 from flask import Flask
2
3 app = Flask(__name__)
```

Routing

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5 @app.route("/")
6 def hello_world():
7     return "<p>Hello, World!</p>"
```

- `@app.route("/")` is Python decorator: extends the behavior of a function
  - Tells Flask what URL should trigger our function
  - The `"/"` is the root of our web site domain
    `http://127.0.0.1:5000` takes us to this route
  - We can have other routes: `@app.route("/register")`
    `http://127.0.0.1:5000/register` takes us to this other route

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What else to learn:

- Variable rules:
  `https://flask.palletsprojects.com/en/stable/quickstart/#variable-rules`
- HTTP methods:
  `https://flask.palletsprojects.com/en/stable/quickstart/#http-methods`

Templates

File ./app.py:

```
from flask import render_template

@app.route('/hello/')
@app.route('/hello/<name>')
def hello(name=None):
    return render_template('hello.html', person=name)
```

File ./templates/hello.html:

```
<!doctype html>
<title>Hello from Flask</title>
{% if person %}
  <h1>Hello {{ person }}!</h1>
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- 2 routes for the same function
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- Import `render_template` (Jinja2 template engine)
- 2 routes for the same function
- The function has a named argument
- `render_template` passes the named arguments
- The template has access to the Python variables.
  Inside of {% %} is Jinja2 code
  Inside of {{ }} is to print as HTML

What else to learn about templates?

- If statements: `https://jinja.palletsprojects.com/en/stable/templates/#if`
- For loops: `https://jinja.palletsprojects.com/en/stable/templates/#for`
- Template Inheritance
  `https://jinja.palletsprojects.com/en/stable/templates/#template-inheritance`

MVC (extra)

Model View Controller

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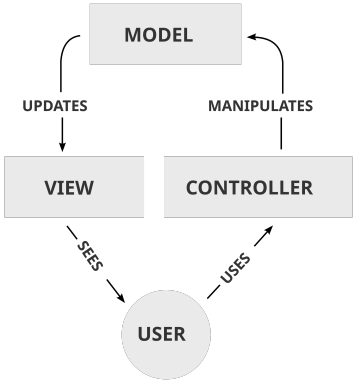
We split the applications in:

- Model: The internal representation of the information (e.g., our domain objects)
  - Interact with the database
  - Busyness logic
  - Do complex computations
- View: The interface for the user
  - Builds the HTML/Javascript/JSON/Text
- Controller: Links model and view



Docker (extra)

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- It is also runs on MacOS and Windows

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Why use Docker?

- Like git, it is a standard in the industry
- It will make the life of the TAs way easier

An Usual Setup

The Bank Example Project

The Bank Example Project Overview

Let's write our web apps!

Hands-on

- Follow my step-by-step guide: `https://github.com/rafaelcgs10/dis2025`
- Follow the official Flask tutorial: `https://flask.palletsprojects.com/en/stable/tutorial/`