Flask

One website made with Flask

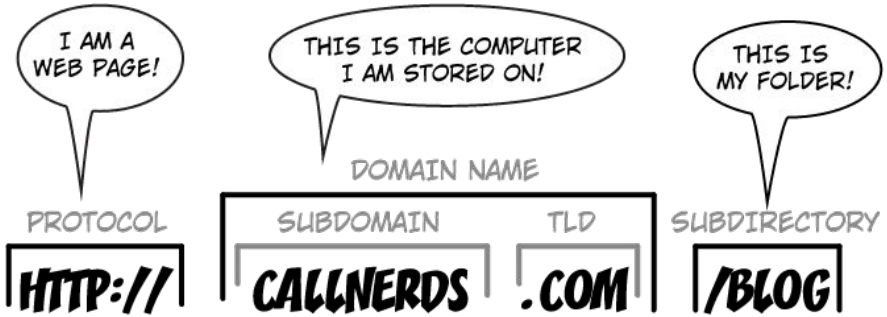
The WWW, and finding information with the URL

World Wide Web:

- documents stored on servers
- identified by Uniform Resource Locators (URLs)
- interlinked by hypertext links
- accessed via the Internet

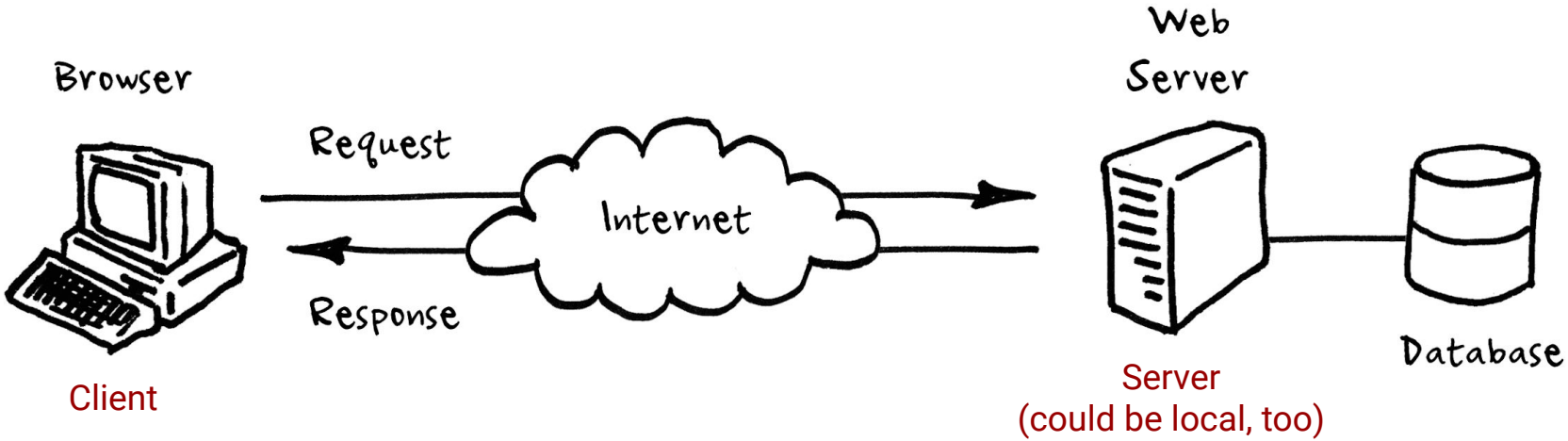
URL:
the location of a web resource on a computer network and the mechanism for retrieving it.

FYI: Communication protocol



http://slides.com/jameyhoff/different-parts-of-a-domain-name#/

Client-server relationship and GET and POST requests



An HTTP GET request method retrieves information from the server. Some data can be passed within the URL's query string, specifying (for example) search terms, date ranges, etc.

In a POST request, an arbitrary amount of data of any type can be sent to the server in the body of the request message. -- *Wikipedia*

Confidential and/or lengthy information should be sent using POST.

https://developer.mozilla.org/en-US/docs/Learn/HTML/Forms/Sending_and_retrieving_form_data

Web Browser

A web browser sends, requests, receives, and renders data on the internet and WWW.

