GENERAL ASSEMBLY

JAVASCRIPT DEVELOPMENT

Sasha Vodnik, Instructor

HELLO!

1. Pull changes from the `svodnik/JS-SF-9-resources` repo to your computer
2. Open the `10-ajax-apis/starter-code` folder in your code editor

AJAX & APIS

LEARNING OBJECTIVES

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

- Use event delegation to manage dynamic content in jQuery.
- 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 vanilla JS.
- Implement a jQuery Ajax client for a simple REST service.
- Reiterate the benefits of separation of concerns – API vs. Client.

AGENDA

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

WEEKLY OVERVIEW

WEEK 6	Advanced jQuery / Ajax & APIs
WEEK 7	Asynchronous JavaScript & Callbacks / Advanced APIs
	HOLIDAY WEEK — NO CLASS!
WEEK 8	Project 2 Lab / Closures & the module pattern

EXIT TICKET QUESTIONS

1. Should I focus on vanilla JS or on jQuery? Is it important to master vanilla JS before digging in on jQuery?

EVENT DELEGATION

WITHOUT EVENT DELEGATION

add an event listener to each li in the DOM

1. load page

2. set event listener on list items

3. add a new list item

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

- item1
- item2
- item3

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

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

click event is not automatically applied to the new li element

WITH EVENT DELEGATION

1. load page

- item1
- item2
- item3

2. set event listener on parent of list items

selector changed from ‘li’ to ‘ul’

new argument ‘li’ added to on() method

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

add an event listener to the ul element that applies to all of its li descendants

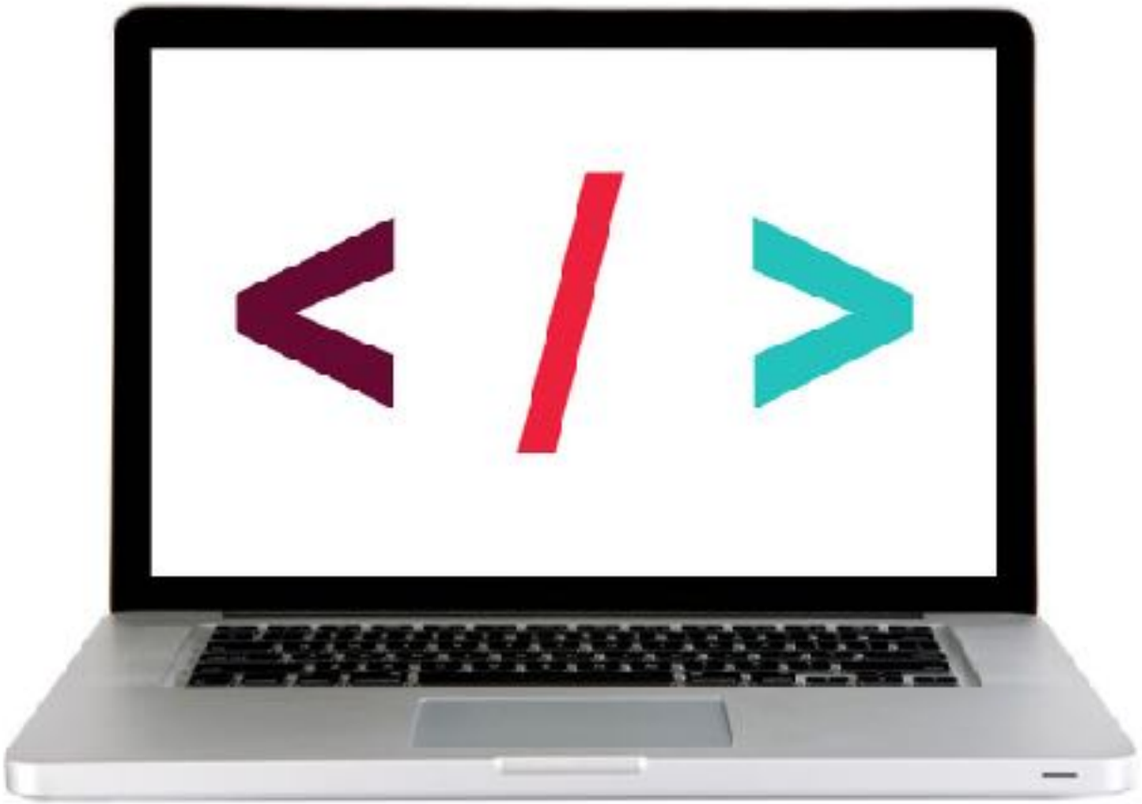
- item1 — click event
- item2 — click event
- item3 — click event

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!

INTRO TO JQUERY



LET'S TAKE A CLOSER LOOK

EXERCISE - EVENT DELEGATION

EXERCISE

OBJECTIVE

- Use event delegation to manage dynamic content.

LOCATION

- `starter-code > 1-best-practices-exercise`

TIMING

10 min

1. Return to main.js in your editor and complete items 4a and 4b.
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: When the user mouses over each item, the item should turn grey. Don't use CSS hovering for this.
4. BONUS: 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');
});
```

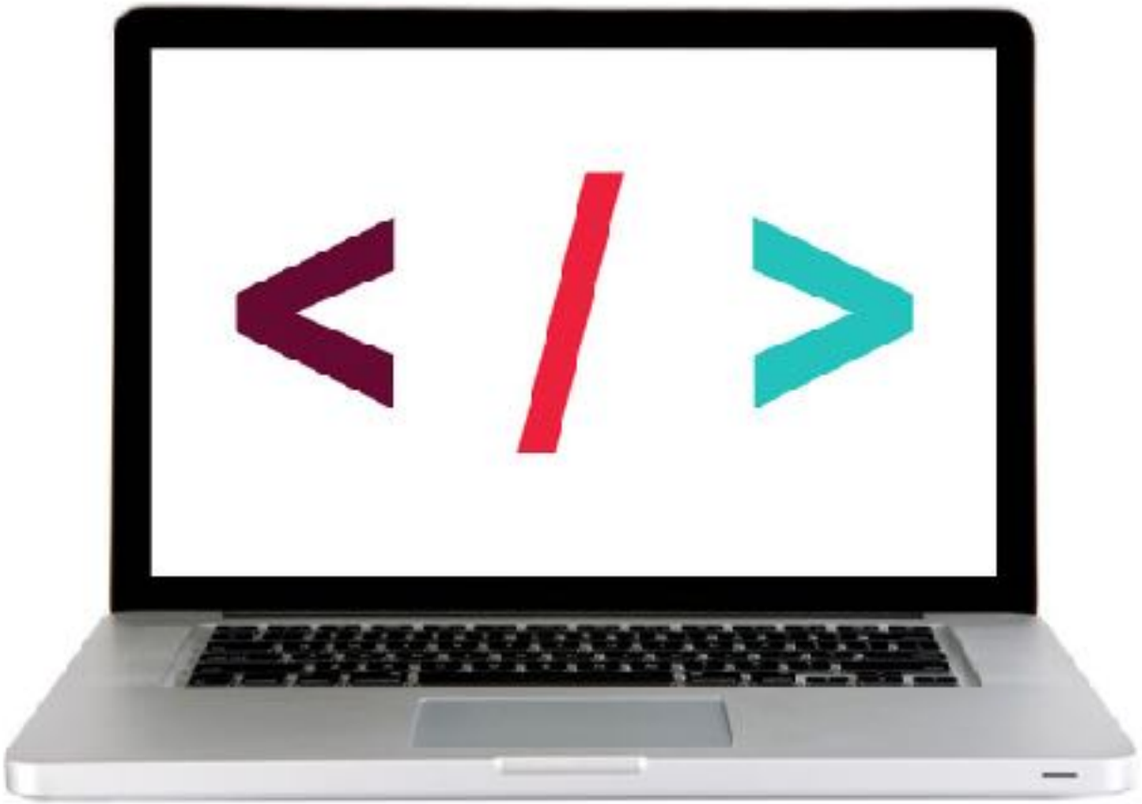
ATTACHING MULTIPLE EVENTS WITH A SINGLE .ON() STATEMENT

- Grouping all the events for an element in a single `.on()` statement makes our code more organized and is faster

