JavaScript

Fundamentals

Week 2 - JSON – AJAX and API's

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Welcome

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What is JSON

JSON stands for **J**ava**S**cript **O**bject **N**otation

THE MOST POPULAR DATA FORMAT ON THE WEB

The JSON syntax is very similar to JavaScript object notation but it is not an **object.**

- JSON format is just plain text often used to send data from a server to a web page
- JSON is a format for sending, receiving and storing data
- JSON is programming language independent, JSON data can be written in any programming language

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JSON data types

- ✓a string
- ✓a number
- ✓JSON object
- ✓an array
- ✓a boolean
- ✓null

JSON values cannot be one of the following data types:

- a function
- a date
- Undefined

See valid data types and also

Exception for function and date

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JSON build-in functions

JSON.parse()

Used to convert any JSON received from the server into JavaScript objects.

JSON.stringify()

Used to convert any JavaScript object into JSON format, and send JSON to the server.

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JSON resources

- JSON FORMATER AND VALIDATOR
- JSON FORMATTER CHROME ADD-ON
- W3SCHOOLS JSON INTRODUCTION
- JSON FILES ON GITHUB

Now let's practice

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What is AJAX

AJAX stands for **A**synchronous **J**ava**S**cript **A**nd **X**ML

Ajax is simply a Web Development Technic, used to **SEND** and **RETRIEVE** data in the background

Without having to refresh the web page

The data is often sent in a format called JavaScript Object Notation **(JSON).**

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What is AJAX cont.

AJAX stands for **A**synchronous **J**ava**S**cript **A**nd **X**ML

- AJAX is not a programming language
- AJAX uses a browser build-in **XMLHttpRequest** object (to request data from a server)
- AJAX uses an **asynchronous** processing model, improving and speeding up the user experience

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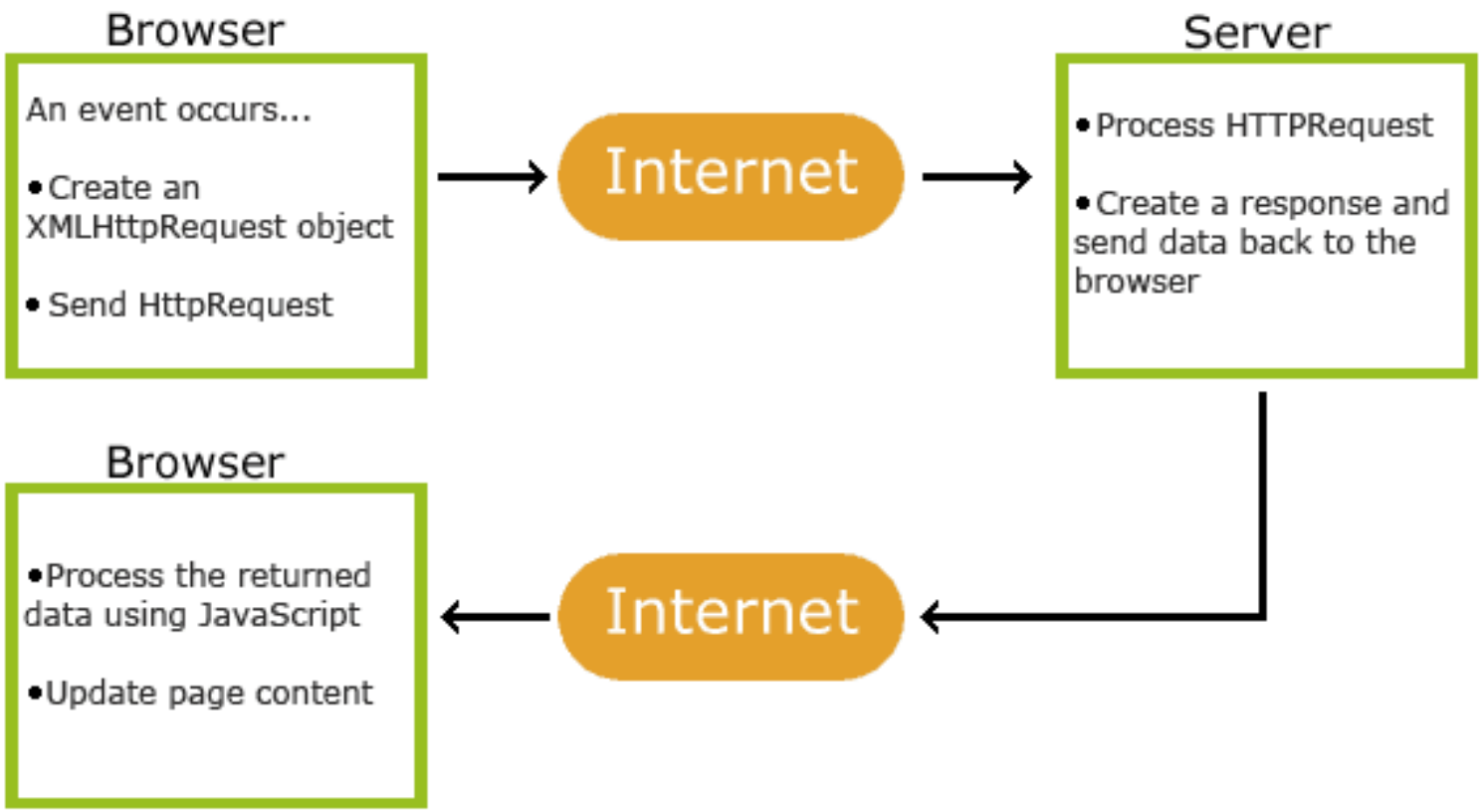
How AJAX Works