Typical steps are:

- A user inputs a URL into the address bar
- A GET request is sent to the appropriate web server
- The web server responds with HTML (Hypertext Markup Language) and associated content (CSS - Cascading Style Sheets, images, video, etc.)
- The browser’s layout engine renders the content (including HTML and CSS)

HTML (Hypertext Markup Language)

HTML is written using **tags**, where the tags describe content:

Tag	Description
`<h1> - <h6>`	Heading
`<p>`	Paragraph
`<i>`	Italic
`<b>`	Bold
`<a>`	Anchor (links)
`<ul> & <li>`	Unordered List & List Item
`<blockquote>`	Blockquote
`<img>`	Image
`<div>`	Division

Example HTML:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Simple HTML document</title>
</head>
<body>
  <h1>Hello World!</h1>
</body>
</html>
```

Other examples:

http://www.tutorialrepublic.com/html-examples.php

Of note:

Setting width and height of images
Making a simple table
Create a text input field
Dropdown list
Link to a css stylesheet
Use of javascript

CSS (Cascading Style Sheets)

Hard-coding formatting information into HTML is unreasonable for large websites. Formatting is placed in CSS. The HTML document references the CSS document, and uses classes and IDs defined in that document.

HTML file

```
<!DOCTYPE html>
<link rel="stylesheet" type="text/css" href="mystyle.css">
<title>Page Title</title>

<h1 class="red_text">This is a red heading using a class.</h1>
<p id="blue_text">This is a blue paragraph using an ID.</p>
```

CSS file

```
.red_text {
    color: red
}

#blue_text {
    color: blue
}
```

Demo:
https://www.w3schools.com/css/css_intro.asp

Flask

Flask is a web micro-framework. It provides you with the minimal tools and libraries to build a web application in Python. It's a micro-framework in that it only has two dependencies:

- **Werkzeug** - a WSGI (Web Server Gateway Interface) utility library for interface between web servers and web applications for the Python programming language.
- **Jinja2** - its html template engine

A simple Flask web application

It’s usually comprised of

- app.py
- templates/index.html
- static/style.css

```
web_app/
  app.py
  templates/
    index.html
  static/
    hello.css
```

All of this is put in an app folder.

Flask is literal: you **must** call the folder containing .html files **templates** (not template, not html) and you **must** call the folder containing .css and .js files **static**.

A simple Flask web application

app.py:

```
#!/usr/bin/env python

import flask


# Create the application.
APP = flask.Flask(__name__)


@APP.route('/')
def index():
    """ Displays the index page accessible at '/'
    """
    return flask.render_template('index.html')


if __name__ == '__main__':
    APP.debug=True
    APP.run()
```

templates/index.html

```
<!DOCTYPE html>
<html lang='en'>
<head>
  <meta charset="utf-8" />
  <title>Hello world!</title>
  <link type="text/css" rel="stylesheet"
        href="{{ url_for('static',
              filename='hello.css')}}" />
</head>
<body>

It works!

</body>
</html>
```

Folder structure:

```
web_app/
  app.py
  templates/
    index.html
  static/
    hello.css
```

Jinja2

Jinja2 is a templating language for Python, modeled after Django. Besides allowing HTML to be removed from the Flask app and placed into a template, it allows data to be passed-in, allowing the web page to dynamically change with the data it is given. It has many other advantages (see website).

```
<title>{% block title %}{% endblock %}</title>
<ul>
{% for user in users %}
  <li><a href="{{ user.url }}">{{ user.username }}</a></li>
{% endfor %}
</ul>
```

http://jinja.pocoo.org/docs/2.9/

Resources

- flask_walkthrough.ipynb
  - Step-by-step investigation of Flask syntax and use cases with a lot of documentation
- https://www.fullstackpython.com/flask.html
  - Good overview of what you can do
- https://realpython.com/blog/python/flask-by-example-part-1-project-setup/
  - Flask with PostgresSQL database deployed on Heroku with many front end refinements
- https://blog.miguelgrinberg.com/post/the-flask-mega-tutorial-now-with-python-3-support
  - Another excellent step-by-step guide
- https://www.fullstackpython.com/jinja2.html
  - Jinja2 formatting examples
- http://www.tutorialrepublic.com/html-examples.php
  - HTML examples for about everything

Workflow and Architecture