APIs

Overview

- What is an API?
- RESTful API Design
- Accessing APIs
- Postman

Background

API

- API stands for Application Programming Interface. Interface in this case refers to *how we can interact* with the application, *not a user interface.* So an API is the set of features and rules that allow for interaction.
- We have already been creating and using APIs throughout this course! The DOM is an API that allows us to interact with web pages. There are APIs for interacting with Bluetooth devices. When we've created servers, we were setting up an API and defining how it could be used with endpoints. Those are the kind we'll be working with today. We'll learn more about their design and how to interact with them.

Why APIs?

- APIs provide tons of information and capabilities to developers that they wouldn't otherwise have. For example, there are APIs that provide sports data. If you wanted to create a fantasy football website, you could use an API that provided data for you instead of having to go and collect it yourself.
- Or maybe you want to create a custom script for your smart thermometer. By reading through the API documentation, you can figure out what functionality is available to you without knowing how the entire system works.

How do we use them?

It depends on the API. Some are accessible right in HTML or JavaScript or through specific software. Today, we'll be using URLs (endpoints, params, queries, etc) to interact with APIs that are hosted on the internet. We'll get into more specifics after we talk about API design and REST.

REST

RESTful API

Representational State Transfer Application Programming Interface

It means that a request or response will require/include ALL the data, it doesn't rely on another request/function

This sounds important

It is!

- A set of standards for API architecture
- **URLs are uniform and meaningful**
- Client and server are independent of each other
  - Can be in different languages!
- HTTP(S) is the protocol
- Each request is independent

What Does It Look Like?

RESTful API design looks like the servers we've used and created in class so far. So working with other people's APIs should feel pretty familiar.

REST Endpoints

Different methods (usually) produce different results for the same endpoint. Consistent, predictable, and meaningful endpoint naming is an important part of REST.

Method	Endpoint	Usage
GET	***/albums***	Get a list of albums
POST	***/albums***	Create a new album
GET	***/albums/<id>***	Get one album
PUT	***/albums/<id>***	Edit one album
DELETE	***/albums/<id>***	Delete one album

Using a hierarchy in designing endpoints helps us stay organized. Thinking in a hierarchy can help us figure out other people's APIs.

Endpoint	Usage
/albums	Get a list of several music albums
/albums/<id>	Get one album by its ***id***
/albums/<id>/tracks	Get an album's tracks

Accessing Data from APIs

How to Get Started

Look for documentation! Here's what you can expect:

- List available endpoints
- Tell you how to format request parameters
- Tell you what you'll get back
- Explain rate limits, authorization requirements, etc

Example API Docs: Spotify

Spotify Web API Documentation

Know Your Limits!

Many APIs have rate limits. They can be:

- Per Minute
- Per Hour
- Per Day
- Lifetime

And by:

- IP address
- User ID

Authentication

Many APIs require authentication so that they can

- Track requests made
- Generate analytics
- Require permission

App Authentication

- The application is allowed to speak to the API
- Example: Google Maps

User Authentication

- The user permits the application to speak to the API on their behalf
- Usually goes hand-in-hand with app authentication
- Often uses OAuth
- Examples: Twitter, Facebook

How to Keep Going

As with much of coding, there is lots of trial and error in figuring out how to use APIs. Figuring out documentation can be tough, but you'll get better at it with time. Keep reading and trying things out.

- Try a few requests to get a feel for the API and the data it returns.
- Think about making the smallest steps possible. Don't do everything at once.

Note: Encoding URLs

Sometimes you've got to send special characters or even spaces in a request over the URL.

In a URL, a space is represented as a plus `+` sign:

`I love Python`	`I+love+Python`

Reserved characters are *percent-encoded*.

`Soda & Swine`	`Soda%26Swine`

Here are the encodings of some reserved characters:

Character	Percent-Encoding
!	%21
#	%23
$	%24
&	%26

You can find a full list of reserved characters and their encodings in the MDN docs on percent-encoding.

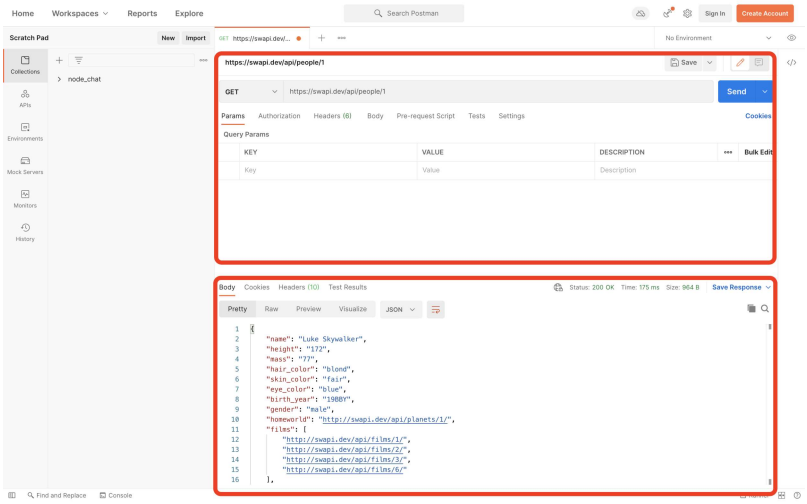
Postman

What is Postman

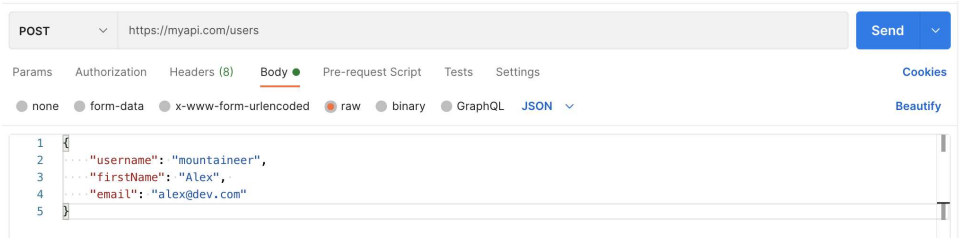
Postman is a tool that we can use to interact with APIs. It is kind of a stand in for a front end.

Layout

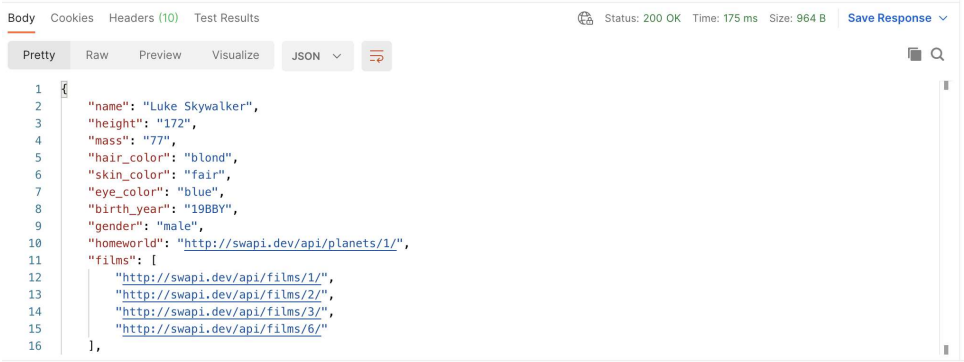
Everything on the top has to do with the request. Everything on the bottom has to do with the response.



In the request section, we can change what type of request we're making, specify the URL we're making the request to, and add a body if needed.



In the response section, we can see the data returned to us as well as other details like any cookies or headers.



The End