GENERAL ASSEMBLY

JAVASCRIPT DEVELOPMENT

Sasha Vodnik, Instructor

HELLO!

1. Pull changes from the `svodnik/JS-SF-14-resources` repo to your computer
2. Open the `09-ajax-apis/starter-code` folder in your code editor

AJAX & APIS

LEARNING OBJECTIVES

At the end of this class, you will be able to

- Identify all the HTTP verbs & their uses.
- Describe APIs and how to make calls and consume API data.
- Access public APIs and get information back.
- Implement an Ajax request with Fetch.
- Create an Ajax request using jQuery.

AGENDA

- APIs & HTTP
- Ajax using Fetch
- Ajax & jQuery
- Separation of concerns

WEEKLY OVERVIEW

WEEK 6	Ajax & APIs / Asynchronous JS & callbacks
WEEK 7	Advanced APIs / Project 2 lab
WEEK 8	Prototypal inheritance / Closures & `this`

EXIT TICKET QUESTIONS

1. How to use Template Literals?
2. How to get event delegation working

HOMEWORK REVIEW

HOMEWORK — GROUP DISCUSSION

EXERCISE

TYPE OF EXERCISE

- Pairs

TIMING

4 min

1. Share your solutions for the homework.
2. Share one thing you found challenging. If you worked it out, share how; if not, brainstorm with your group how you might approach it.

METHOD CHAINING

CHAINING

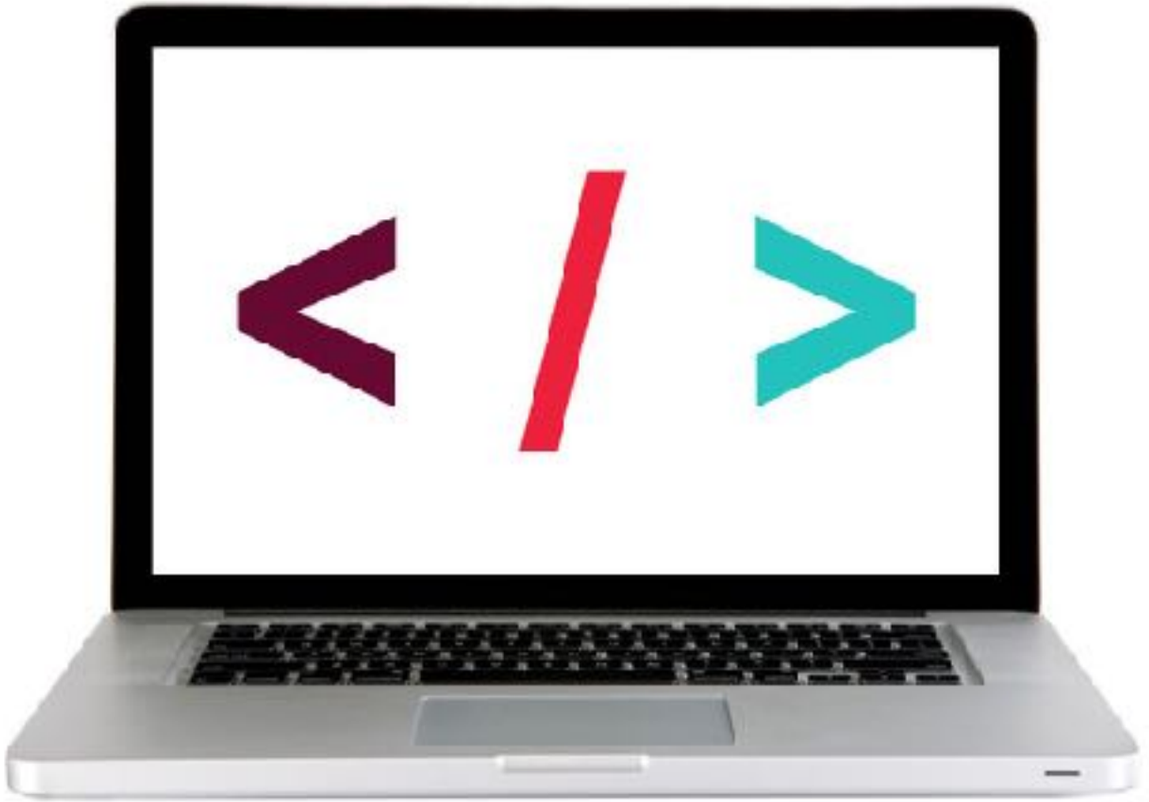
without chaining:

```
let $mainCaption = $('<p>');
let $captionWithText = $mainCaption.html('Today');
let $fullCaption = $captionWithText.addClass('accent');
```

with chaining:

```
let $fullCaption = $('<p>').html('Today').addClass('accent');
```

ADVANCED JQUERY



LET'S TAKE A CLOSER LOOK

EXERCISE - CHAINING

OBJECTIVE

- Use chaining to place methods on selectors.

LOCATION

- `starter-code > 10-best-practices-exercise`

TIMING

3 min

1. In your browser, open index.html and test the functionality.
2. Open main.js in your editor and complete items 1 and 2.
3. In your browser, reload index.html and verify that the functionality is unchanged.

IMPLICIT ITERATION

IMPLICIT ITERATION

explicit iteration

```
$('li').each(function() {
 $(this).removeClass('current');
});
```

jQuery `.each()` method works like a `forEach` loop

not necessary for
element collections

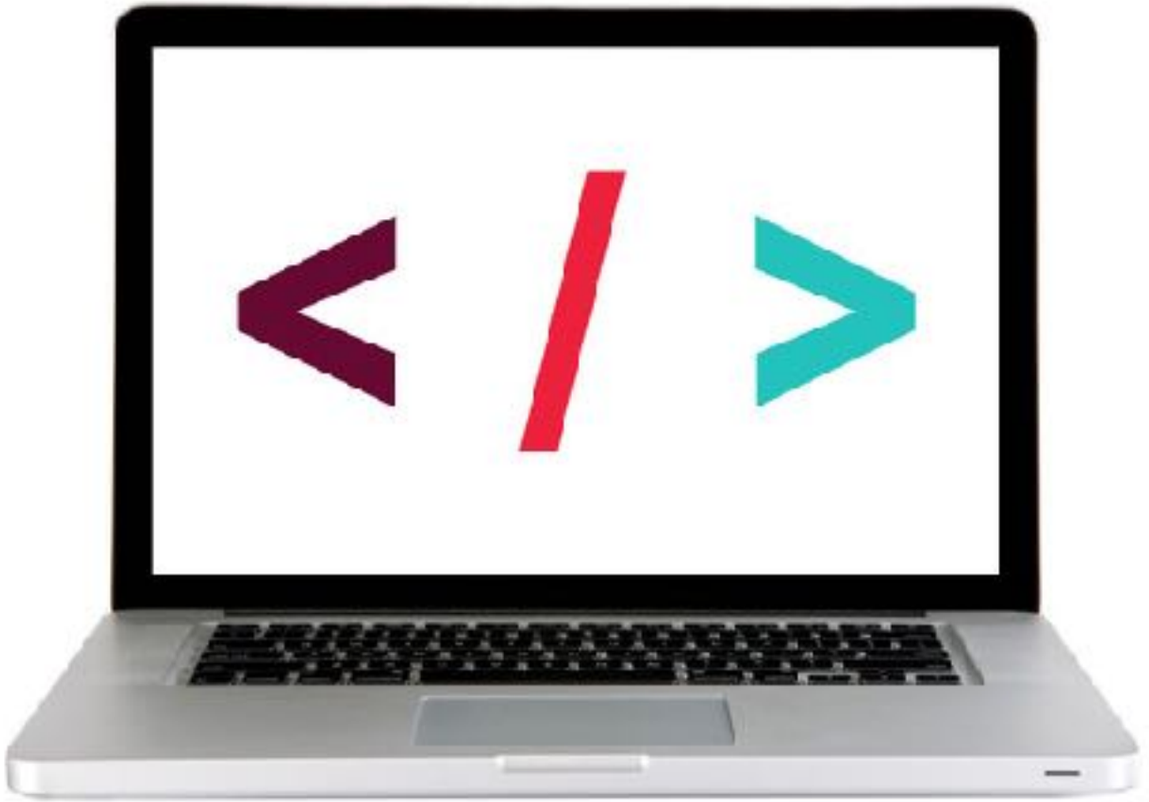
implicit iteration

```
$('li').removeClass('current');
```

applying any method to a jQuery collection iterates through each element!

less code = best practice!

ADVANCED JQUERY



LET'S TAKE A CLOSER LOOK

EXERCISE - IMPLICIT ITERATION

OBJECTIVE

- Use implicit iteration to update elements of a jQuery selection.

LOCATION

- `starter-code > 10-best-practices-exercise`

TIMING

5 min

1. Return to main.js in your editor and complete item 3.
2. In your browser, reload index.html and verify that the functionality is unchanged.

EVENT DELEGATION

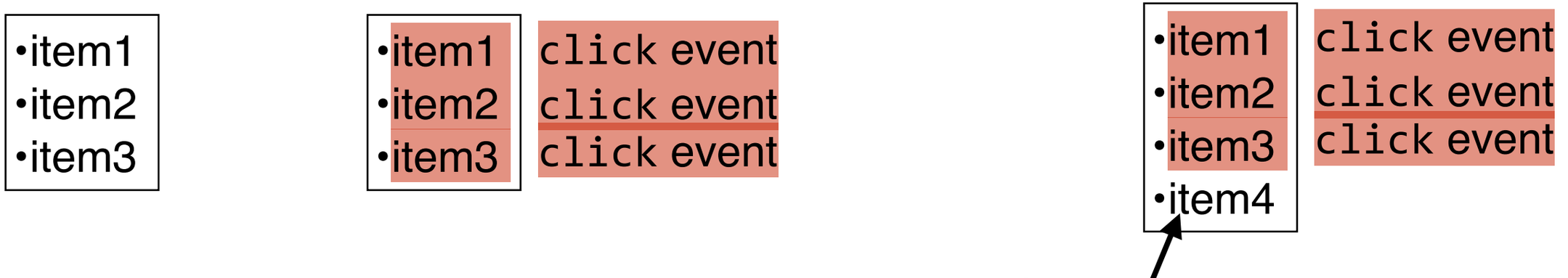
WITHOUT EVENT DELEGATION

1. load page

2. set event listener on list items

```
$('li').on('click',function(){
  addClass('selected')
});
```

3. add a new list item



WITH EVENT DELEGATION

1. load page

- item1
- item2
- item3

2. set event listener on *parent of* list items

selector changed to parent

new second argument specifies children

```
$('ul').on('click', 'li', function(){
  addClass('selected')
});
```

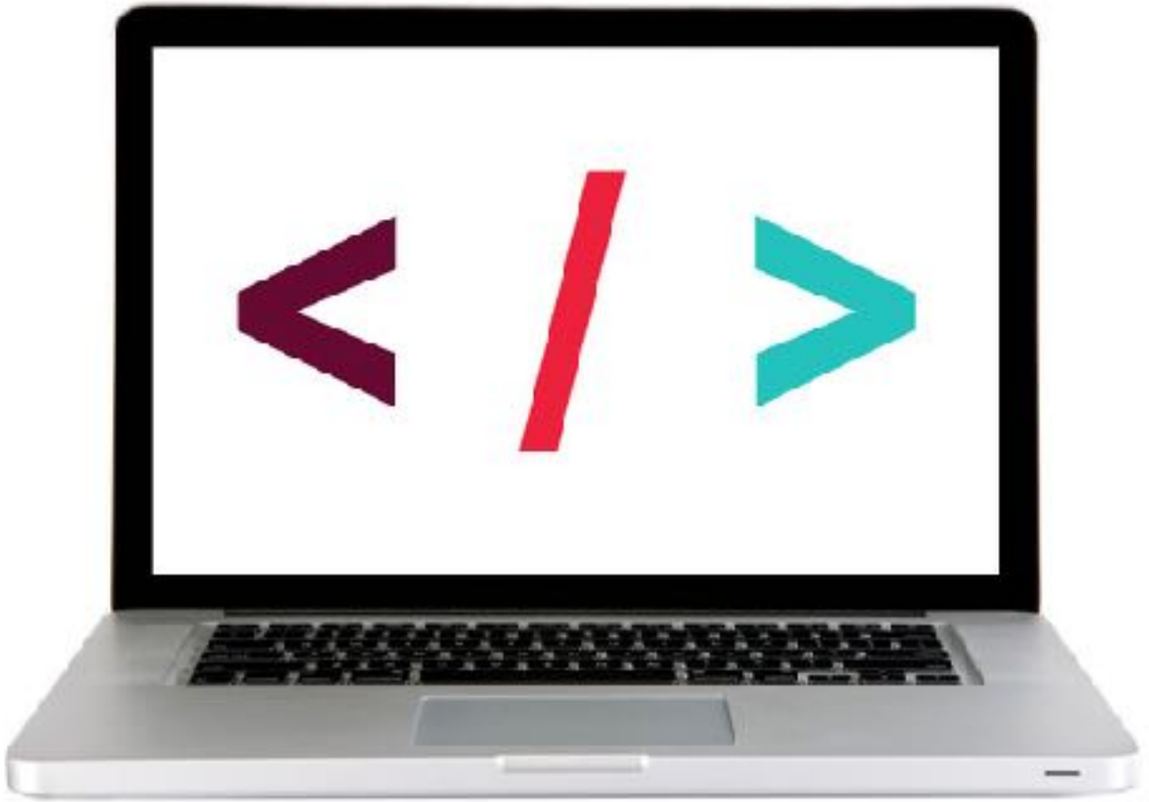
- item1 — click event
- item2 — click event
- item3 — click event

3. add a new list item

- item1 — click event
- item2 — click event
- item3 — click event
- item4 — click event

click event IS automatically applied to the new `li` element!