```
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');
  }
});
```

INTRO TO JQUERY



LET'S TAKE A CLOSER LOOK

EXERCISE - ATTACHING MULTIPLE EVENTS

EXERCISE

LOCATION

- `starter-code > 2-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.

AJAX & APIS

ACTIVITY

EXERCISE

TYPE OF EXERCISE

- Individual/Partner

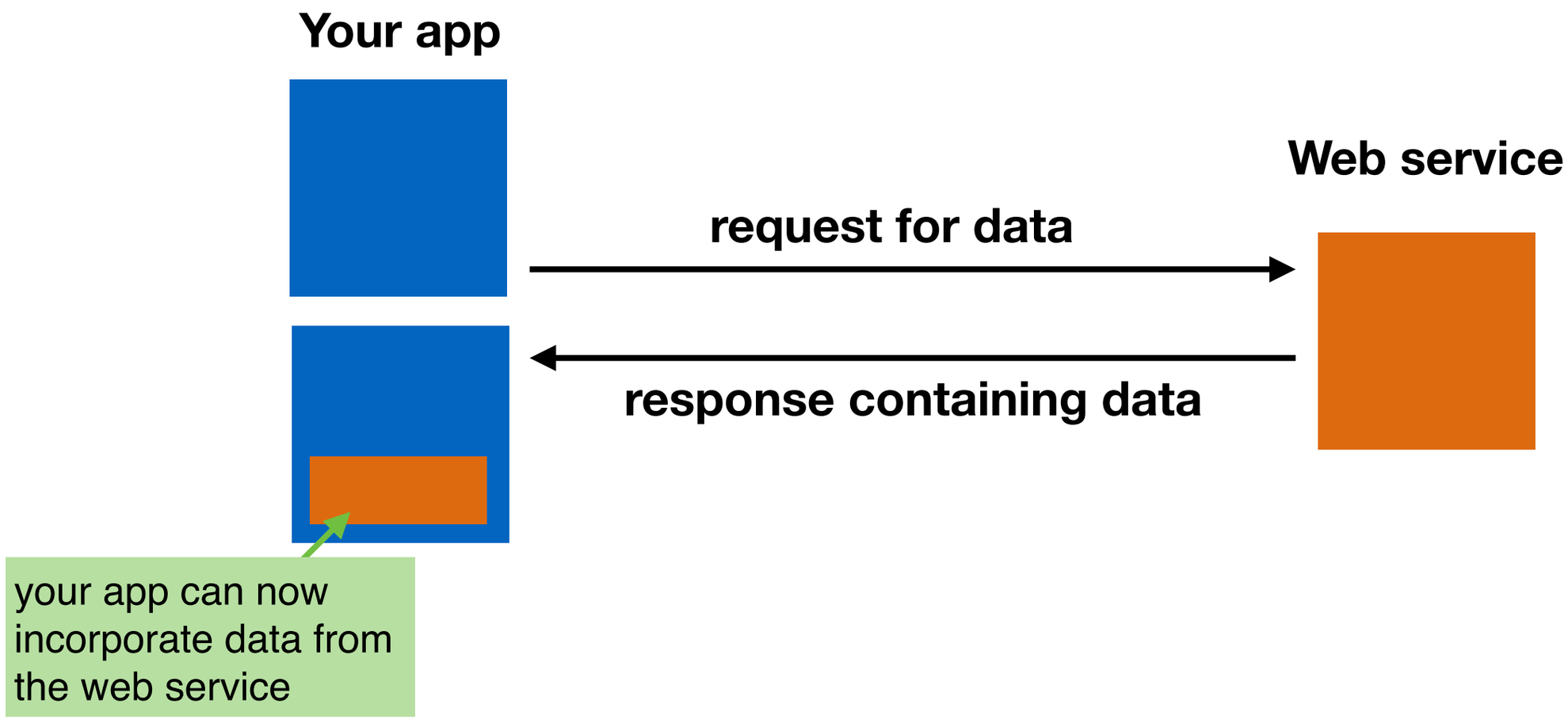
TIMING

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



WEB SERVICES

OpenWeatherMap

Maps

500PX

OMDb

Instagram

skyscanner

API = application programming interface

OpenWeatherMap

Weather Maps API Price Partners Stations

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:

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

OpenWeatherMap

Maps

500PX

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skyscanner

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},
"dt":1369824698
```

