

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

What is Flask?

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 - Micro: enforces very little
 - In/for Python

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Other frameworks out there

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

Who uses Flask?

Who uses Flask?



reddit

Uber

Prerequisites

Prerequisites

- 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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3 app = Flask(__name__)
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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:

```
1 from flask import render_template
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3 @app.route('/hello/')
4 @app.route('/hello/<name>')
5 def hello(name=None):
6     return render_template('hello.html', person=name)
```

File ./templates/hello.html:

```
1 <!doctype html>
2 <title>Hello from Flask</title>
3 {% if person %}
4     <h1>Hello {{ person }}!</h1>
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- 2 routes for the same function
- The function has a named argument

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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

Model View Controller

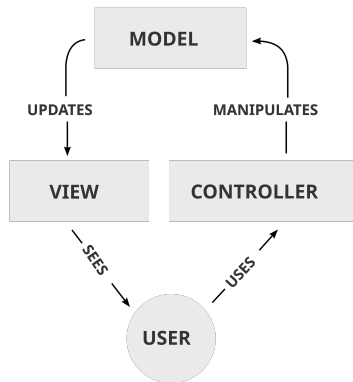
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We split the applications in:

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



Docker (extra)

Docker Introduction

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version of system libraries, databases, the environment variables...
- Docker does exactly that!

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- It is a container solution based on a Linux kernel feature called cgroups
- 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

More concepts

- Docker container: isolated process with its own file system
- Docker image: is a package that includes all of the files, binaries, libraries, and configurations to run a Docker container
 - Built on layers: make your own image on top of existing ones
- Docker volume: persistent data stores for containers

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An usual setup:

- Dockerfile: The Docker image in which your main app will run on
- `entrypoint.sh`: The script that the Dockerfile calls when its container is starting up
- `docker-compose.yml`: Organizes all the different Docker containers of your application

A Minimal MVC Flask app with Docker Project

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- App

Let's write our web apps!

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