ADVANCED JQUERY



LET'S TAKE A CLOSER LOOK

EXERCISE - EVENT DELEGATION

OBJECTIVE

- Use event delegation to manage dynamic content.

LOCATION

- `starter-code > 10-best-practices-exercise`

TIMING

10 min

1. Return to main.js in your editor and complete item 4.
2. In your browser, reload index.html and verify that when you add a new item to the list, its “cross off” link works.
3. BONUS 1: When the user mouses over each item, the item should turn grey. Don't use CSS hovering for this.
4. BONUS 2: Add another link, after each item, that allows you to delete the item.

ATTACHING MULTIPLE EVENTS WITH A SINGLE ON() STATEMENT

ATTACHING MULTIPLE EVENTS WITH A SINGLE .ON() STATEMENT

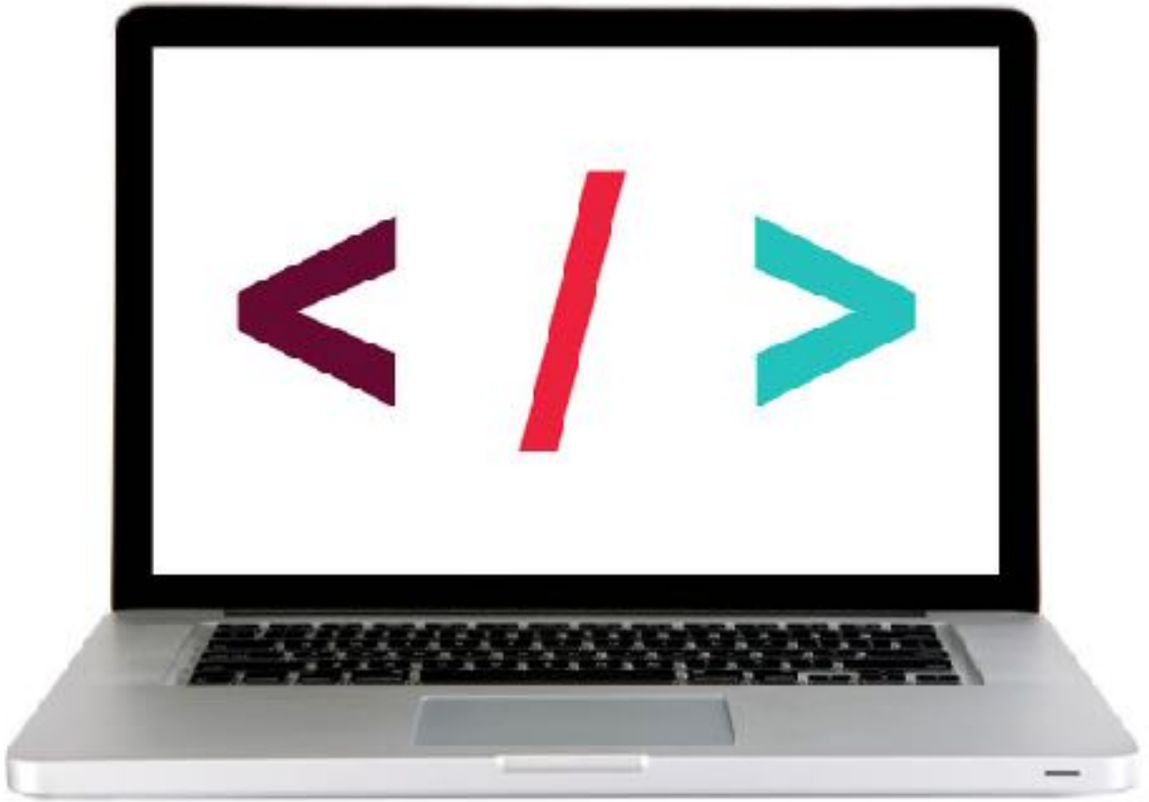
- We could write a separate `.on()` statement for each event on an element:

```
var $listElement = $('#contents-list');

$listElement.on('mouseenter', 'li', function(event) {
  $(this).siblings().removeClass('active');
  $(this).addClass('active');
});

$listElement.on('mouseleave', 'li', function(event) {
  $(this).removeClass('active');
});
```

ATTACHING MULTIPLE EVENTS WITH A SINGLE .ON() STATEMENT

```
var $listElement = $('#contents-list');

$listElement.on('mouseenter mouseleave', 'li', function(event) {
  if (event.type === 'mouseenter') {
    $(this).siblings().removeClass('active');
    $(this).addClass('active');
  } else if (event.type === 'mouseleave') {
    $(this).removeClass('active');
  }
});
```

ADVANCED JQUERY



LET'S TAKE A CLOSER LOOK

EXERCISE - ATTACHING MULTIPLE EVENTS

LOCATION

- `starter-code > 11-multiple-events-exercise`

TIMING

5 min

1. In your browser, open index.html. Move the mouse over each list item and verify that the sibling items turn gray.
2. In your editor, open main.js and refactor the two event listeners near the bottom of the file into a single event listener for multiple events.
3. In your browser, reload index.html and verify that the functionality is unchanged.

LAB - JQUERY HOMEWORK

EXERCISE

LOCATION

- `08-advanced-jquery > starter-code > Homework-4 > survey-form`

TIMING

10 min

1. Now that you have a clearer understanding of event delegation, implement this feature in the `survey-form` exercise from last week's homework.
2. When you complete the project (or if you already have completed it), please make yourself available to classmates who have questions.

AJAX & APIS

ACTIVITY

TYPE OF EXERCISE

- Individual/Partner

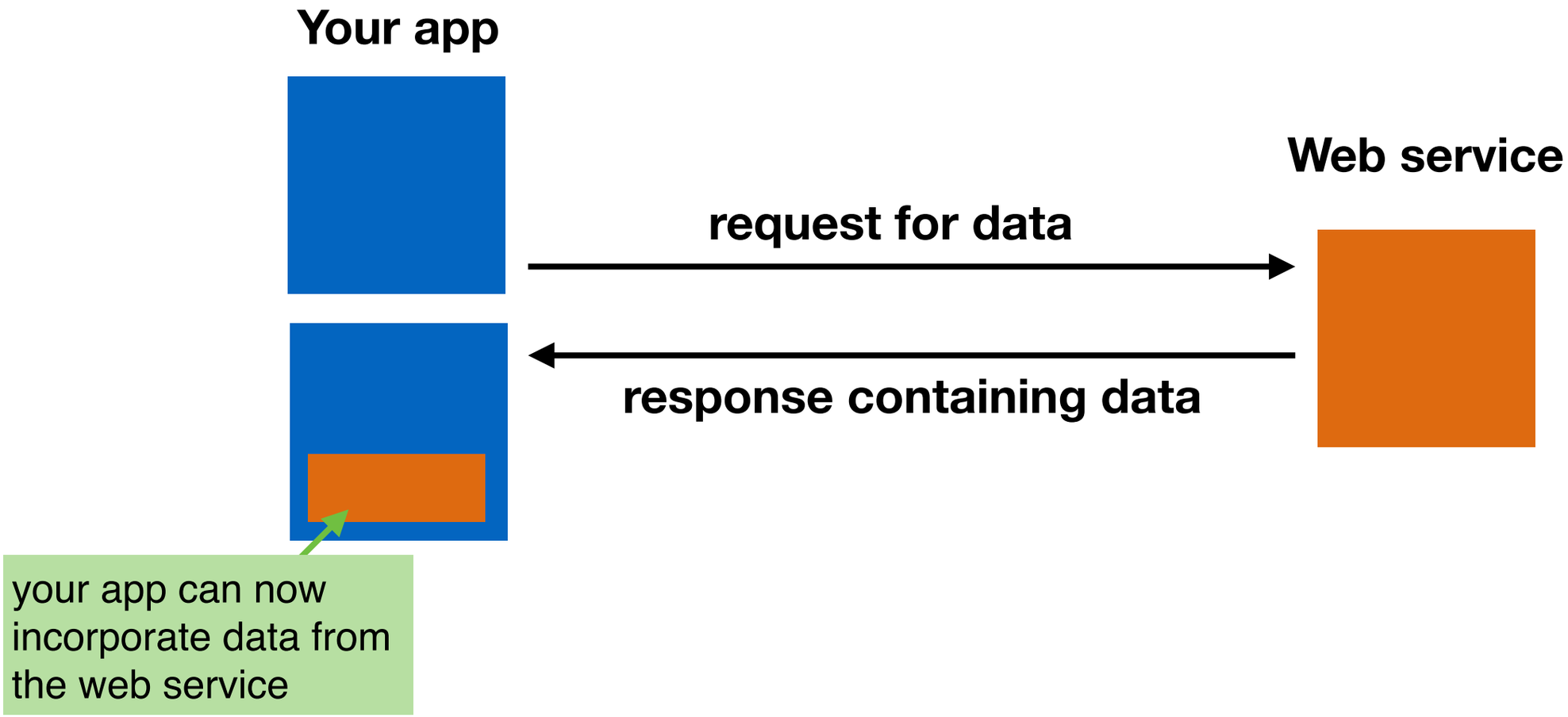
TIMING

3 min

1. Think about how you could use one or more sources of web data in an app.
2. Write a description or sketch a schematic of your app on your desk.