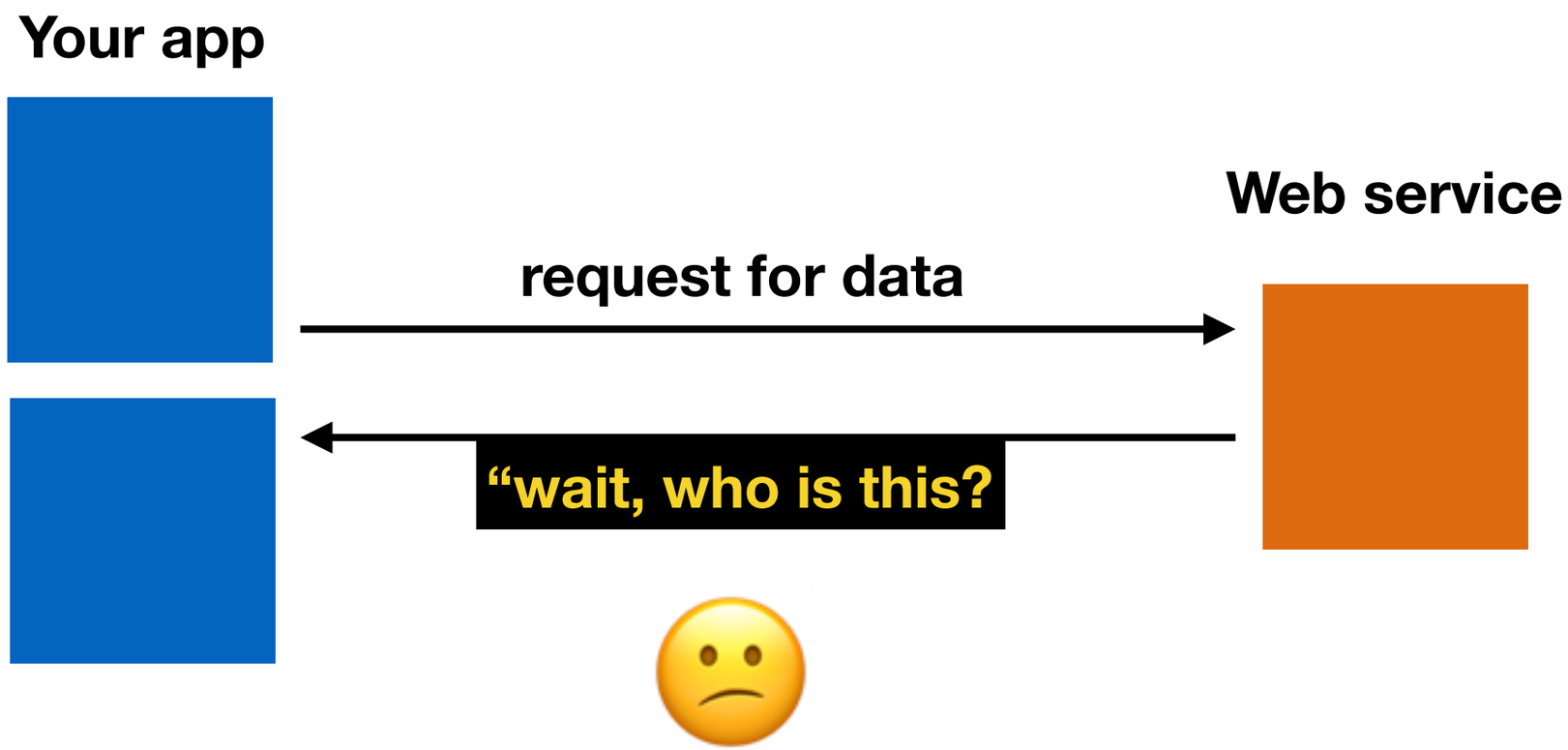
WHAT WE NEED TO KNOW TO USE AN API

TERMS OF SERVICE

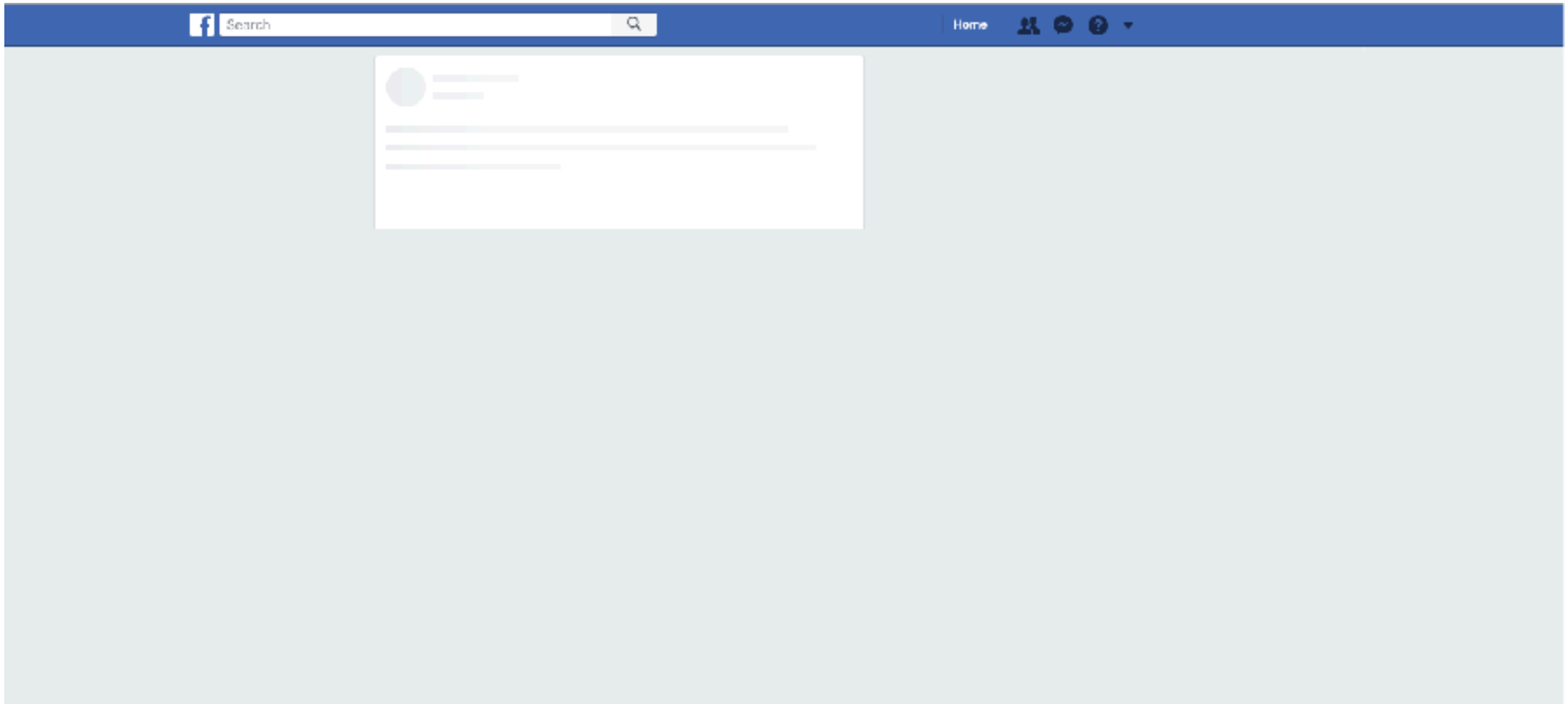
HOW TO MAKE A REQUEST

HOW TO UNDERSTAND RESPONSE

AN API MIGHT REQUIRE AUTHENTICATION



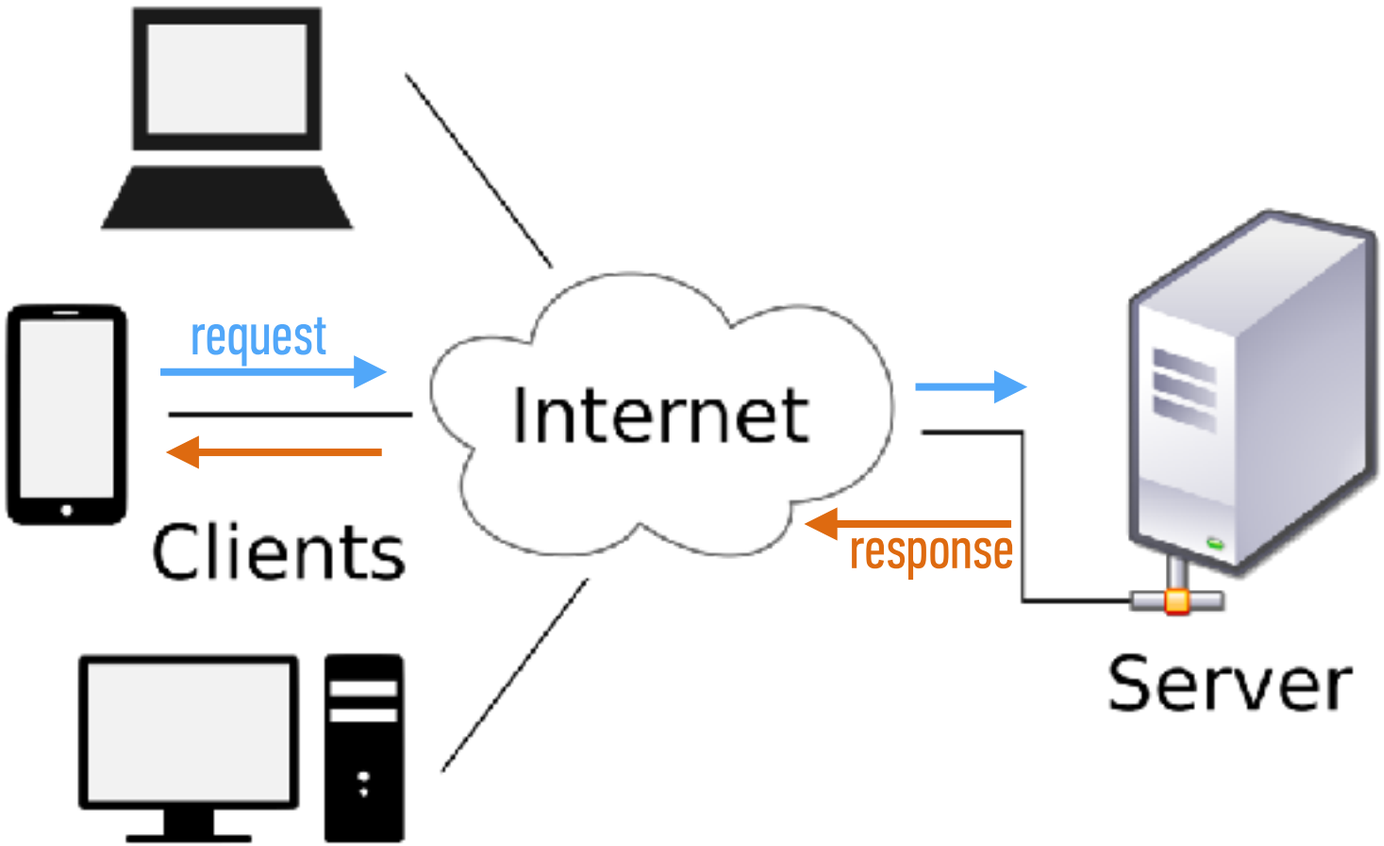
YOUR APP MIGHT EXPERIENCE A DELAYED RESPONSE



YOUR REQUEST MAY RESULT IN AN ERROR

REST (representational state transfer)

- architectural style of web applications
- transfers a representation of the state of a server resource to 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:

