Intermediate Python

Unit 3: Introduction to Flask

Overview

- What is Flask?
- Why are we learning this?
- The Internet, aka "the web"
- Writing Flask applications

What is Flask?

Flask is a Python library.

Flask is a library that lets us create **web applications** and **websites/webpages**.

Flask is a web framework.

Flask helps us build web servers.

Flask helps us build web servers that power our web applications.

A note on terminology

The terms **web application**, **website**, and **webpage** are all interchangeable and refer to a website that is accessed with a web browser.

Why are we learning this?

Why are we learning this?

Much of our world is powered by the web.

Why are we learning this?

Even when we're not browsing *the web* on our *browsers*, we're likely on the web.

Why are we learning this?

Everything is connected to the web: your phone, your watch, even your fridge might even be connected to the web.

Why are we learning this?

But the primary use of the web is still the usage of webpages, and this is what we'll be learning about.

Why are we learning this?

Being able to create programs that rely on *the web* or *networking* is an important part of being a software engineer.

The Internet

What is The Internet?

The Internet is a global network of billions of computers and electronic devices that are able to talk to each other.

Talking to each other

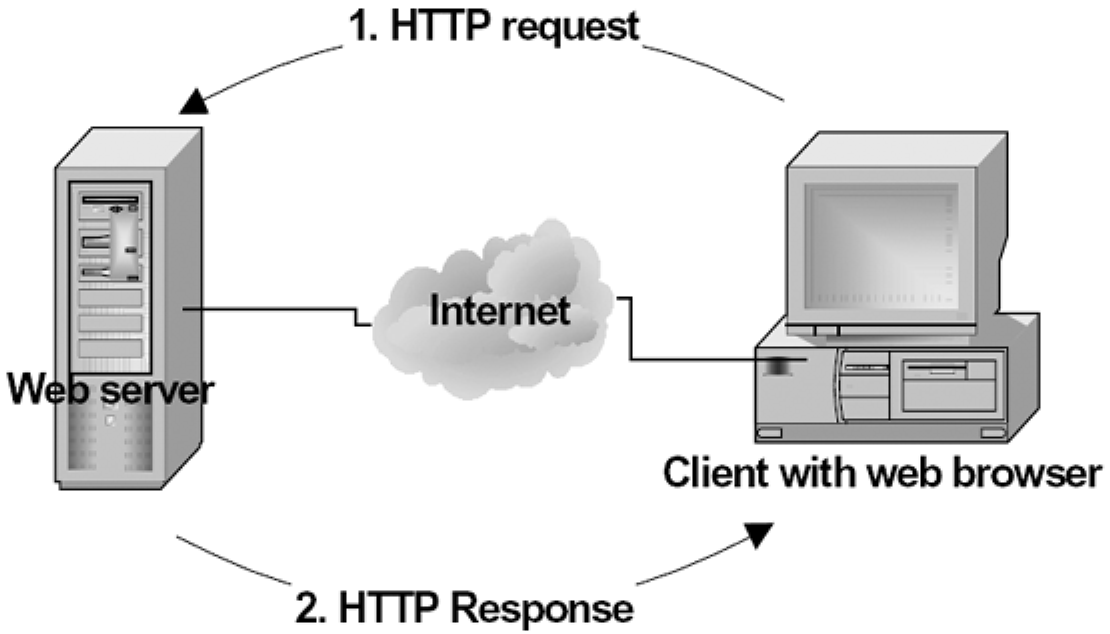
What is meant by "talking to each other" is simply the act of sending and receiving messages.

Talking to each other

The first computer sends a **request** for some data and the second computer **responds** to the request.

Terminology

- **Request**: a message sent by a computer, the sender, to another computer, the receiver.
- **Response**: a response to a message sent back from the receiver to the sender.


1. HTTP request
Web server
Internet
Client with web browser
2. HTTP Response

Let's jump into the code

Sample Flask application

```python
import flask

app = flask.Flask(__name__)

@app.get("/")
def index():
    return "Hello, world"

app.run()
```

Let's break this down

```
import flask

app = flask.Flask(__name__)

@app.get("/")
def index():
    return "Hello, world"

app.run()
```

Imports

```
import flask

app = flask.Flask(__name__)

@app.get("/")
def index():
    return "Hello, world"

app.run()
```

Using imported code

```
import flask

app = flask.Flask(__name__)

@app.get("/")
def index():
    return "Hello, world"

app.run()
```

`__name__`

```python
import flask

app = flask.Flask(__name__)

@app.get("/")
def index():
    return "Hello, world"

app.run()
```

Creating an application

```
import flask

app = flask.Flask(__name__)

@app.get("/")
def index():
    return "Hello, world"

app.run()
```

Running an application

```
import flask

app = flask.Flask(__name__)

@app.get("/")
def index():
    return "Hello, world"

app.run()
```

Functions

```python
import flask

app = flask.Flask(__name__)

@app.get("/")
def index():
    return "Hello, world"

app.run()
```

Whatever our function returns will be the response sent back to the client.

Whatever our function returns will be what is displayed in our browser.

Decorators

```
import flask

app = flask.Flask(__name__)

@app.get("/")
def index():
    return "Hello, world"

app.run()
```

Decorators

Decorators allow us to add functionality to out functions.

Templates

Routes can return HTML

```
@app.get("/")
def index():
    return """
        <!DOCTYPE html>
        <html>
            <head>
                <title>Project: Recipe book</title>
            </head>
            <body>
                <h1>Recipe Book</h1>
                <h2>Contents</h2>

                ...
    """
```

Routes can return HTML

But this can be cumbersome due to the length of the content.

Templates

Flask provides a function named `render_template` that lets us move our HTML code into separate files.

Contents of `templates/index.html`

```html
<!DOCTYPE html>
<html>
    <body>
        <h1>Hello World!</h1>
    </body>
</html>
```

Contents of `application.py`

```python
# ...

@app.get("/")
def index():
    return render_template("hello.html")

# ...
```

Templates

This makes working with HTML easier because it's no longer a string in our Python code.

Templates

Flask templates use a library called Jinja2.

Jinja2

Jinja2 offer functionality that lets you merge variables in into your HTML code.

Contents of `templates/index.html`

```html
<!DOCTYPE html>
<html>
    <body>
        <h1>Hello {{ name }}!</h1>
    </body>
</html>
```

Contents of `application.py`

```python
# ...

@app.get("/")
def index():
    return render_template("hello.html", name="Marcos")

# ...
```

Keyword arguments

When you call a function in Python and pass an argument to it, you can specify the name of the argument.

Keyword arguments, an example

```python
def print_greeting(name):
    print("Hello " + name)

print_greeting("Ahmed")
print_greeting(name="Cindy")

name_to_greet = "Janira"
print_greeting(name=name_to_greet)
```