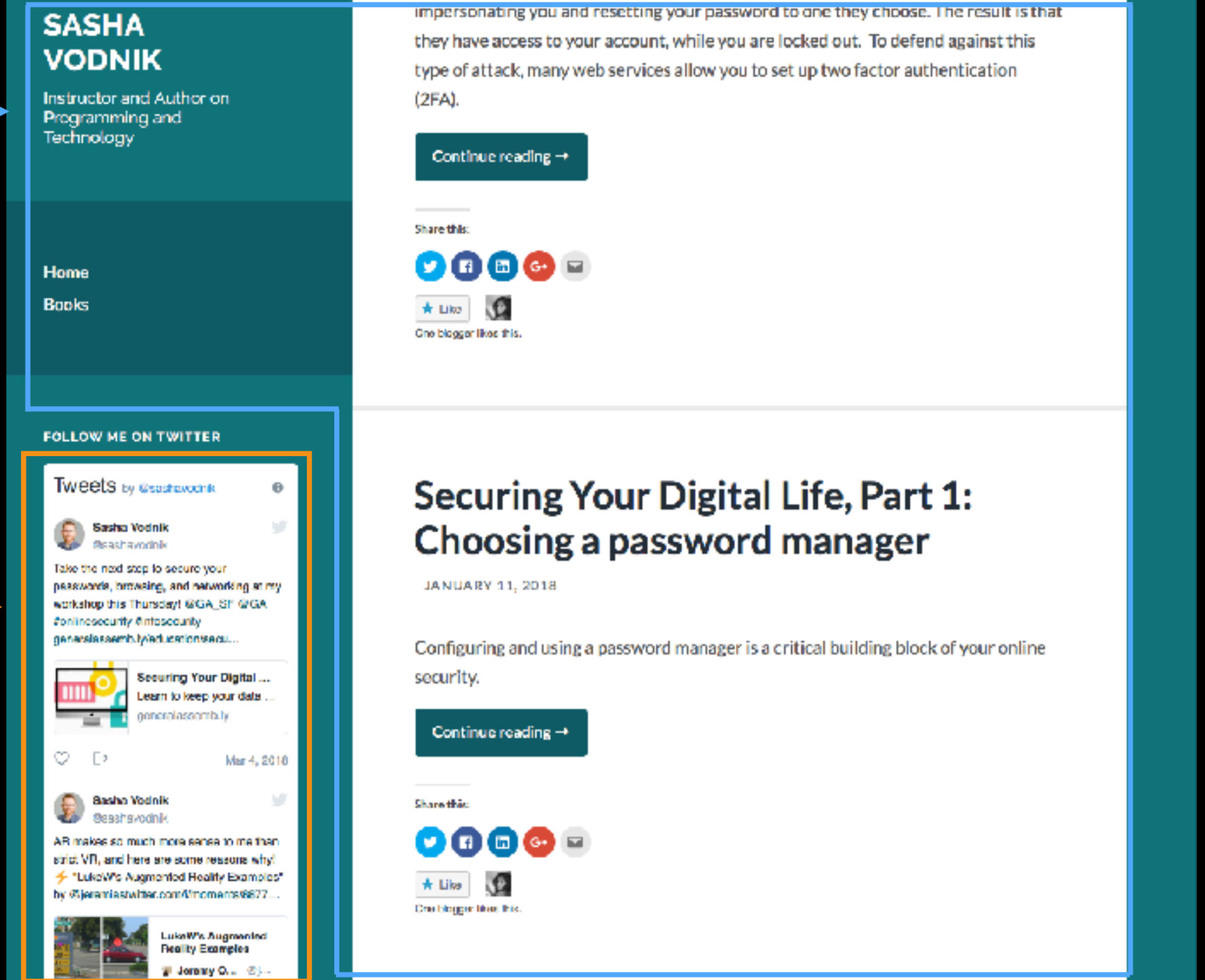
APIs

WEB SERVICES

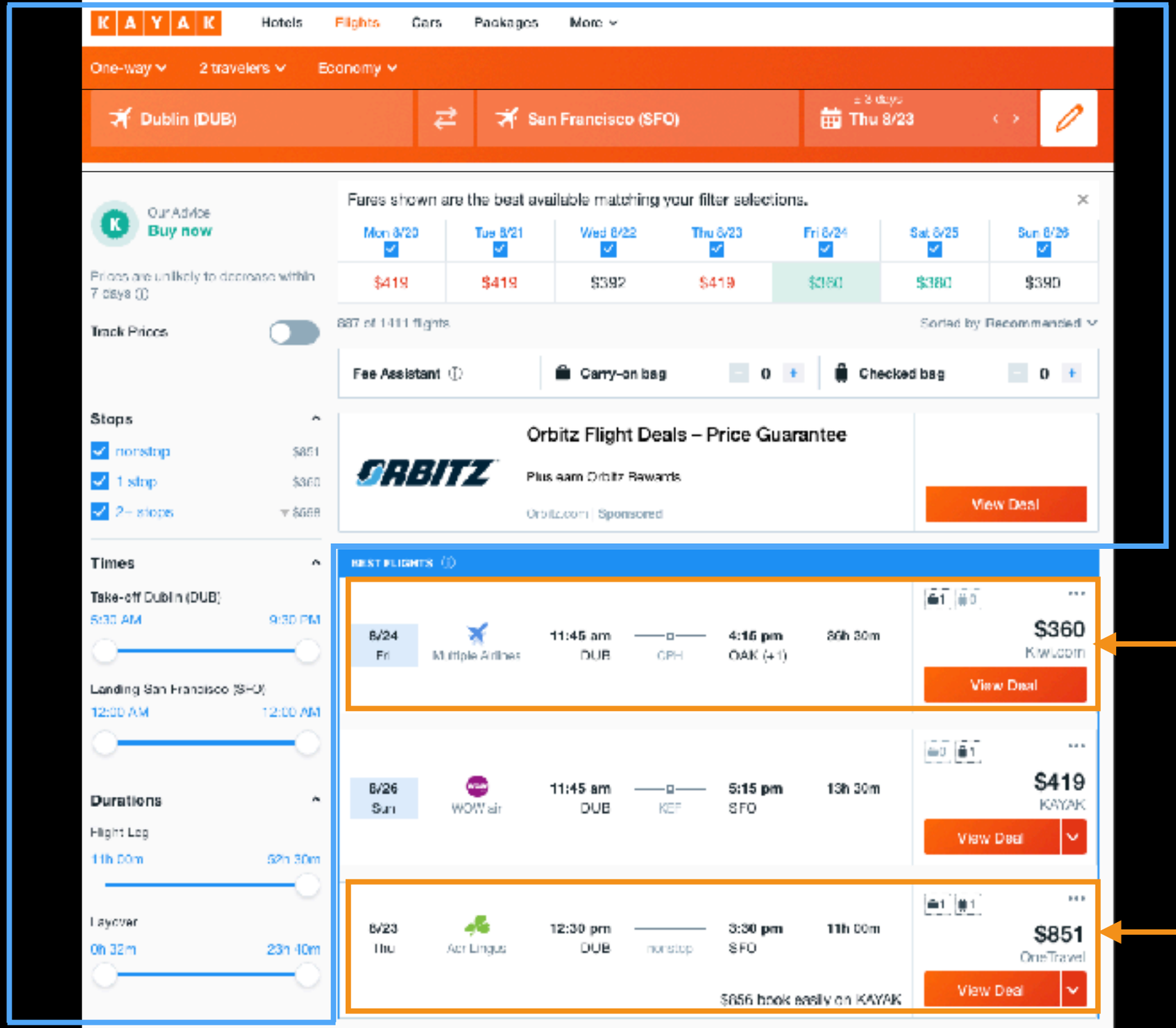


my website content

Content from Twitter added using Twitter API



Kayak website content

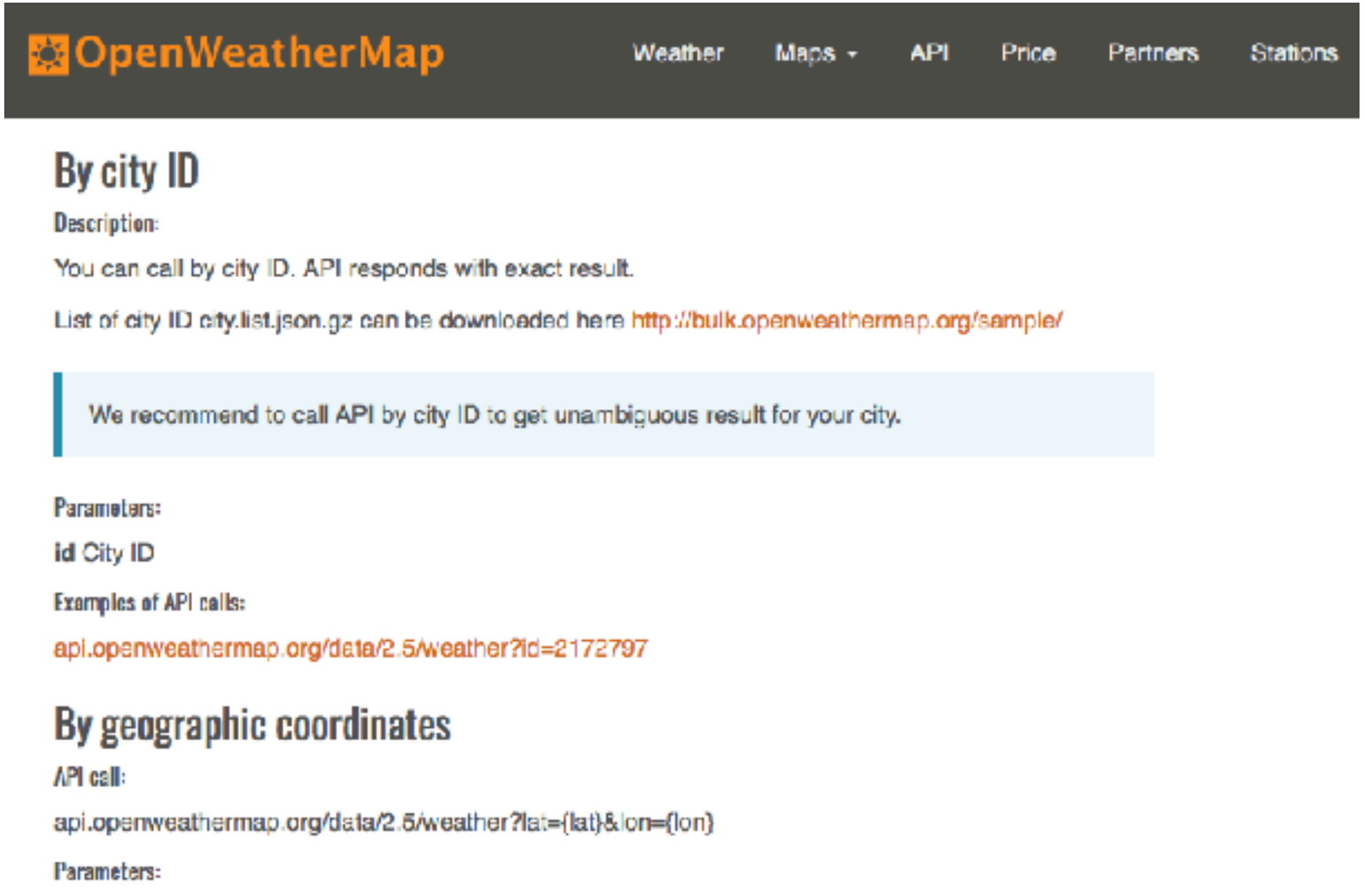


Content from kiwi.com using API

Content from OneTravel using API

WEB SERVICES

API = application programming interface



APIS IN THE REAL WORLD

- Most APIs are unique, like separate languages
- APIs for
  - devices (iPhone)
  - operating systems (macOS)
  - JavaScript libraries (jQuery API)
  - services (Slack)




WEB SERVICES

ENDPOINTS

- Addresses (URLs) that return data (JSON) instead of markup (HTML)

By city ID

Description:

You can call by city ID. API responds with exact result.

List of city ID city.list.json.gz can be downloaded here http://bulk.openweathermap.org/sample/

> We recommend to call API by city ID to get unambiguous result for your city.

Parameters:

id City ID

Examples of API calls:

api.openweathermap.org/data/2.5/weather?id=2172797

By geographic coordinates

API call:

api.openweathermap.org/data/2.5/weather?lat={lat}&lon={lon}

Parameters:

lat, lon coordinates of the location of your interest

Examples of API calls:

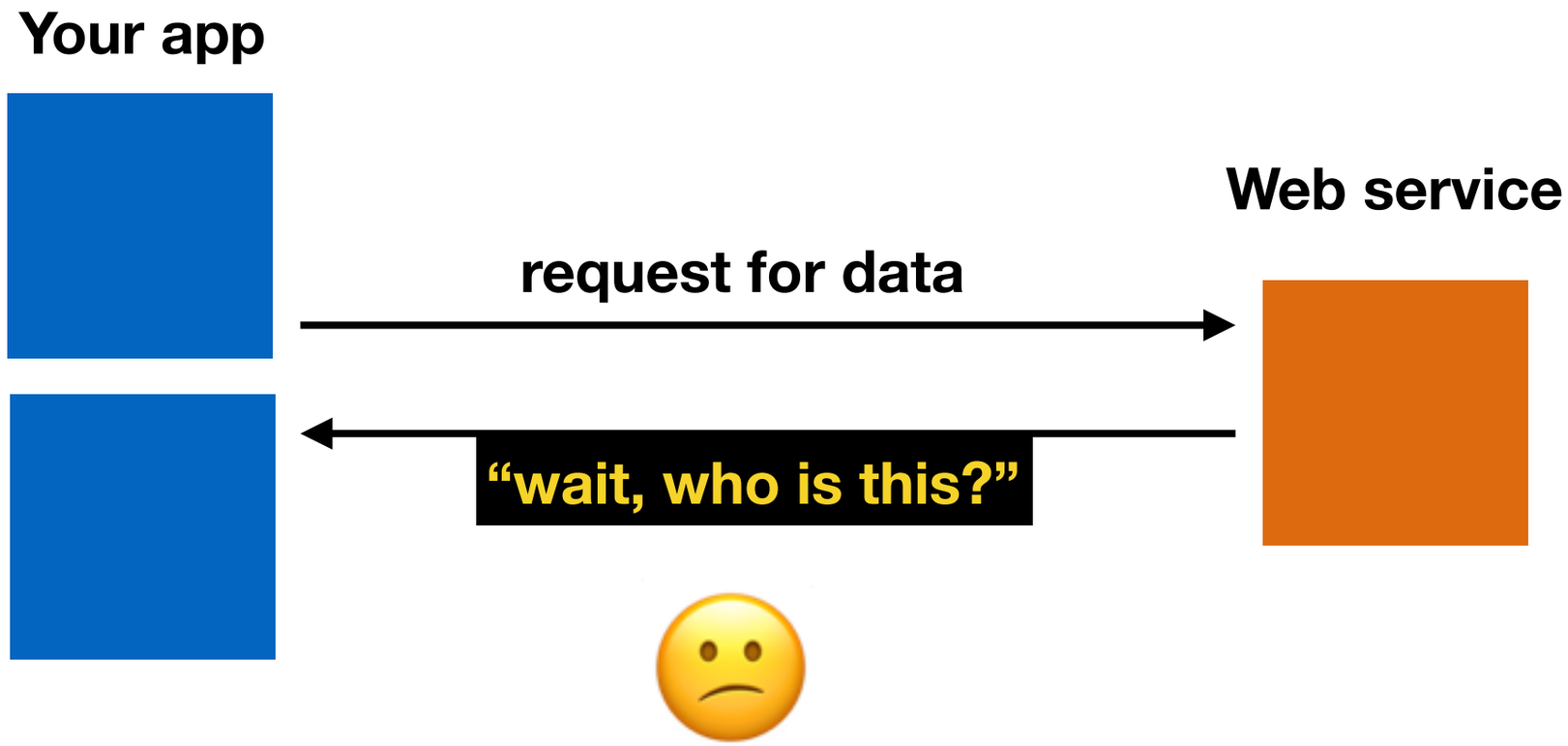
api.openweathermap.org/data/2.5/weather?lat=35&lon=139