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4n"}],
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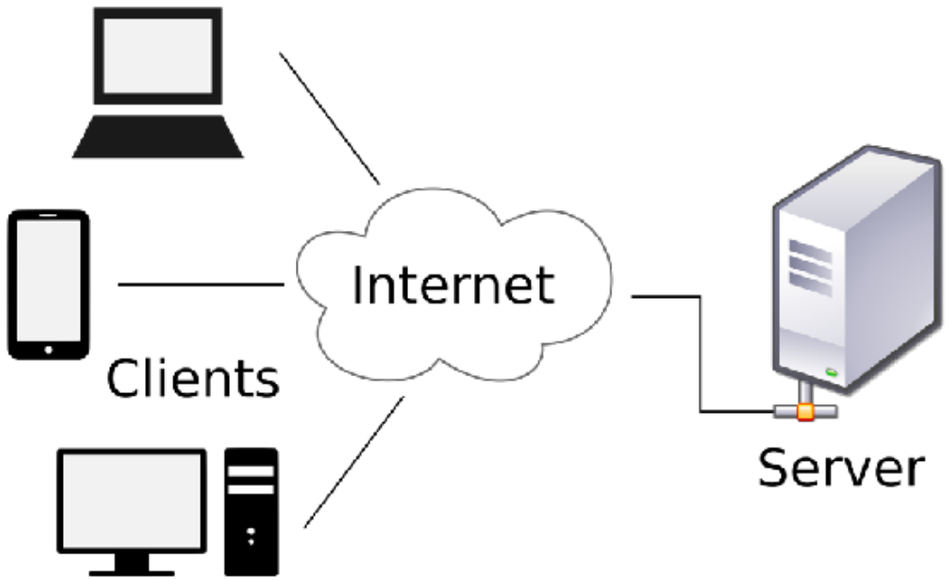
":292.04},
"wind":{"speed":7.31,"deg":187.002},
"rain":{"3h":0},
"clouds":{"all":92},
"dt":1369824698,
"id":1851632,
"name":"Shuzenji",
"cod":200}
```

HTTP

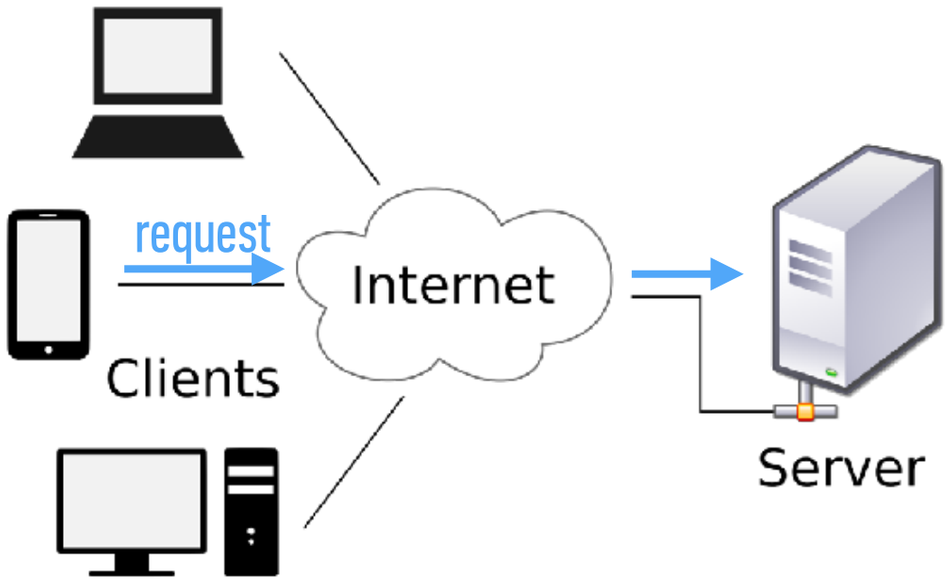
HTTP (hypertext transfer protocol)

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



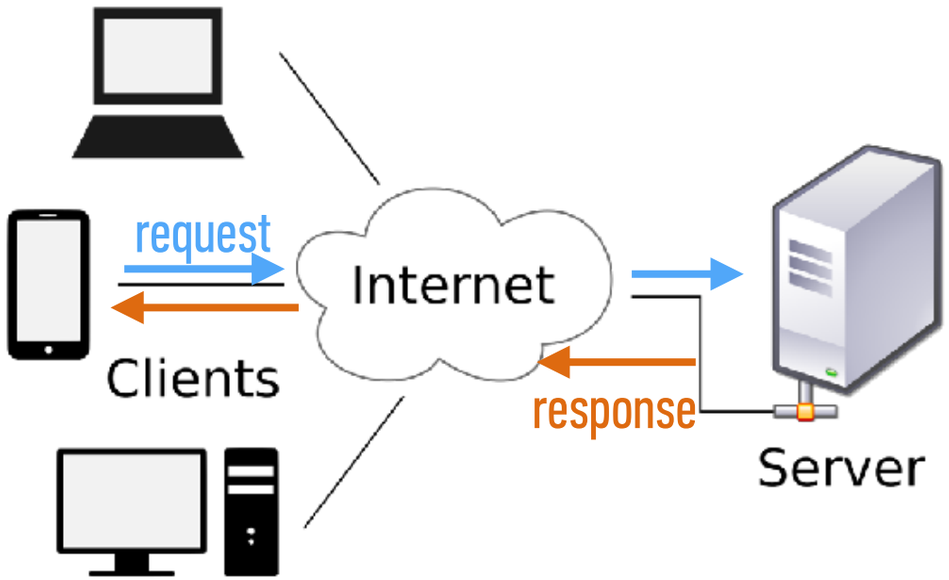
HTTP (hypertext transfer protocol)

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

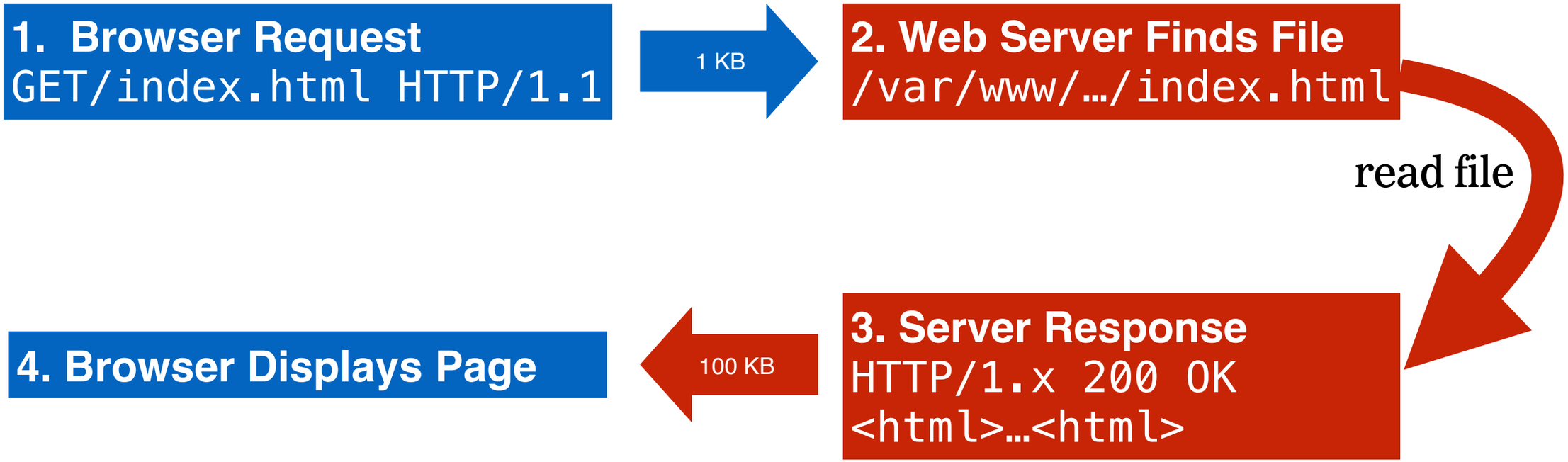


HTTP (hypertext transfer protocol)

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



HTTP REQUEST AND RESPONSE



HTTP (hypertext transfer protocol)

HTTP client

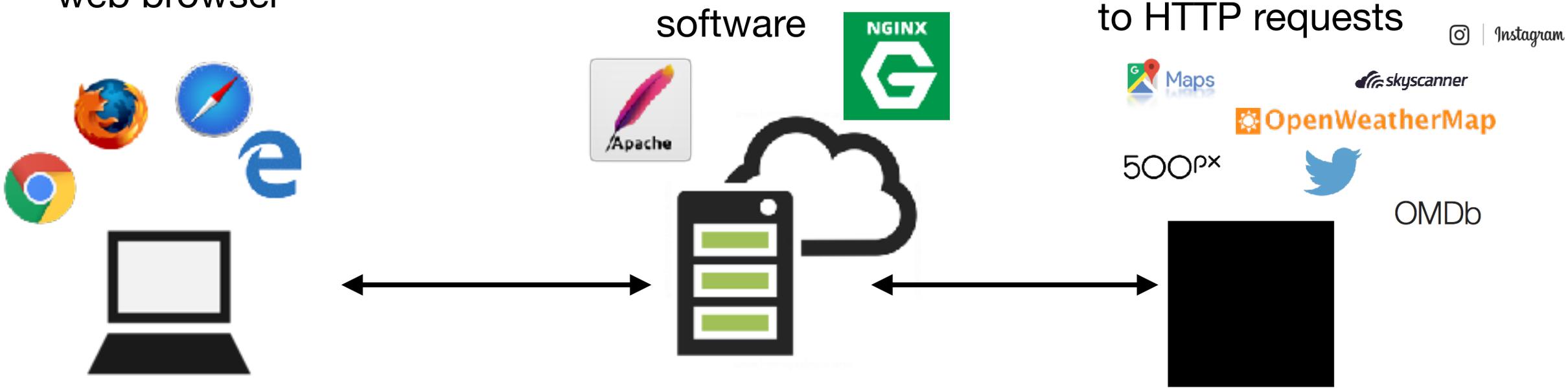
web browser

HTTP server

web server software

Web service

app that responds to HTTP requests



HTTP REQUESTS IN EVERYDAY LIFE

protocol host resource path query

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

HTTP REQUEST STRUCTURE

