

# Advanced Programming with Python

## Session 2

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# Plan for today

- Flask routing

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- HTTP clients with Requests

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- returning different status codes



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- HTTP clients with Requests
- returning different status codes
- using request bodies



We will use `flask` in this course to learn and create web servers in Python.

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example: simple flask application

how do we use 'flask'?





```
from flask import Flask

app = Flask("simplest server")

@app.route("/hello")
def hello():
    return "hello from the web!"

app.run()
```

# HTTP routes

Our flask server can handle different routes by adding more handlers to it:

```
@app.route("/hello")
def hello():
    return "hi!"
```

```
@app.route("/goodbye")
def hello():
    return "bye!"
```

We can also capture part of the path as a variable:

```
@app.route("/hello/<name>")
def hello(name):
    return "hello " + name
```

# HTTP methods

One can specify which methods the function handles in the **methods** parameter

```
@app.route("/hello", methods=["GET"])  
def hello():  
    return "hi!"
```

```
@app.route("/goodbye", methods=["POST"])  
def goodbye():  
    return "bye!"
```

# Returning JSON

Flask has a **jsonify** function that we can use to convert the data we want to JSON:

```
from flask import Flask, jsonify

app = Flask("hello server")

@app.route("/hello")
def hello():
    return jsonify({"message": "hello", "name": "Pepe"})
```



So far, we've been focusing only on one side of the client-server side, the server.

However, we can create HTTP clients in Python too!

# HTTP clients. requests library

We can use requests to get an HTTP response as follows:

```
import requests

response = requests.get("url")

data = response.json()

print(data)
```





We all know the infamous **404 Not Found** HTTP status code. Apart of it, there are a lot more that are used when developing HTTP servers. Some of the most used are:

## 200 OK

Used whenever everything went correctly.



## 201 Created

Used to give the user feedback so they know the resource has been created.

## 400 Bad request

A general error in the received request. It's used commonly too mark a request as invalid because of some validation problem.

## 404 Not found

Whenever the resource requested by the user is not found



# Interlude... Tuples

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We all remember the list data structure, a structure that can hold zero or more elements of different types.

Well, there's another list-like data structure, called `tuple`. The big difference between the two of them is that lists can grow or shrink in size, with the `.pop` or `.append` methods, while tuples cannot change their size.

# Interlude... Tuples

```
my_list = [1,2,3] # We create lists with square brackets
my_tuple = (1,2,3) # We create tuples with parentheses

my_list.append(4) # adds an element at the end of my_list
my_tuple.append(4) # ERROR! tuple object has no attribute append
```



# Interlude... Tuples

Something else to remark about tuples is that, if Python sees comma separated values without any surrounding (parentheses, curly brackets, or square brackets), will understand them as a tuple.

```
tuple_with_parentheses = (1,2,3)
tuple_without_parentheses = 1,2,3

print(type(tuple_with_parentheses))
# <class 'tuple'>
print(type(tuple_without_parentheses))
# <class 'tuple'>
```



Flask allows returning a **tuple** in any route, in which the first parameter is the **response body**, and the second the **status code**:

```
@app.route("/users/<user_id>")
def get_user(user_id):
    if user_not_found():
        return jsonify({"error": "not found"}), 404
```

# Status Codes

See `exercises/translations.py`

## Practice

Let's implement a simple flask server that finds the correct translation for hello in a dictionary of translations.

We want our server to respond to requests to `/translation/<language>`.

The dictionary can look like this:

```
translations = {  
    "en": "hello",  
    "es": "hola",  
    "it": "ciao",  
}
```

If the received language doesn't exist, we want to return a 404 response.