API respond:


```
{"coord":{"lon":139,"lat":35},
"sys":{"country":"JP","sunrise":1369769524,"sunset":1369821049},
"weather":[{"id":804,"main":"clouds","description":"overcast clouds","icon":"0
4n"}],
"main":{"temp":289.5,"humidity":89,"pressure":1013,"temp_min":287.04,"temp_max
":292.04},
"wind":{"speed":7.31,"deg":187.002},
"rain":{"3h":0},
"clouds":{"all":92},
```

WHAT WE NEED TO KNOW TO USE AN API

AN API MIGHT REQUIRE AUTHENTICATION

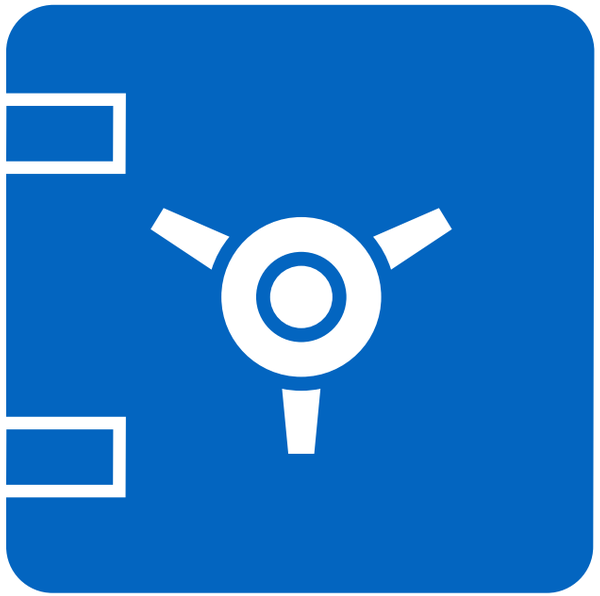


API KEY

- unguessable character string
- connects your requests to your account

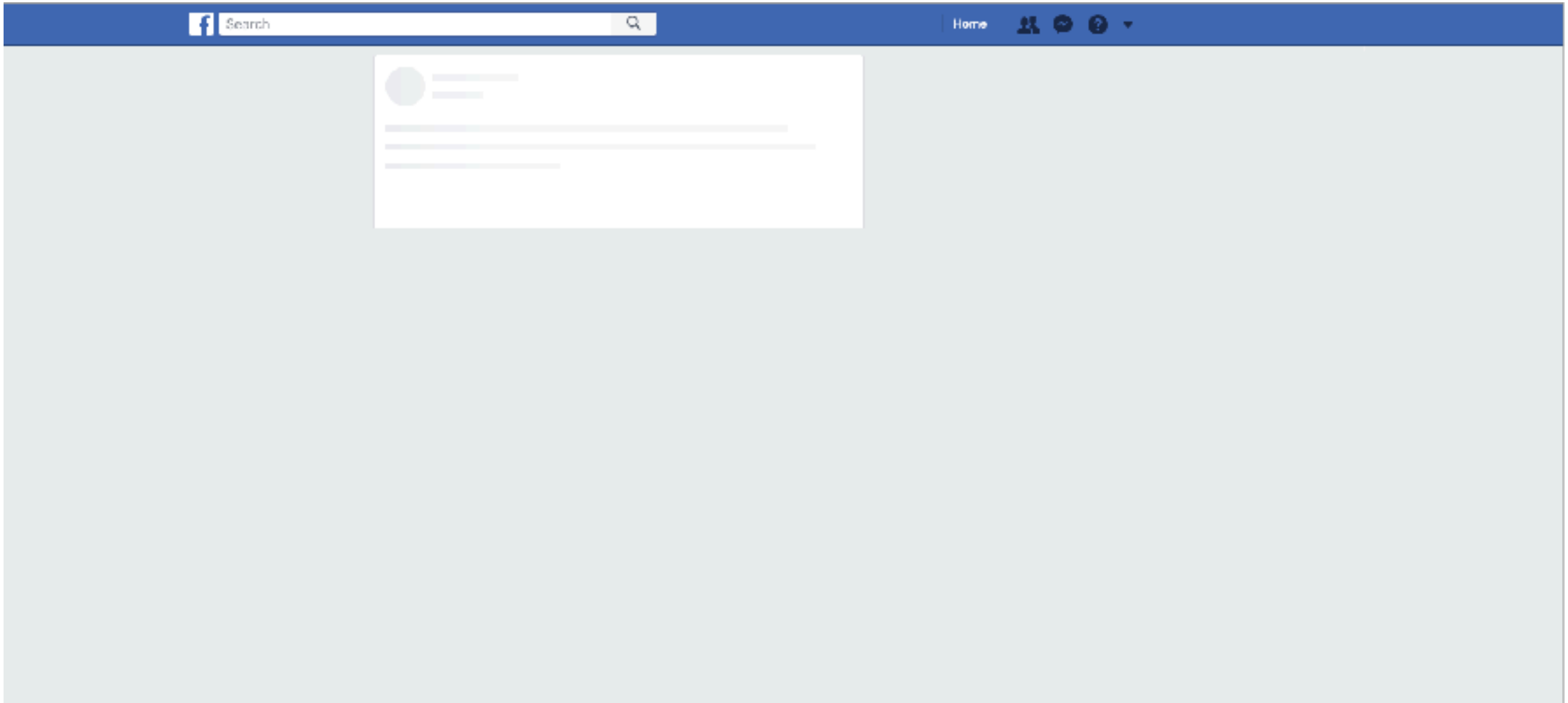
API REQUEST WITH AUTHENTICATION

KEEP YOUR API CREDENTIALS PRIVATE



- Don’t post to a public code repo
- Don’t share with other developers outside of your organization

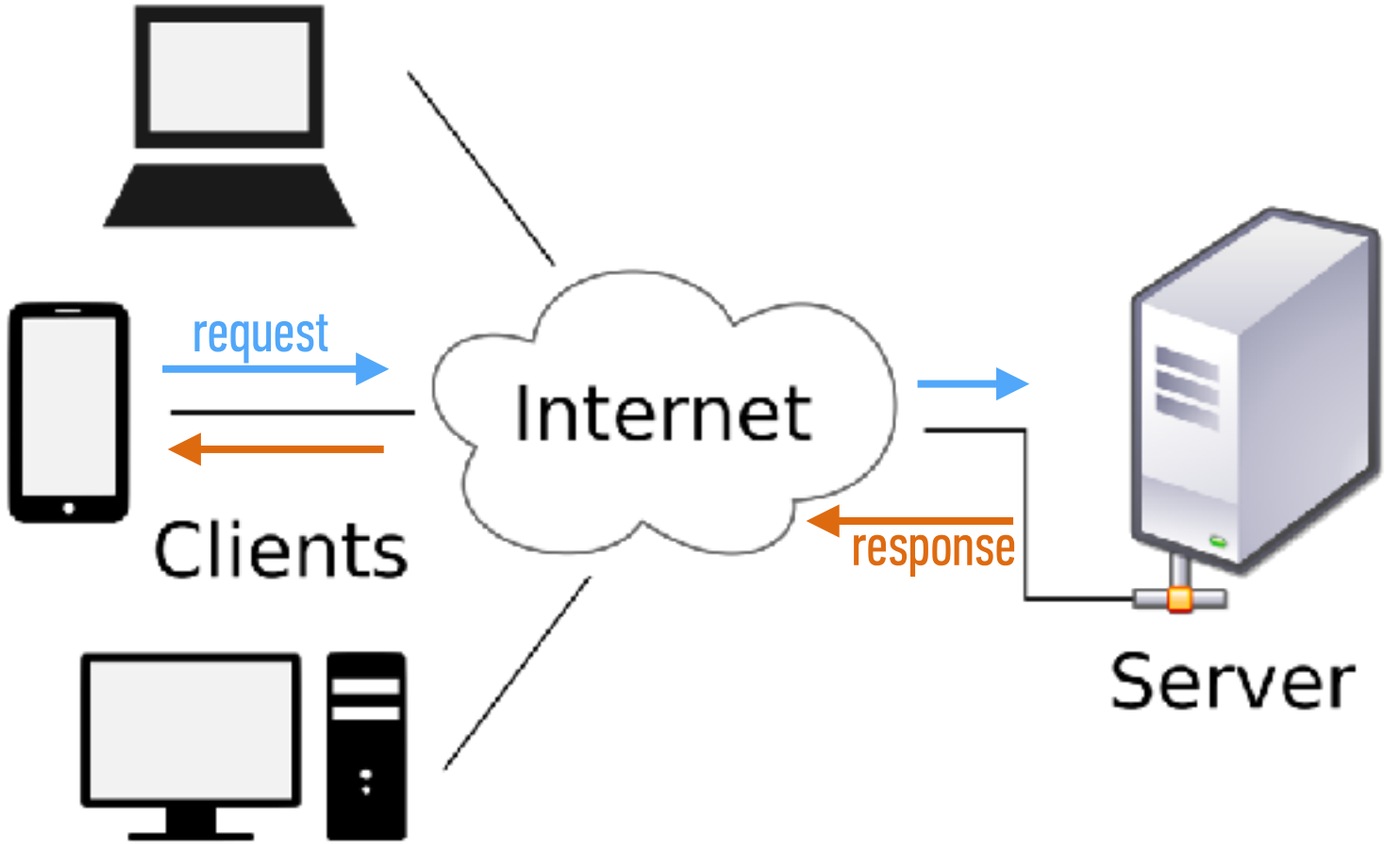
YOUR APP MIGHT EXPERIENCE A DELAYED RESPONSE



YOUR REQUEST MAY RESULT IN AN ERROR

REST (representational state transfer)

- architectural style of web applications
- transfers a representation of the state of a resource between the server and the client



RESTful API

- adheres to REST architecture
- uses
  - a base URL
  - an Internet media type (such as JSON)
  - standard HTTP methods

By geographic coordinates

API call:

api.openweathermap.org/data/2.5/weather?lat={lat}&lon={lon}

Parameters:

lat, **lon** coordinates of the location of your interest

Examples of API calls:

api.openweathermap.org/data/2.5/weather?lat=35&lon=139

API respond:


```
{"coord":{"lon":139,"lat":35},
"sys":{"country":"JP","sunrise":1369769524,"sunset":1369821049},
"weather":[{"id":804,"main":"clouds","description":"overcast clouds","icon":"0
4n"}],
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":292.04},
"wind":{"speed":7.31,"deg":187.002},
"rain":{"3h":0},
"clouds":{"all":92},
"dt":1369824698,
"id":1851632,
"name":"Shuzenji",
"cod":200}
```
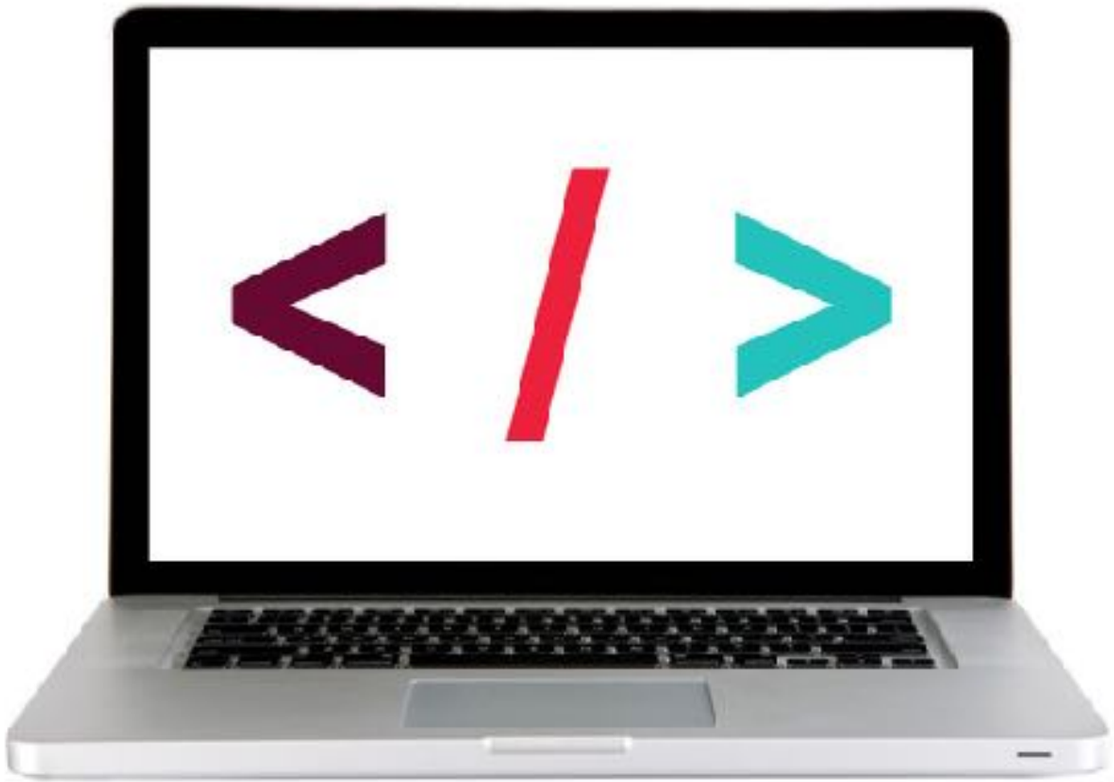
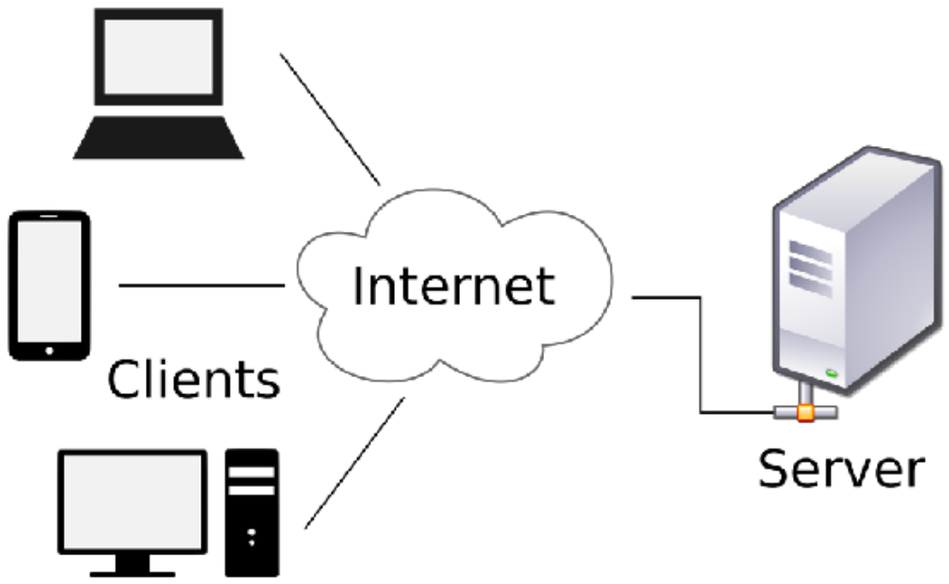

LET'S TAKE A CLOSER LOOK



HTTP

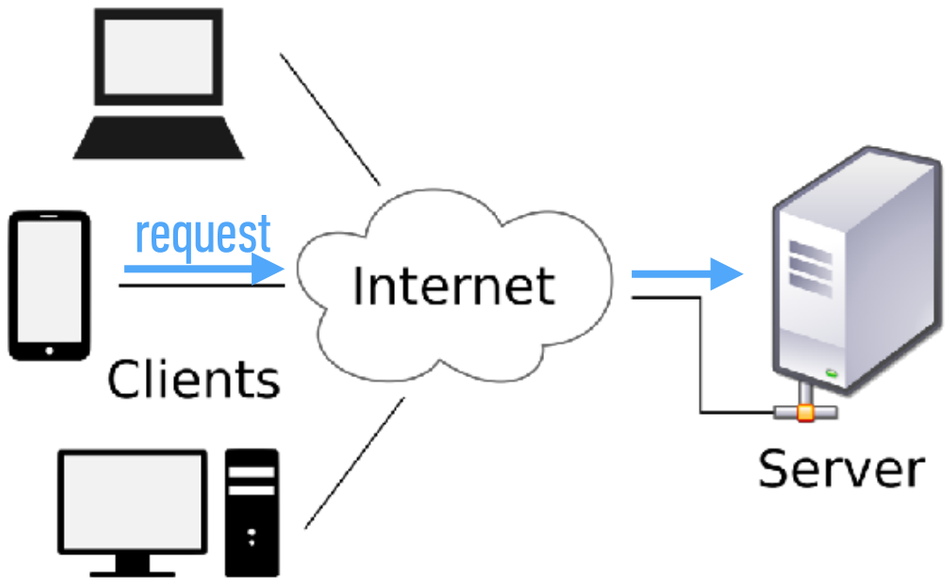
HTTP (hypertext transfer protocol)

- System of rules for how web pages are transmitted between computers
- Defines the format of messages passed between HTTP clients and HTTP servers



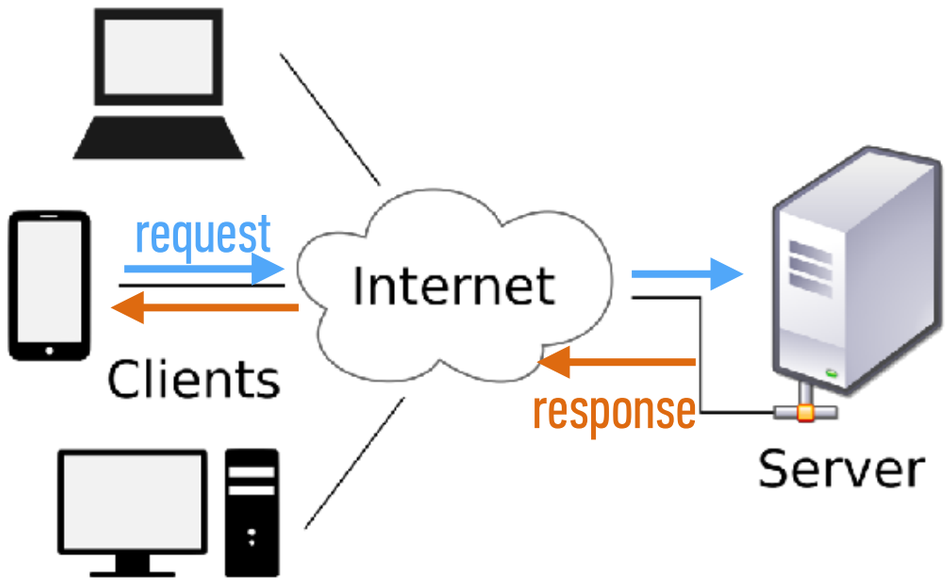
HTTP (hypertext transfer protocol)

- A client sends a **request** to a server.

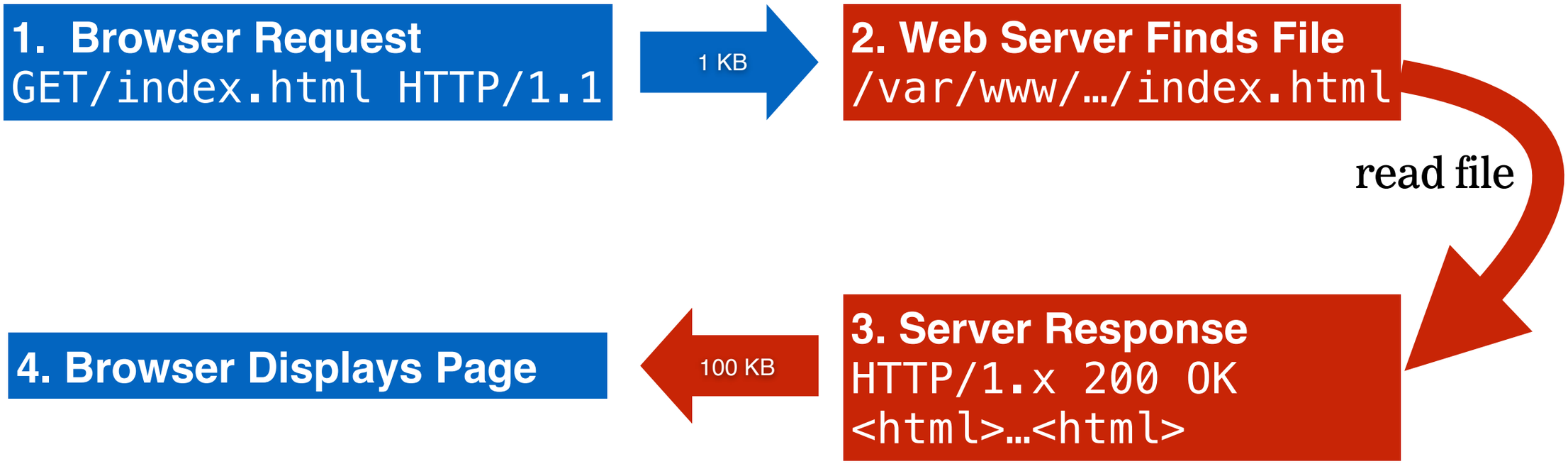


HTTP (hypertext transfer protocol)

- A server sends a **response** back to a client.



HTTP REQUEST AND RESPONSE



HTTP (hypertext transfer protocol)

