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APIs

Today's Learning Objectives

In this lesson, you will:

- Make HTTP requests for data to external API sources.
- Evaluate API documentation to determine data contents, accessibility, and request formatting.





Before starting, we'll need an API key to use a weather API for our first coding challenge, so let's walk through the process together [as described in their documentation.](#)

Don't worry: we'll learn what a key is, and why it's important, later on!

It may take their system a little time to respond with your unique API key, but they should be in place by the time we get to our code challenge.

APIs



What Are APIs?





Discussion:

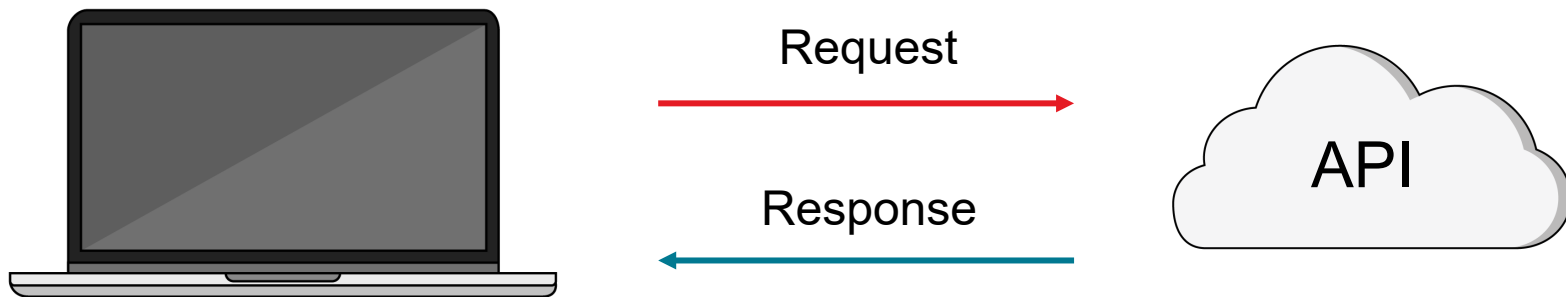
External Data

Have you ever needed information that wasn't ready to go in a file? Things like reference information, up-to-the-minute updated data, or data from an external vendor or another team within your organization?

How did you go about sourcing that information, and what problems did you encounter?

Welcome to the Neighborhood!

APIs, or **application programming interfaces** , are data sources that can give you access to information from all sorts of places on the internet. Simply put, an API is a system that receives **requests** and returns **responses**.



It's All Interfaces?

We are used to numerous **interfaces** in real life. For example:

- **A door handle.** We don't care how a door works, all that we expect is that pushing or pulling the handle will open the door.
- **File → Print.** We don't care how the computer prints the document, all that we expect is that using the "Print" option in the "File" menu will result in the document being printed.

What Kind of Data Is Served Up With an API?

It'd be difficult to find data that **doesn't** have an API. Common uses are:

- **Social media integration** : When you post something on Instagram, you can automatically have it post to Facebook as well.
- **Payment APIs**: When you want to send or receive money via Venmo or the Cash App, the app directly interfaces with your bank or financial institution.
- **Maps**: Many apps like Uber, Lyft, and Waze are built on top of existing map services like Google Maps or Mapbox.

An extensive list of public APIs can be found here: <https://github.com/public-apis/public-apis>

APIs



Requesting Data



APIs Sound Great! How Do I Get Started?

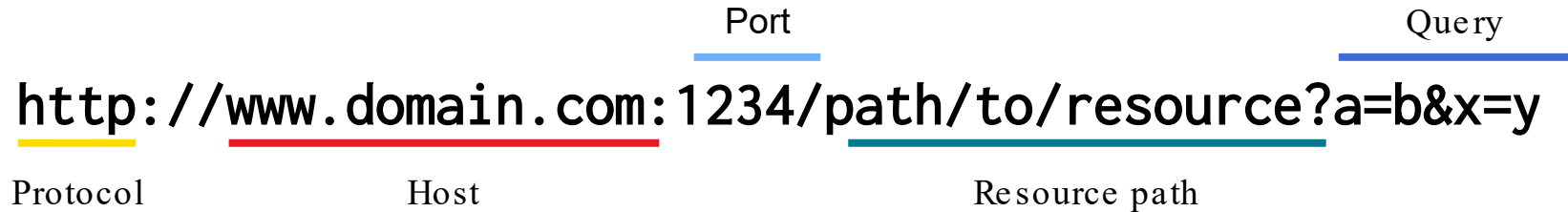
API requests use HTTP, so the way to request information from an API may look somewhat familiar to you!

`http://www.domain.com:1234/path/to/resource?a=b&x=y`

It's a URL address, like what you type when you want to go to any website. But there's more here than meets the eye. Let's talk about each part of this address individually.



APIs Sound Great! How Do I Get Started?


`http://www.domain.com:1234/path/to/resource?a=b&x=y`
Protocol Host Port Resource path Query

Request Methods

GET

- Retrieve information.
- Used by your browser's address bar every time you visit a website.

POST

- Send information.
- Used by most forms to submit data, such as logging in or creating a new post.

PUT

- Update information.
- Requests to change information in a database.

DELETE

- Delete information.

Requesting Data With requests

Once you have identified an address and a method, you can send a request using Python's requests library.

```
import requests
```

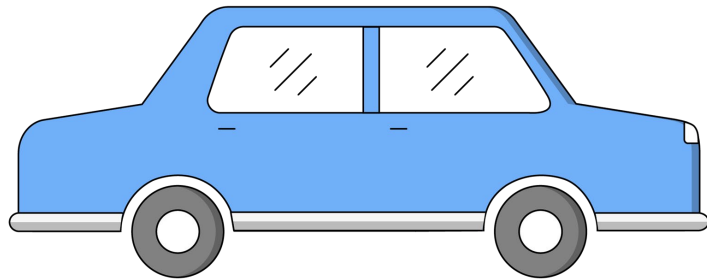
```
data = requests.get(address)
```

What other methods
might there be?