```
[http request method] [URL] [http version]
[list of headers]

[request body]
```

blank line

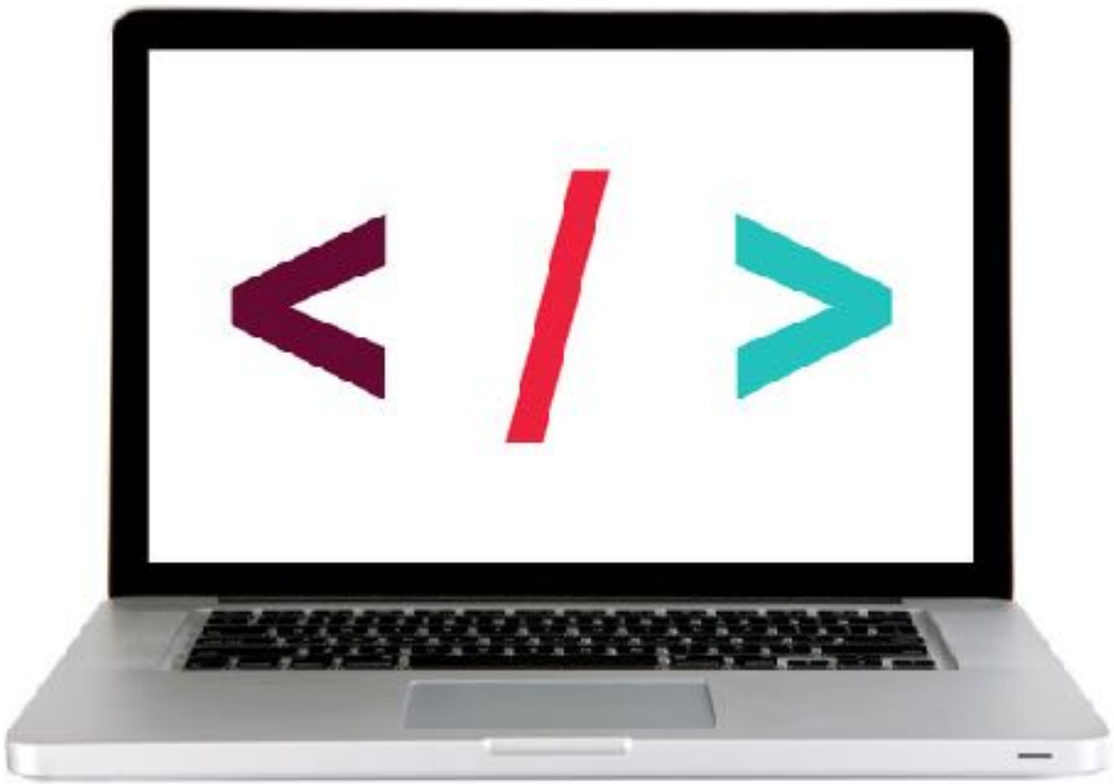
optional

HTTP REQUEST METHODS ("HTTP VERBS")

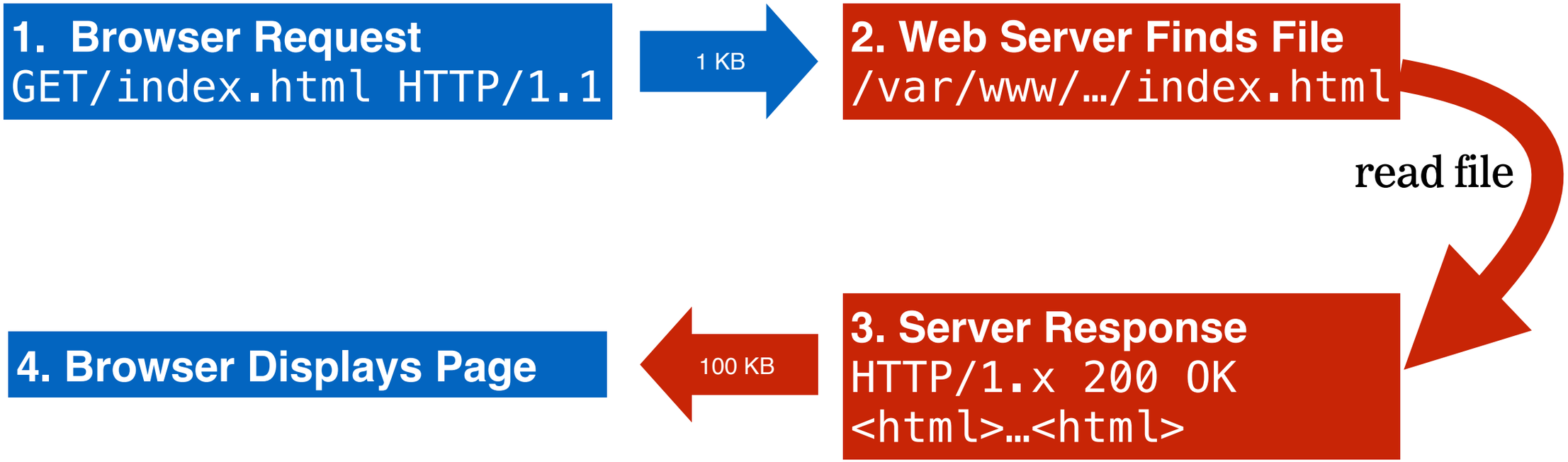
GET	Retrieve a resource
POST	Create a resource
PATCH	Update an existing resource (use instead of PUT, which replaces)
DELETE	Delete a resource
HEAD	Retrieve the headers for a resource

Most widely used

LET'S TAKE A CLOSER LOOK



HTTP REQUEST AND RESPONSE



HTTP RESPONSE STRUCTURE

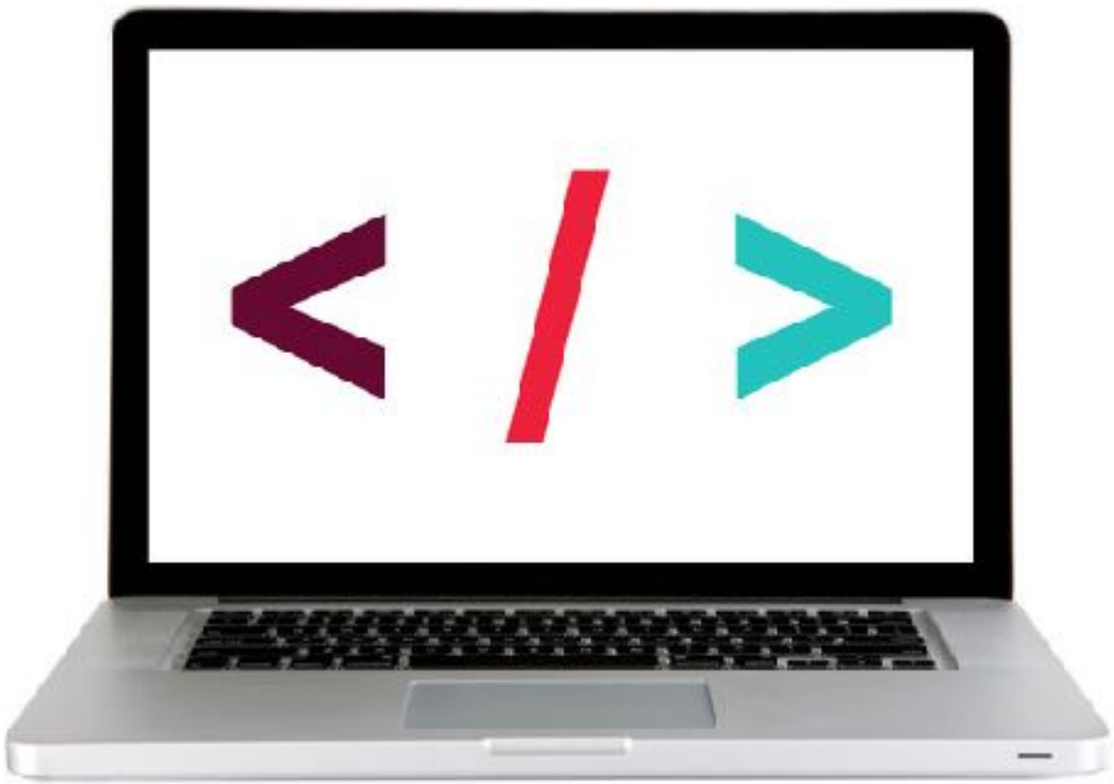
```
[http version] [status] [reason]
[list of headers]