HTTP client

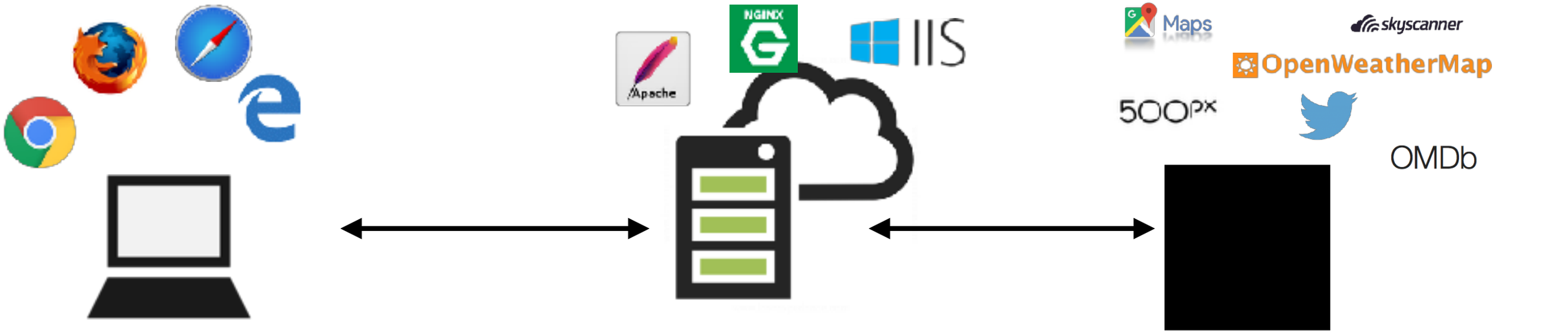
web browser

HTTP server

web server software

Web service

app that responds to HTTP requests

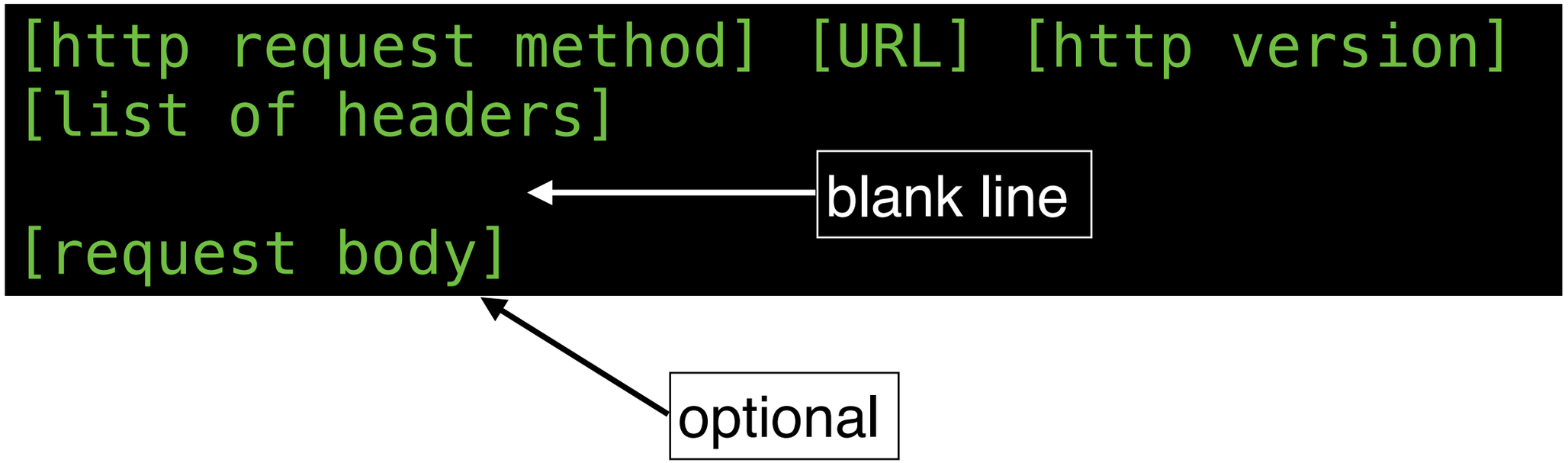


HTTP REQUESTS IN EVERYDAY LIFE

protocol host resource path query

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

HTTP REQUEST STRUCTURE

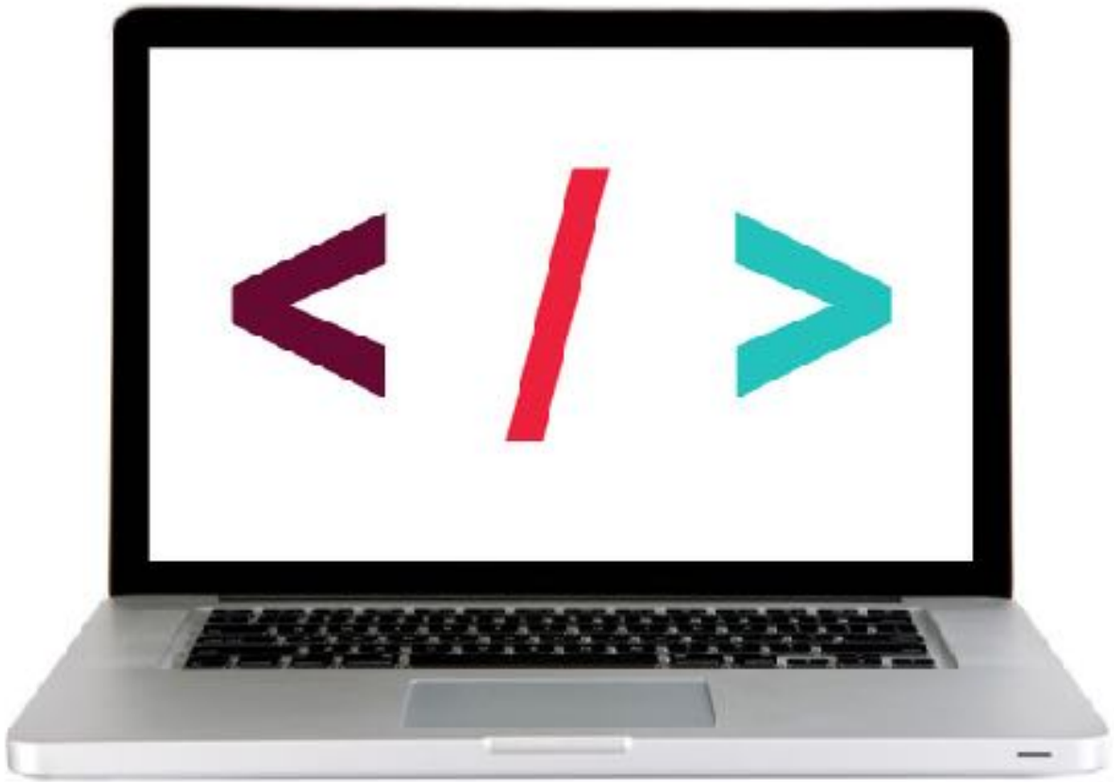


HTTP REQUEST METHODS ("HTTP VERBS")

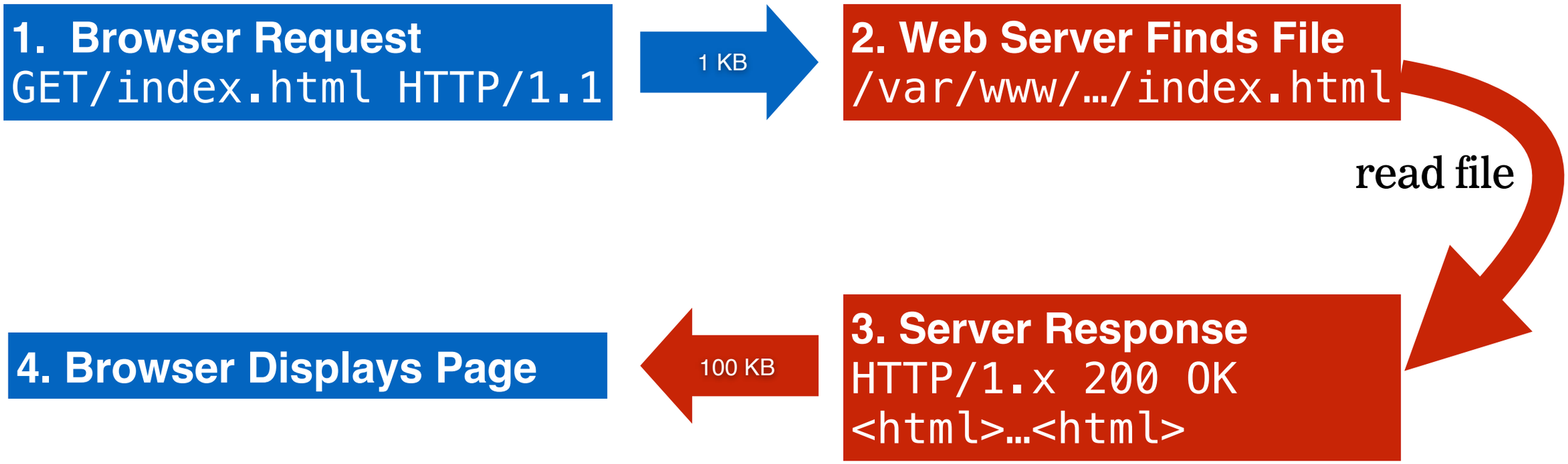
`GET`	Retrieve a resource
`POST`	Create a resource
`PATCH`	Update an existing resource
`PUT`	Replace an existing resource
`DELETE`	Delete a resource