JSON

API endpoints will almost always return JSON-formatted data .

```
{  
  "data": "car",  
  "make": "ford",  
  "model": "focus",  
  "details": {  
    "color" : "blue",  
    "mileage" : "54019"  
  }  
}
```



Does this look like a
Python data structure?

Dealing With JSON

It's **JSON** (JavaScript Object Notation).

However, the `requests` library has a built-in JSON decoder to turn JSON into a Python dictionary.

```
data = request.get(address)
```

```
parsed_data = data.json()
```

```
{  
  "data": "car",  
  "make": "ford",  
  "model": "focus"  
  "details": {  
    "color" : "blue",  
    "mileage" : "54019"  
  }  
}
```

Many-Layered Objects

API response objects are infamously complex in their formats. To dig down to the layer of information you actually want, carefully examine one layer at a time until you reach the data you're looking for.

```
response = {  
    "data": "car",  
    "make": "ford",  
    "model": "focus"  
    "details": {  
        "color" : "blue",  
        "mileage" : "54019"  
    }  
};  
  
print(response)  
# gives us the whole dictionary  
  
print(response["details"])  
# gives us the smaller dictionary  
  
print(response["details"]["color"])  
# finally, gives us "blue"
```

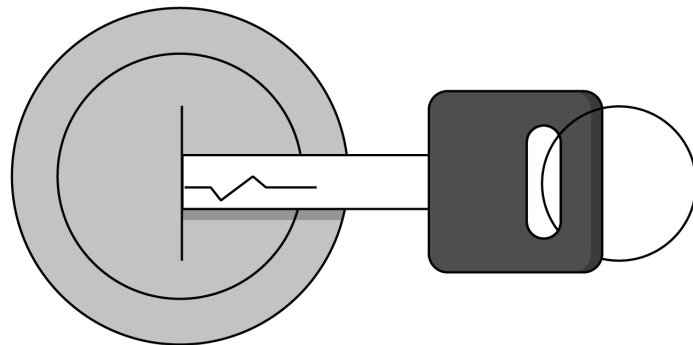


API Keys

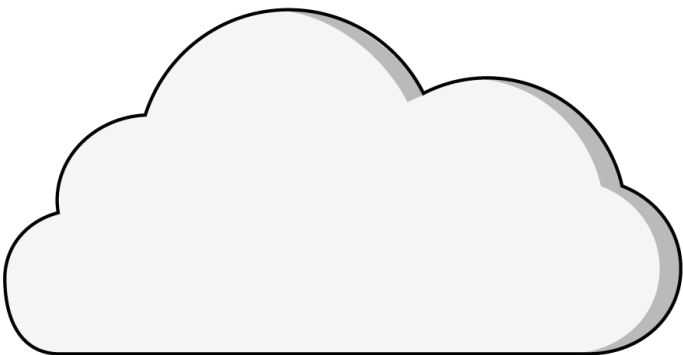
Many APIs require you to include **akey** with your request. You can think of this like a password that prevents someone from misusing the API.

Keys are also used to track your requests for rate limits and potential charges.

Don't worry, most APIs have a free tier!
You can register with the API's website to receive your unique key.



Complete the functionality for a weather application in Section 7.1 of the workbook.



APIs



Evaluating APIs



Read the Docs

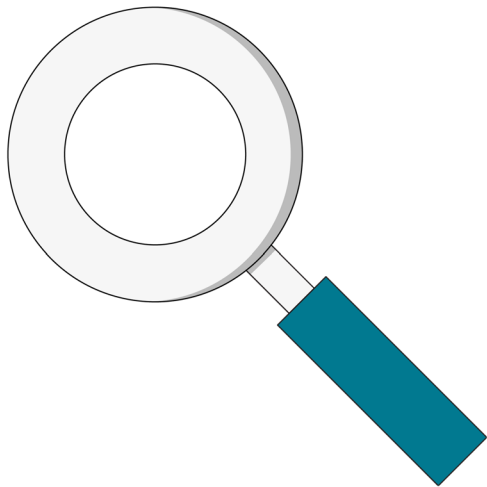
Every API is unique—you will have to explore its documentation to figure out what data you want to access and what URL to use in order to send requests. However, there are a few standard details to check for in any API:

- 1. Do I need an API key?**
 - a. If so, are there rate limits or charges for requests?
 - b. How do I include the key in my requests?
- 2. What are the available endpoints for data?**
 - a. What URL format can search for specific data?
- 3. What will the response data look like?**
 - a. Typically, the response will be JSON.





APIs open up a whole world of new information to our Python programs. Let's see just how much information you can find in Section 7.2 of the workbook.





Guided Walk-Through: Let's Go API Shopping

15 minutes



Using APIs listed in the [public-apis project](#), let's see what to expect from documentation sources.



APIs



Wrapping Up



Recap

In today's class, we...

- Made HTTP requests for data to external API sources.
- Evaluated API documentation to determine data contents, accessibility, and request formatting.

Looking Ahead

On your own:

- Work through the Python progress assessment on myGA (due at the end of the unit).
- Share your capstone project ideas with your instructor for review.
- Join someone else's project or invite others to join yours!

Next Class:

Exploratory Data Analysis With Pandas



Don't Forget: Exit Tickets!