[response body]
```

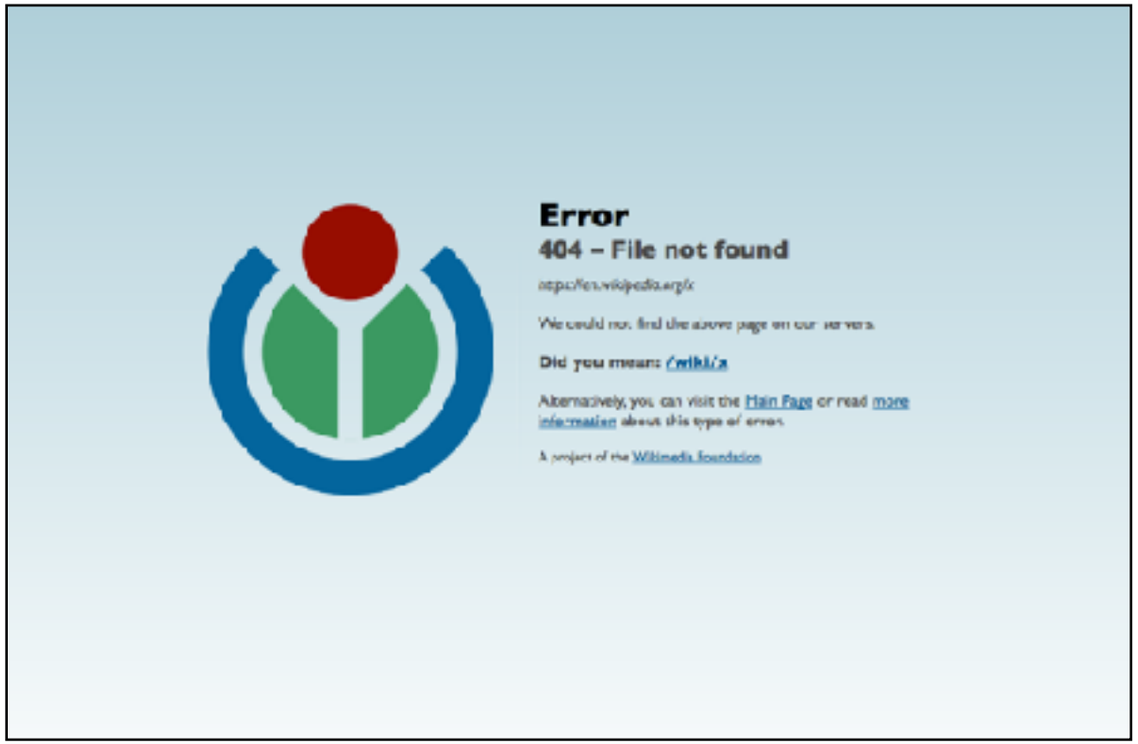
blank line

usually HTML, JSON, etc

LET'S TAKE A CLOSER LOOK



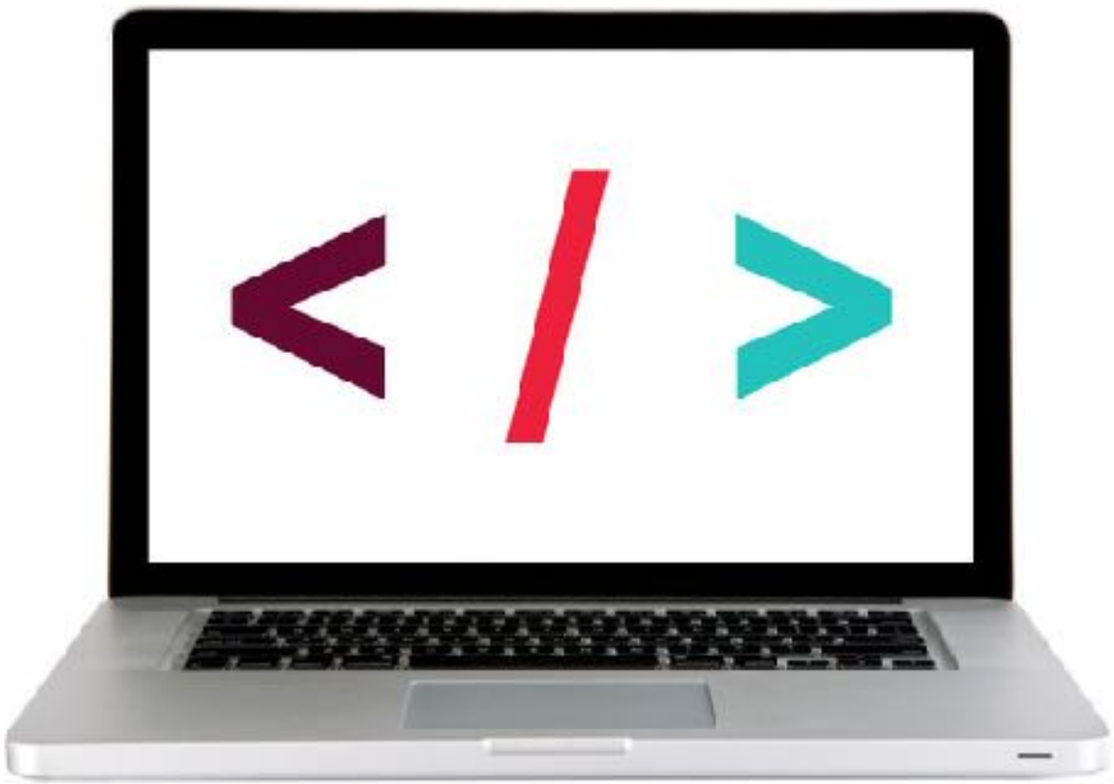
HTTP STATUS CODES



HTTP STATUS CODES

200	Okay
301	Moved permanently
302	Moved temporarily
400	Bad request
403	Forbidden
404	Not found
500	Internal server error

LET'S TAKE A CLOSER LOOK



Ajax

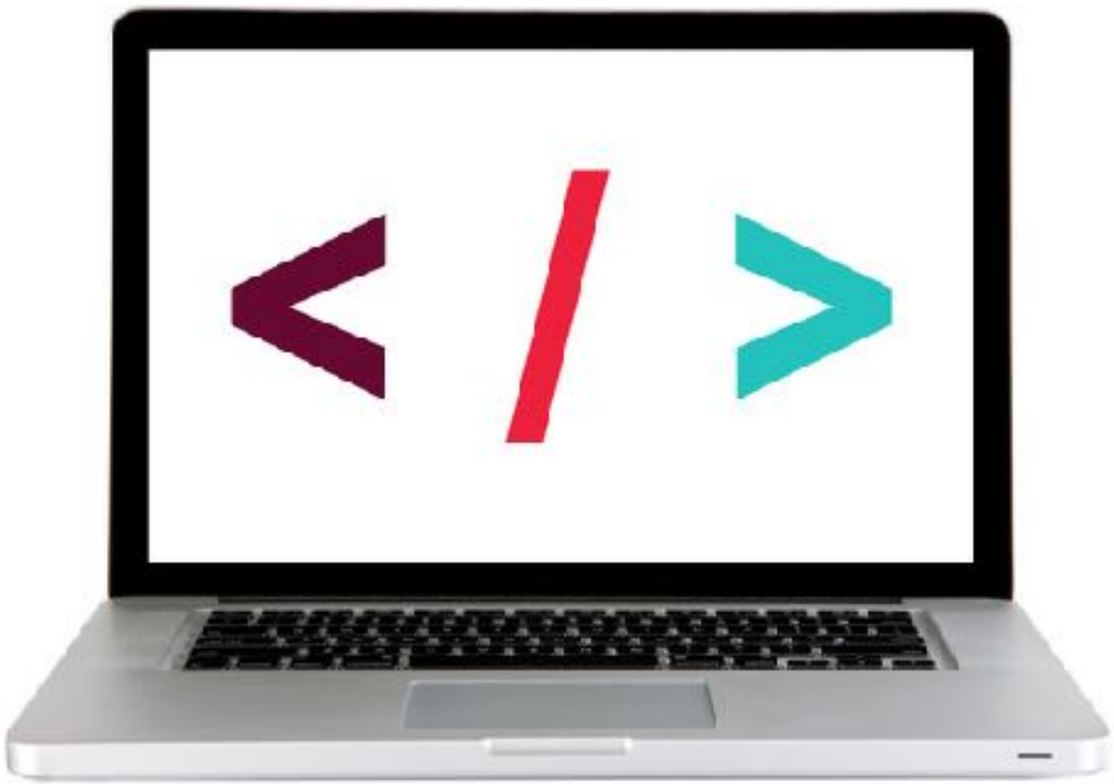
Ajax

A synchronous
J avaScript
A nd
X ML **or JSON!**

Fetch = Ajax requests in vanilla JavaScript

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

LET'S TAKE A CLOSER LOOK



EXERCISE - CREATING AN AJAX REQUEST

EXERCISE

LOCATION

- `starter-code > 4-ajax-exercise`

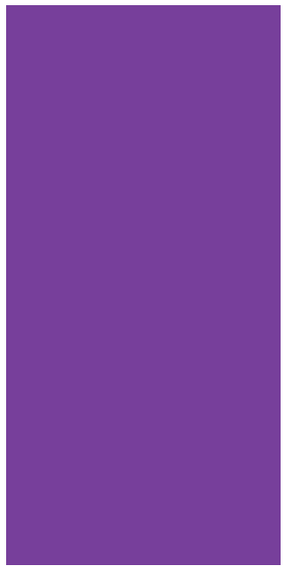
TIMING

5 min

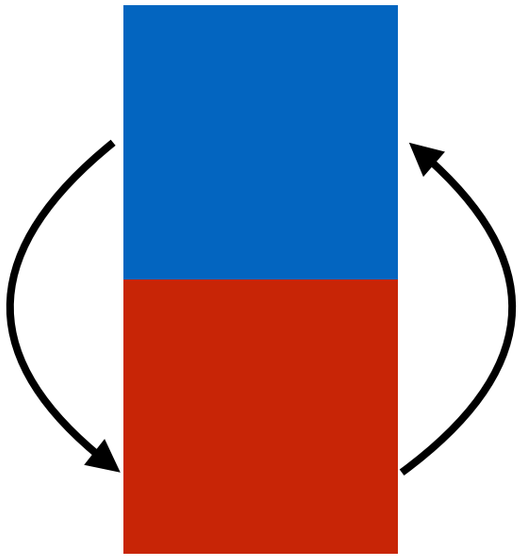
1. Copy the code from the codealong to the main.js file.
2. Change the URL to the one shown in the instructions.
3. Verify that a new set of results is shown in the console.
4. BONUS: Customize the error message to display the text of the HTTP status message.