Most widely used

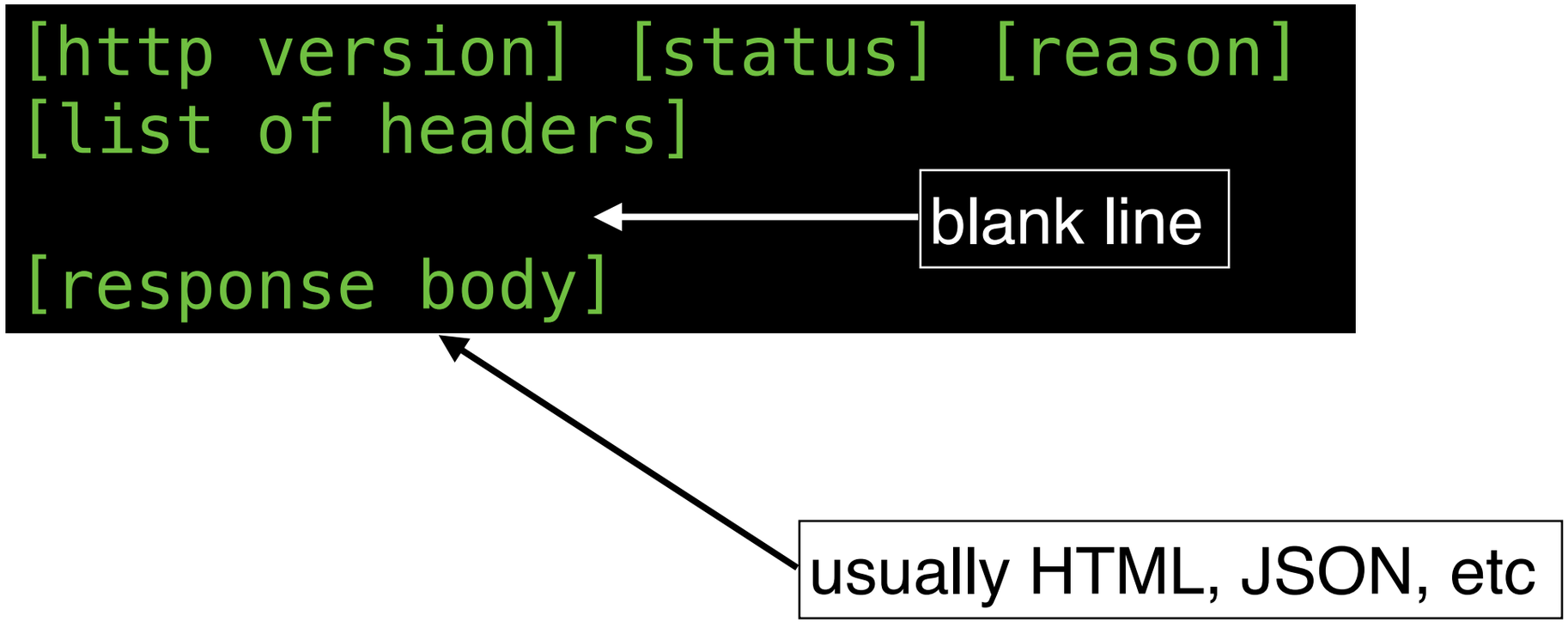
LET'S TAKE A CLOSER LOOK



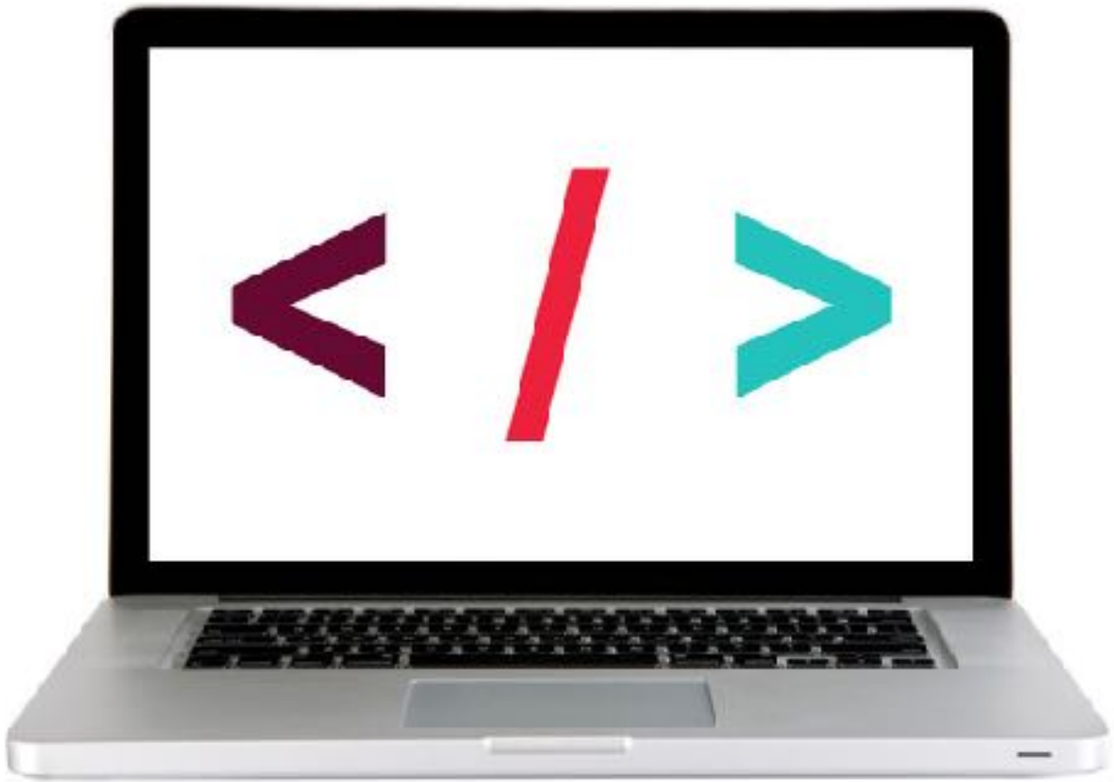
HTTP REQUEST AND RESPONSE



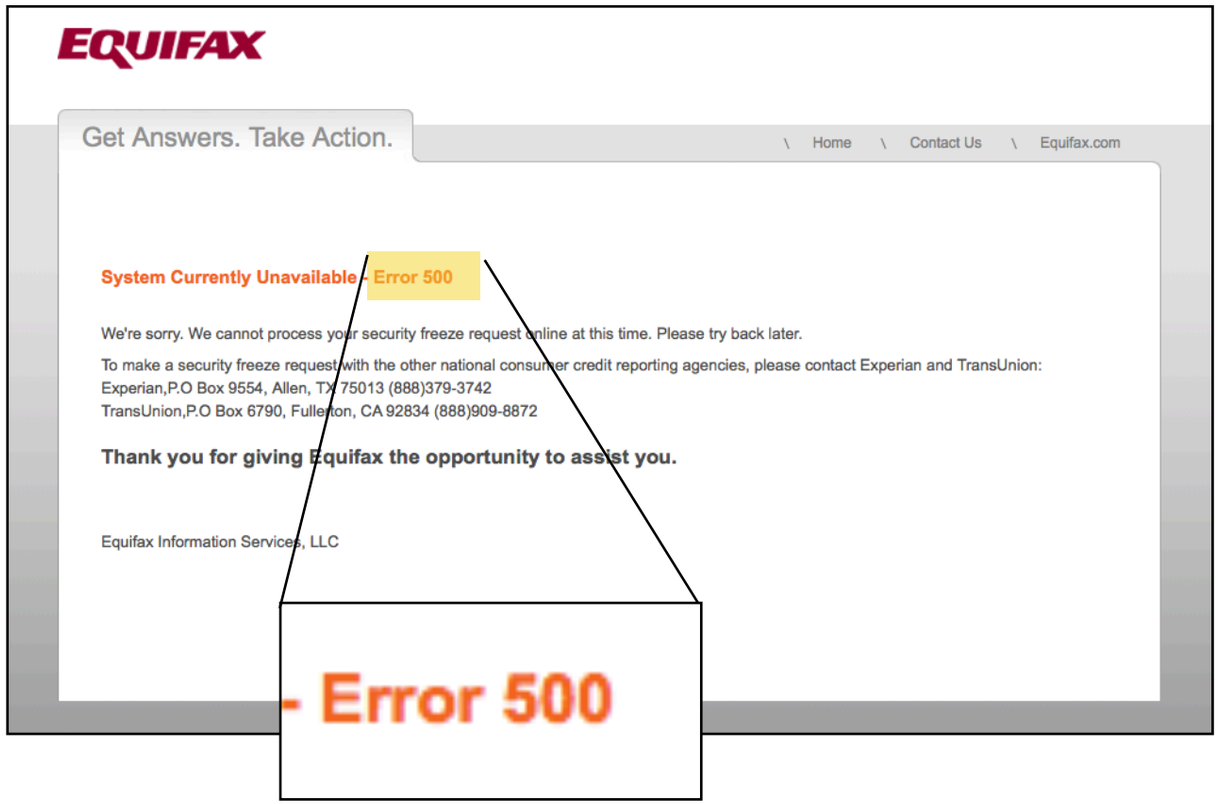
HTTP RESPONSE STRUCTURE

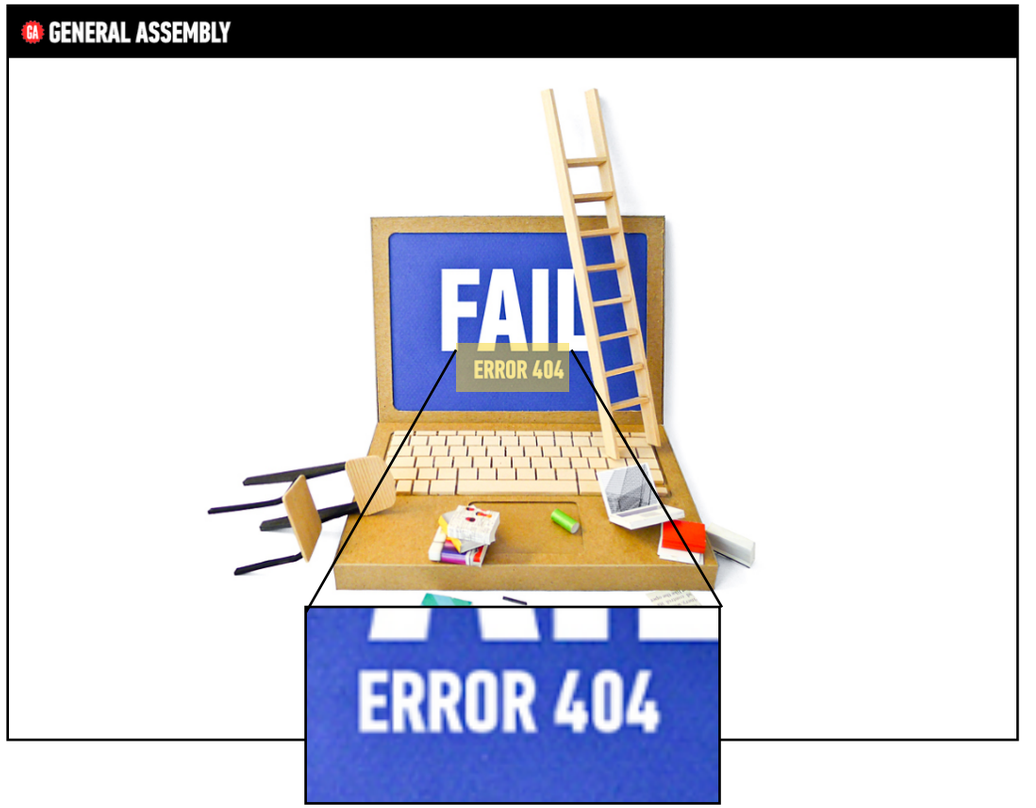


LET'S TAKE A CLOSER LOOK



HTTP STATUS CODES

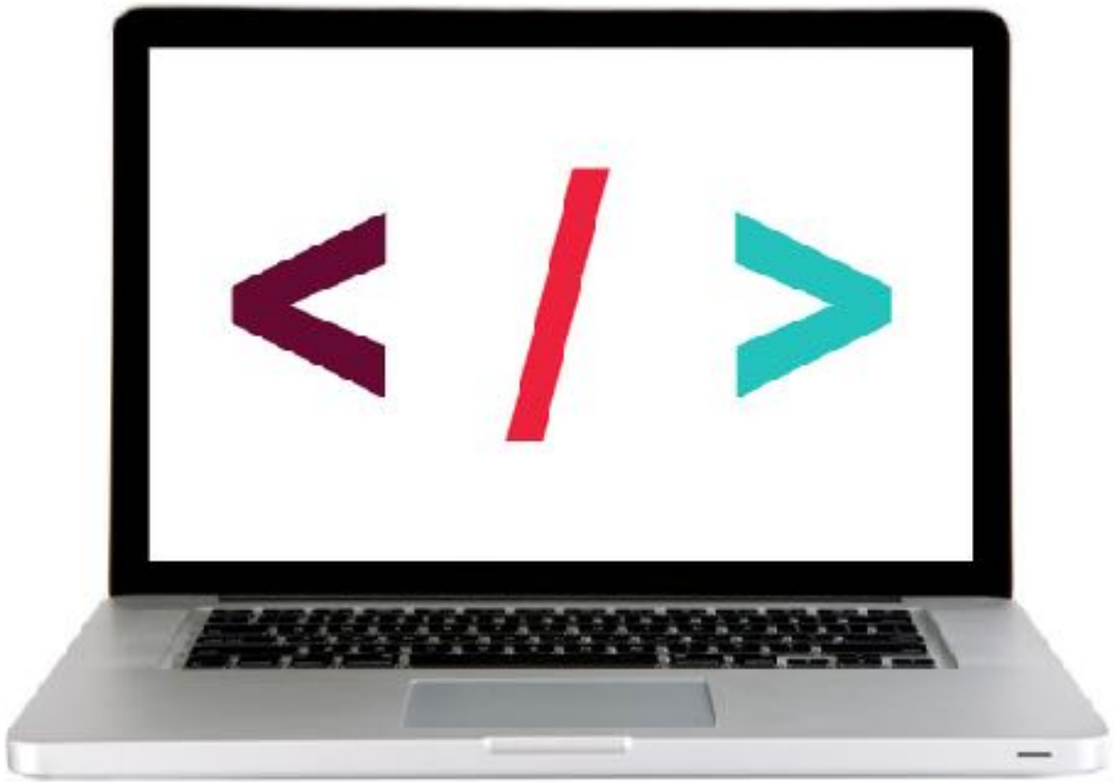




HTTP STATUS CODES

200	Okay
301	Moved permanently
302	Moved temporarily
400	Bad request
403	Forbidden
404	Not found
418	I’m a teapot
500	Internal server error

LET'S TAKE A CLOSER LOOK



Ajax

Ajax

A synchronous

J avaScript

A nd

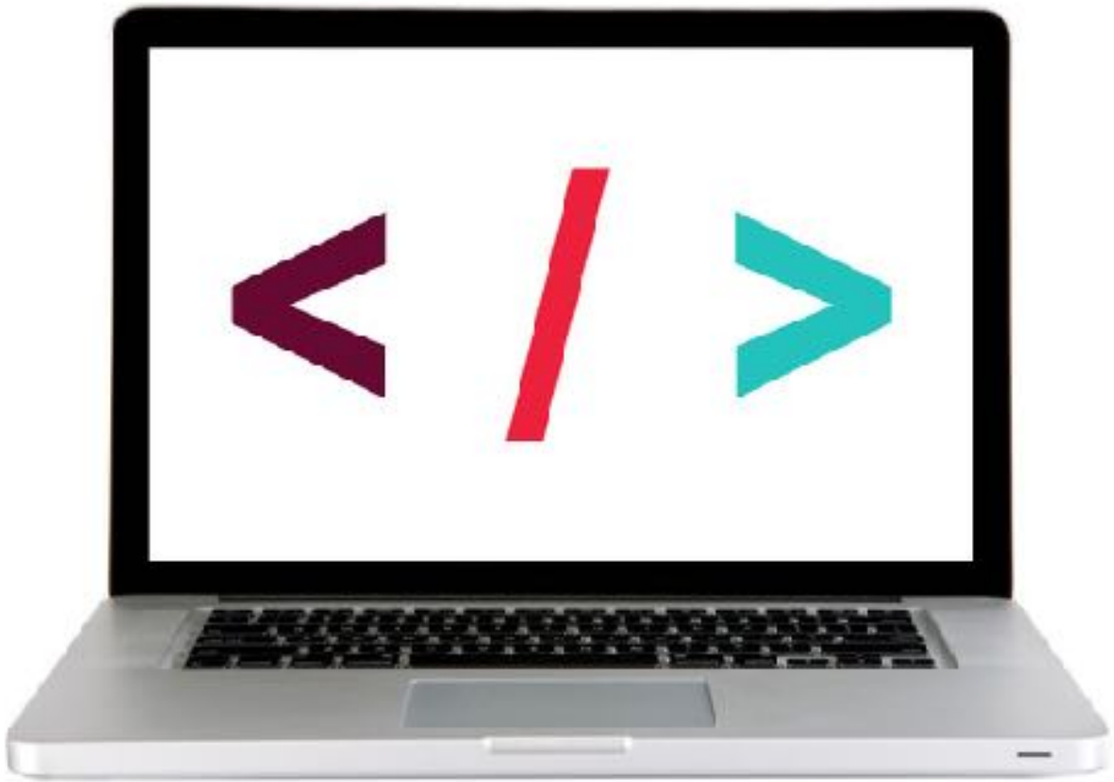
X ML **or JSON!**

Ajax in vanilla JS

Fetch = Ajax requests in vanilla JavaScript

```
fetch(url).then(function(response) {
  // check if request was successful
}).then(function(data) {
  // do something with the data
});
```

