Programming fundamentals for Python

HTTP

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2020-04-20

Plan for today

- Internet basics

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- Requests library

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- Exercises

The Internet

The internet is a **VERY BIG** computer network. It forms a **graph** of computers ones connected to others.

Internet

Discuss the Internet in the whiteboard.

HTTP

HTTP is the protocol that powers The Internet:

Based on **requests** and **responses**.

Clients do requests and **servers** answer with responses

HTTP requests

```
GET / HTTP/1.1
Accept: text/html

Host: www.example.com
```

HTTP Responses

Status

```
HTTP/1.1 200 OK

Date: Mon, 23 May 2005 22:38:34 GMT
Content-Type: text/html; charset=UTF-8
Content-Length: 138
Last-Modified: Wed, 08 Jan 2003 23:11:55 GMT
Server: Apache/1.3.3.7 (Unix) (Red-Hat/Linux)
ETag: "3f80f-1b6-3e1cb03b"
Accept-Ranges: bytes
Connection: close

{"user": "pepegar", "age": 55}
```

HTTP Requests

HTTP requests and responses are messages interchanged between client and server

HTTP requests may contain a lot of metadata but for us, today, the only field that matters is the URL:

HTTP Clients

HTTP clients send requests to HTTP servers. The most iconic case for HTTP clients is web browsers.

Web browsers are HTTP clients that allow us to navigate the web with our computer.

HTTP Clients

Deconstruct what happens when we browse the web (Developer mode)

start at https://en.wikipedia.org/wiki/Echidna

Web APIs

Web APIs, or just APIs are the most common way for exposing information from a web server.

Web APIs

Most web APIs communicate using a data interchange format such as **JSON** or **XML**.

JSON

http://json.org

JSON is a data interchange format used to share data between HTTP clients and servers. Some valid JSON values are:

```
[1,2,3] # lists

1 # numbers

"potatoes" # Strings

{"name":"Pepe","surname":"Garcia"} # dictionaries
```

Using JSON

```
json_encoded_string = """
    {"name": "Pepe", "last_name": "García"}
    """
```

Let's **parse** this JSON string from Python using the **json** module

requests library

Requests is the most famous HTTP library for Python. It has an HTTP client as well as other useful utilities such as JSON handler, etc.

It should be already installed in your computers thanks to Anaconda.

requests library

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

```
import requests

response = requests.get("url")

data = response.text
```

Practice

Let's try using **requests** to get the homepage of http://google.com

requests + json

Requests has builtin function for handling JSON responses

```
response = requests.get('http://api.open-notify.org/astros.json')


response.json()
```

requests library

Use **http://api.open-notify.org/astros.json**

Call the API and print a message like:

```
There's currently 78 people in space:
- Christina Coch
- Alexander Skvortsov
-...
```

requests library

Use the Github API to retrieve all the public repositories in our organization!

https://api.github.com/orgs/pfp-2020/repos

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https://api.github.com/repos/pfp-2020/session-6/commits

Fuel for crazy ideas

https://github.com/toddmotto/public-apis

Exercises

Exercise 1

Create a function that uses the **requests** library to get the lyrics of a song.

You can use the **lyrics.ovh** api as described here:

https://lyricsovh.docs.apiary.io/#reference/0/lyrics-of-a-song/search?console=1

Exercise 1

Create a function that returns the current latitude and longitude of the ISS

http://api.open-notify.org/