   (Hint: look at https://developer.mozilla.org/en-US/docs/Web/API/Response/statusText)
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.

SEPARATION OF CONCERNS

code for data and view intermingled



code for data

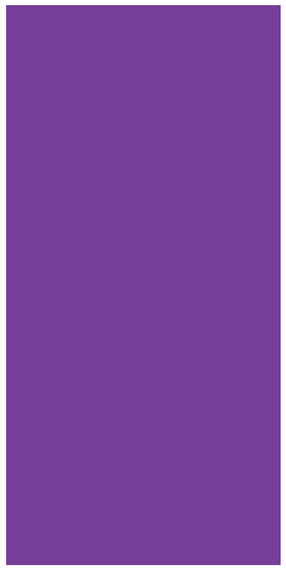


code for view

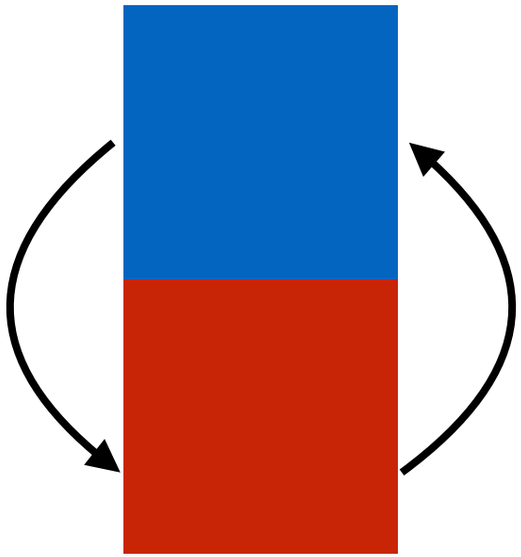
parts of code call each other, but are maintained separately

SEPARATION OF CONCERNS - HTTP

code for client and for HTTP requests intermingled



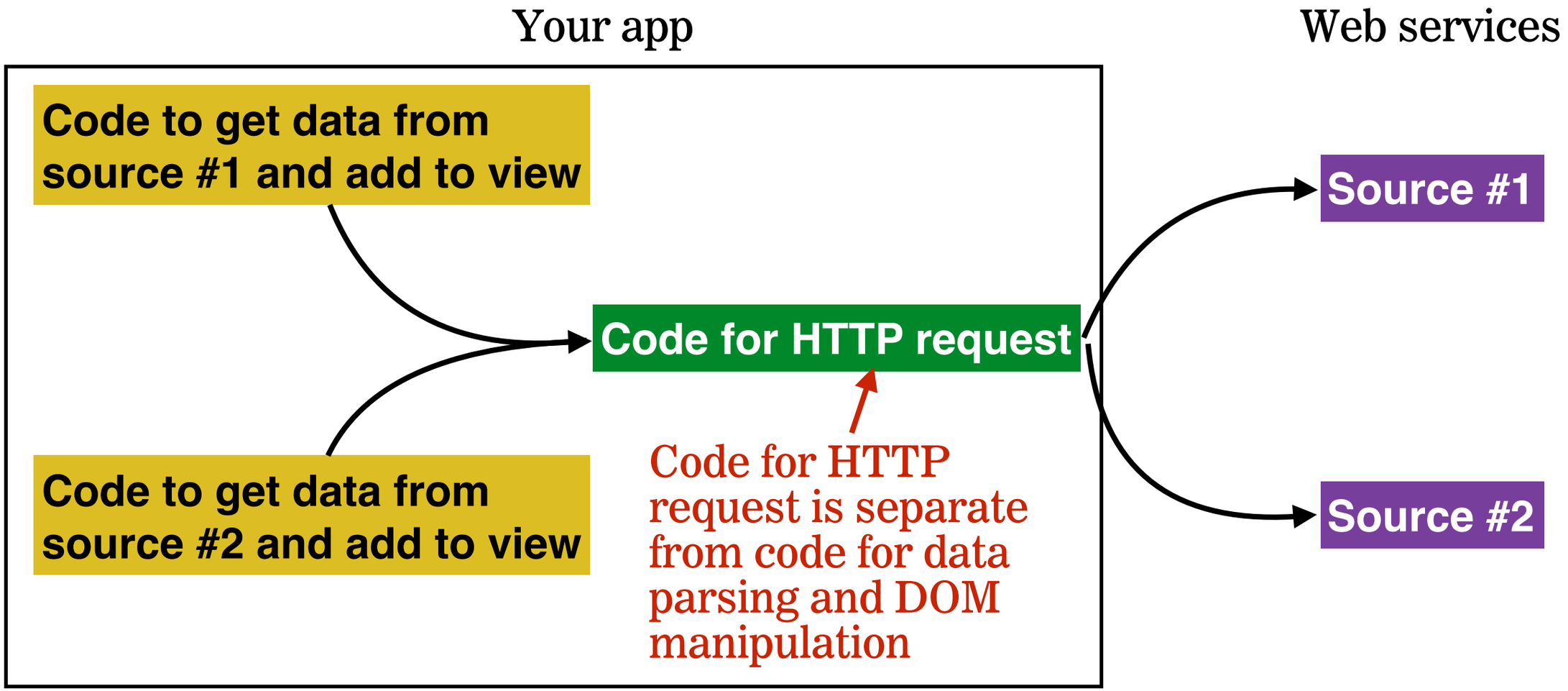
code for client



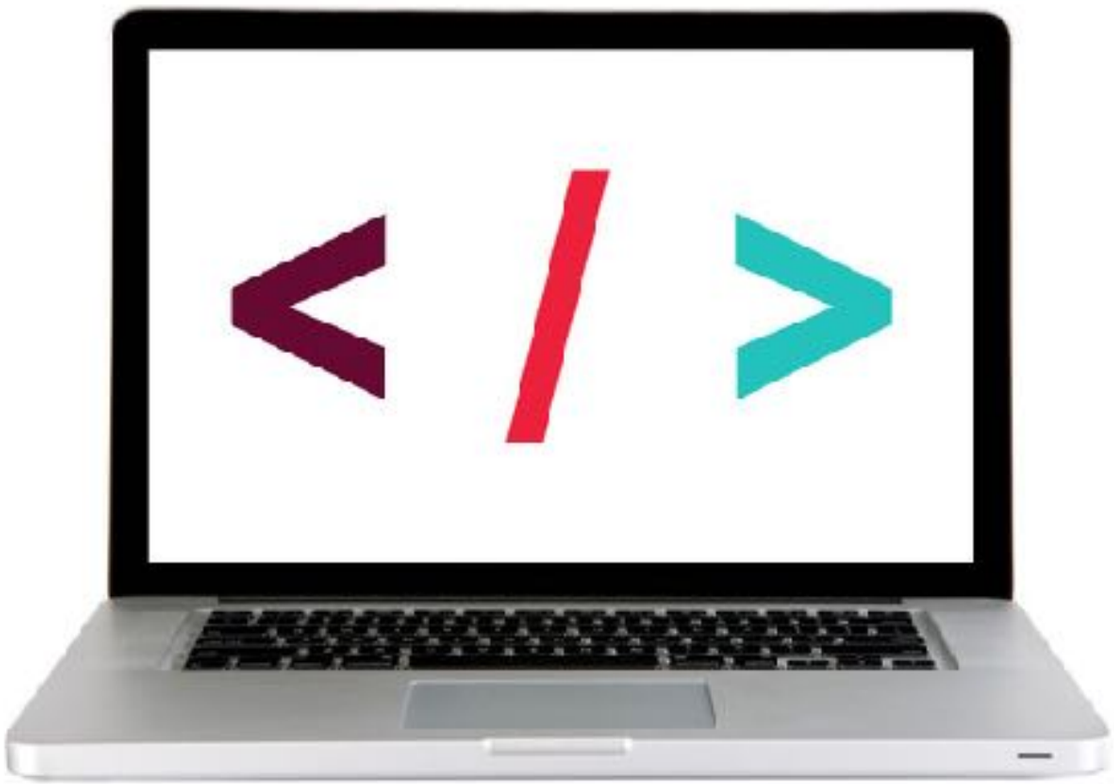
parts of code call each other, but are maintained separately

code for HTTP

SEPARATION OF CONCERNS - HTTP



LET'S TAKE A CLOSER LOOK



EXERCISE – SEPARATION OF CONCERNS

EXERCISE

TYPE

- Pairs

TIMING

2 min

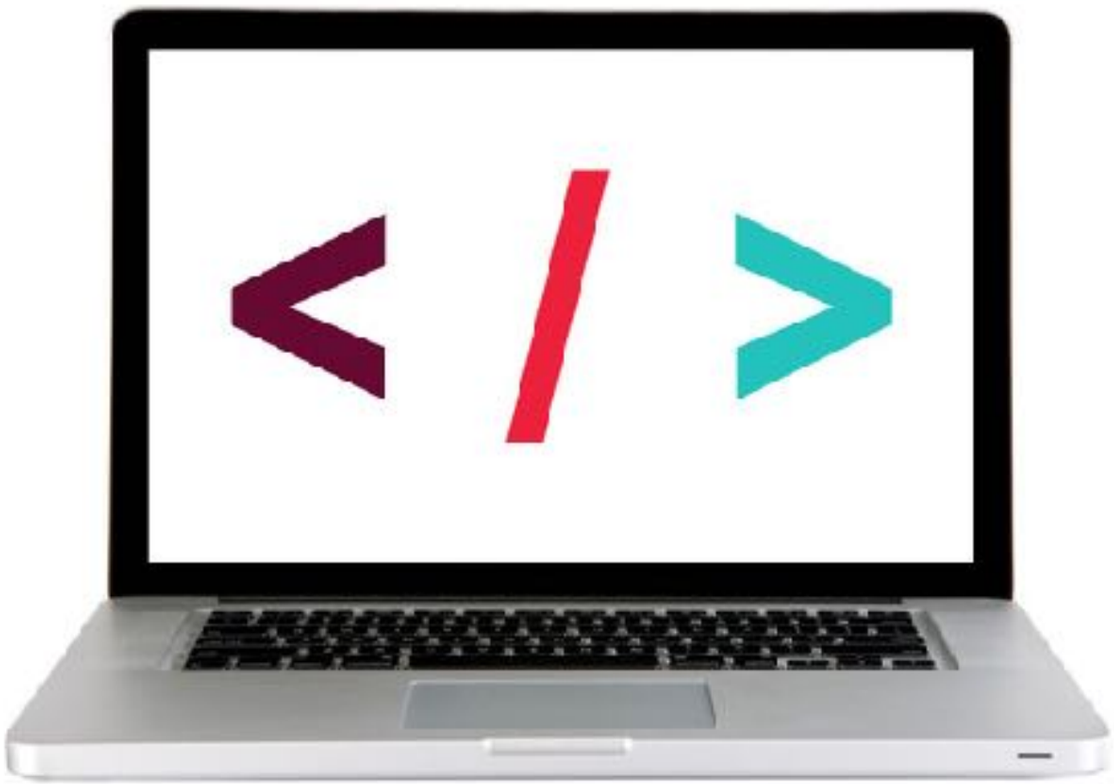
1. Imagine you're creating an app that displays the current weather from weather.com, and world news headlines from the LA Times
2. Spend 30 seconds thinking about how you might architect this app to implement separation of concerns; feel free to draw on your desk if that's helpful
3. After 30 seconds, find a partner and share your ideas for app architecture. Make note of what's similar and what's different in your plans.

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



LAB

LAB — JQUERY AJAX & SEPARATION OF CONCERNS

OBJECTIVES

- Implement a jQuery Ajax client for a simple REST service.
- Reiterate the benefits of separation of concerns – API vs. Client.

LOCATION

- `starter-code > Homework-5 > 7-jquery-ajax-exercise`

EXECUTION

until 9:20

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 #10)

LEARNING OBJECTIVES - REVIEW

- Use event delegation to manage dynamic content in jQuery.
- 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 vanilla JS.
- Implement a jQuery Ajax client for a simple REST service.
- Reiterate the benefits of separation of concerns – API vs. Client.

NEXT CLASS PREVIEW

Asynchronous JavaScript and Callbacks

- Pass functions as arguments to functions that expect them.
- Write functions that take other functions as arguments.
- Return functions from functions.

Q&A