LET'S TAKE A CLOSER LOOK



EXERCISE - CREATING AN AJAX REQUEST

LOCATION

- `starter-code > 1-fetch-ajax-exercise`

TIMING

5 min

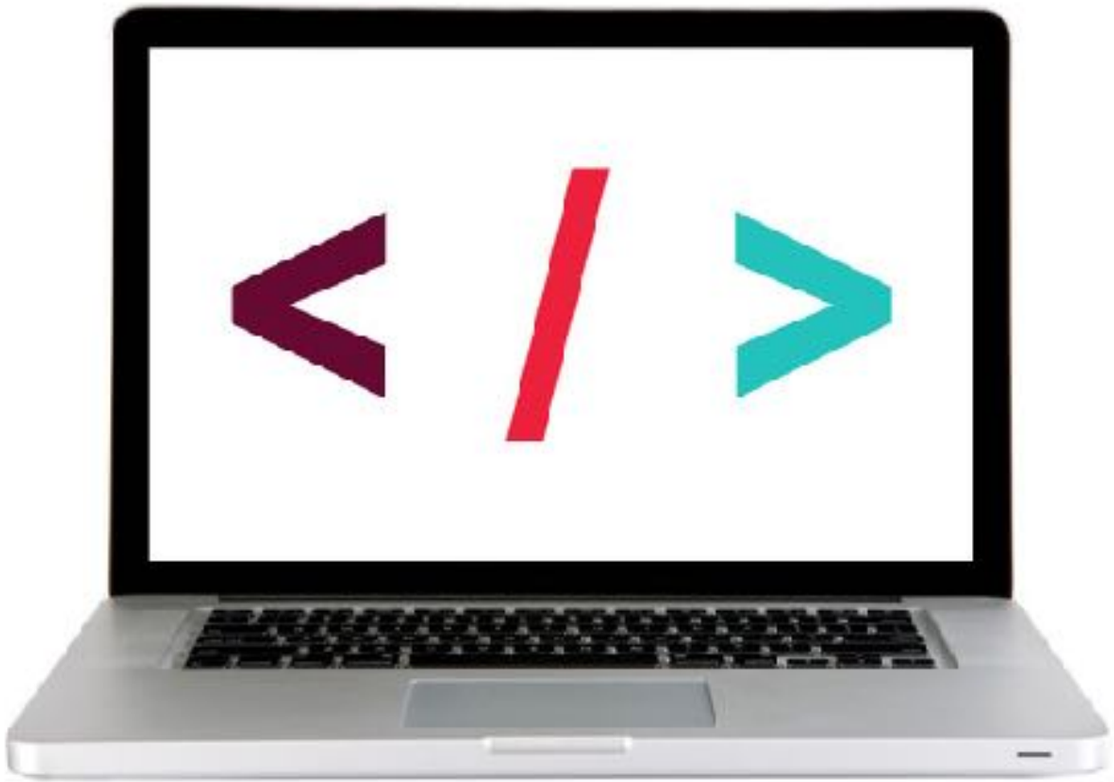
1. Copy the code from the codealong to the main.js file.
2. Change the URL to the one shown in the instructions.
3. Verify that a new set of results is shown in the console.
4. BONUS: Customize the error message to display the text of the HTTP status message.
   (Hint: look at https://developer.mozilla.org/en-US/docs/Web/API/Response/statusText)
5. BONUS: Refactor the code to work with user interaction. In the index.html file there is a "Get Health Data" button. Modify your code so data is only requested and logged to the console after a user clicks the button.

jQuery Ajax

Using Ajax with jQuery

method	description
`$.get()`	loads data from a server using an HTTP GET request
`$.ajax()`	performs an Ajax request based on parameters you specify

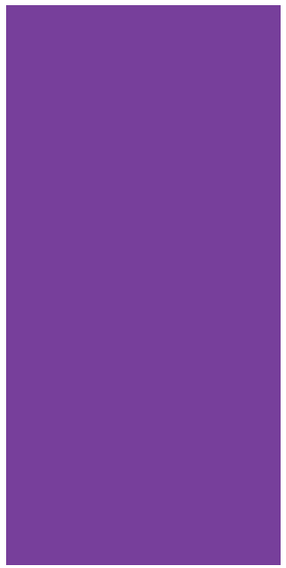
LET'S TAKE A CLOSER LOOK



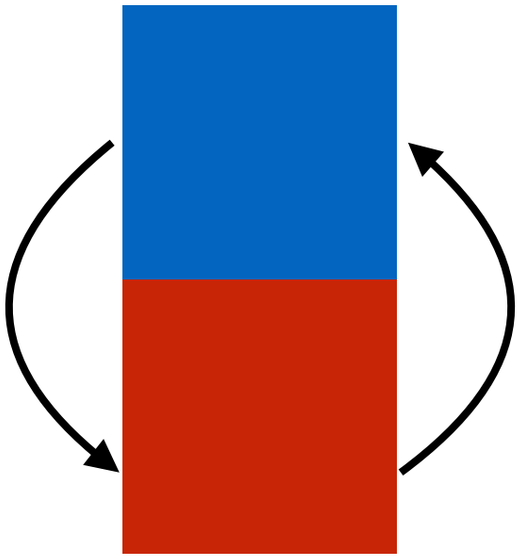
Code organization

SEPARATION OF CONCERNS

code for data and view intermingled



code for data

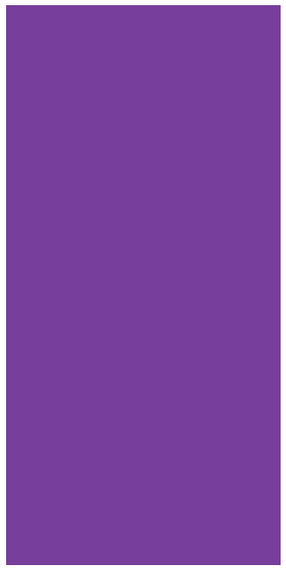


code for view

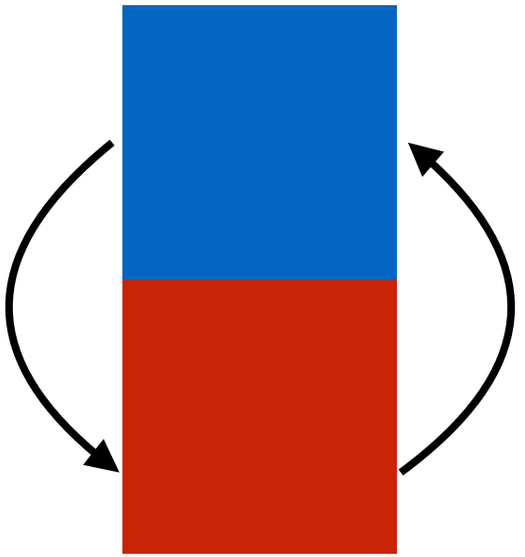
parts of code call each other, but are maintained separately

SEPARATION OF CONCERNS - HTTP

code for client and for HTTP requests intermingled



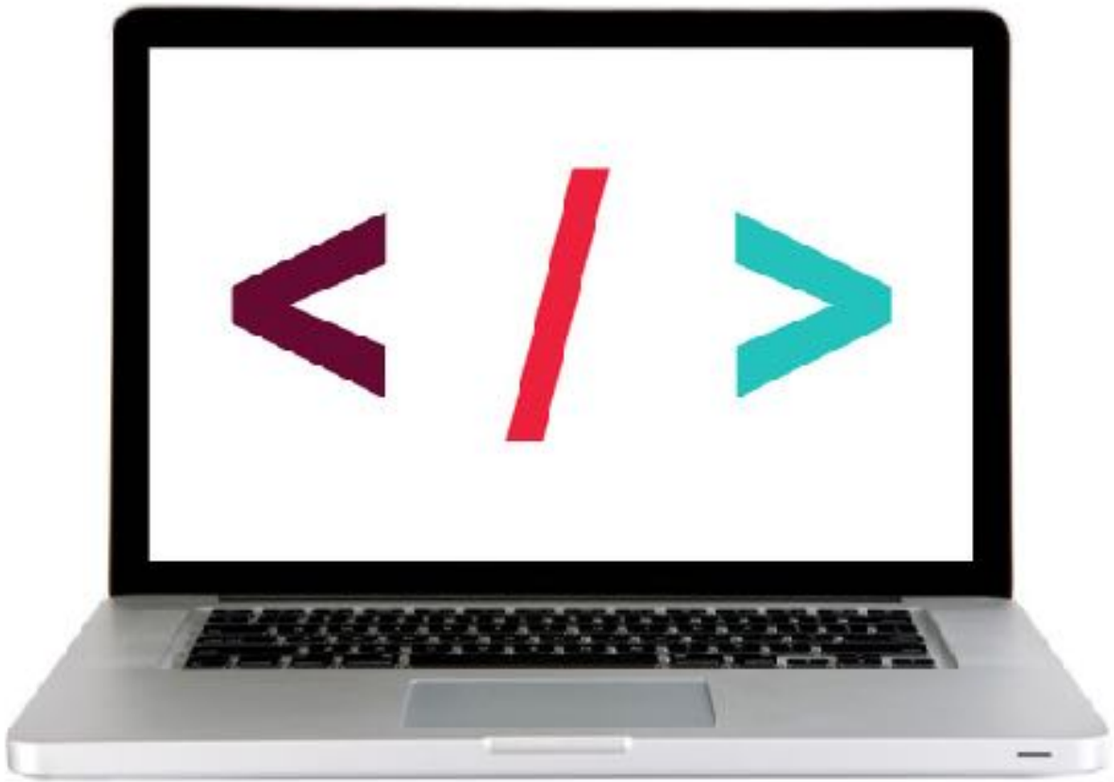
code for client



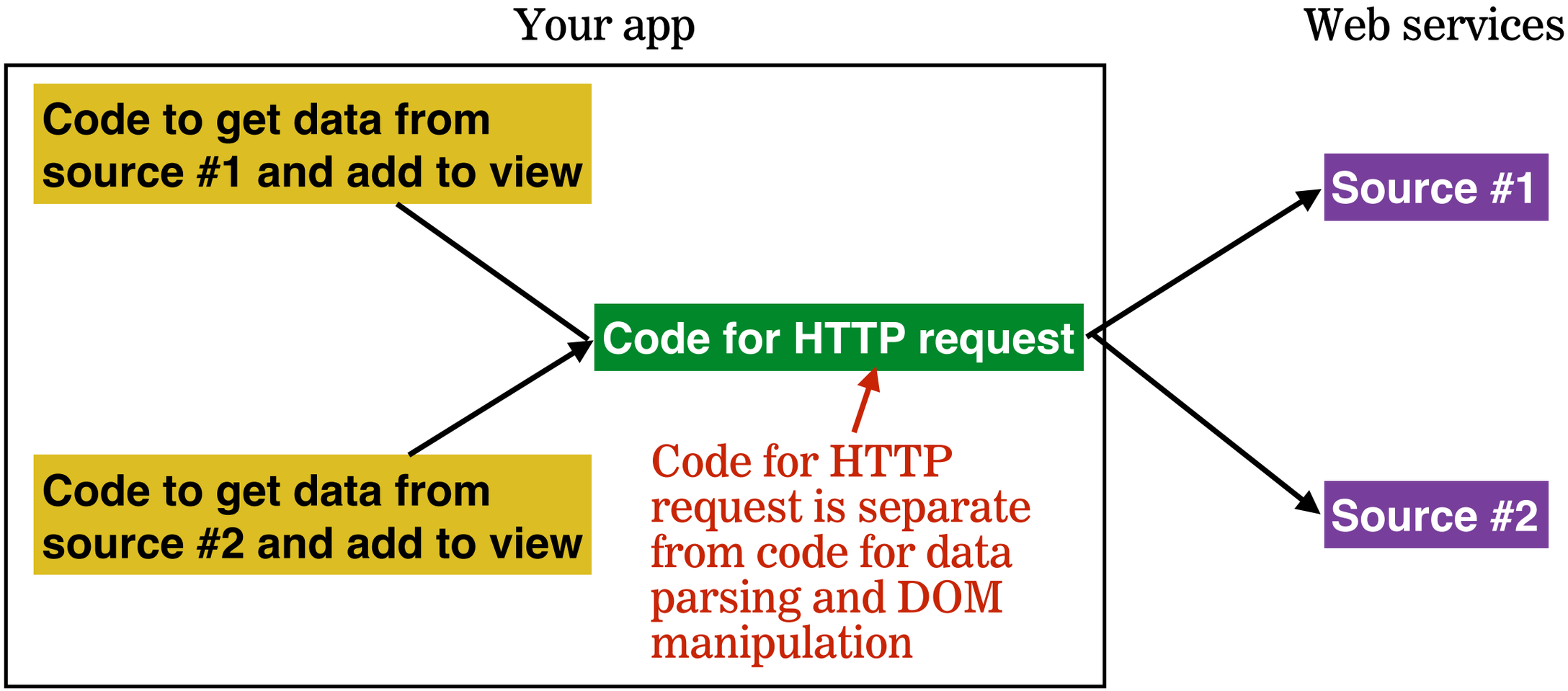
code for HTTP

parts of code call each other, but are maintained separately

LET'S TAKE A CLOSER LOOK



CREATING DRY CODE FOR HTTP REQUESTS



LAB — JQUERY AJAX

OBJECTIVE

- Create an Ajax request using jQuery or Fetch.

LOCATION

- `starter-code > 4-ajax-lab`

EXECUTION

45 min

1. Open index.html in your editor and familiarize yourself with the structure and contents of the file.
2. Open main.js in your editor and follow the instructions.

Exit Tickets!

(Class #9)

LEARNING OBJECTIVES - REVIEW

- Identify all the HTTP verbs & their uses.
- Describe APIs and how to make calls and consume API data.
- Access public APIs and get information back.
- Implement an Ajax request with Fetch.
- Create an Ajax request using jQuery.

NEXT CLASS PREVIEW

Asynchronous JavaScript and Callbacks

- Describe what asynchronous means in relation to JavaScript
- Pass functions as arguments to functions that expect them.
- Write functions that take other functions as arguments.
- Build asynchronous program flow using Fetch

Q&A