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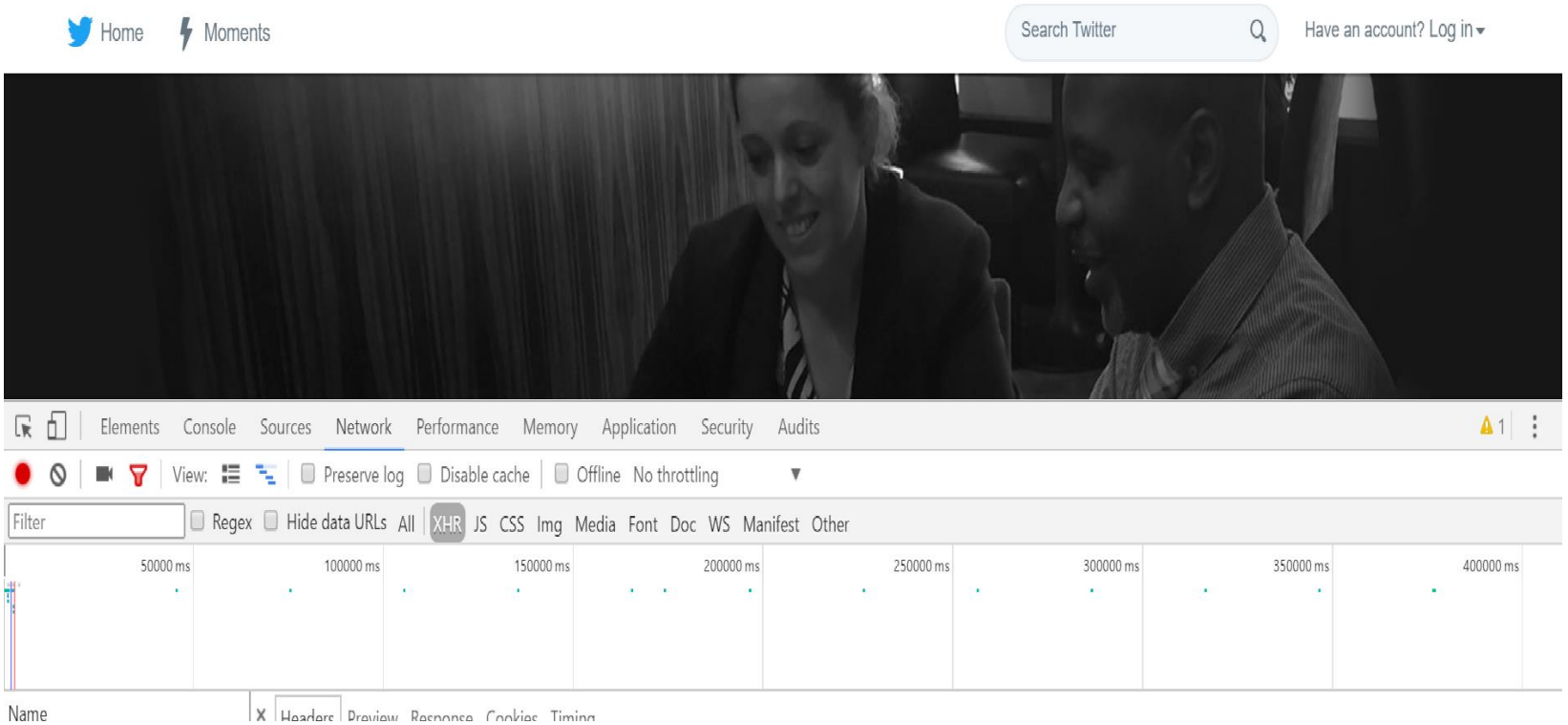
How AJAX Works cont.



The AJAX Request

1. `var xhr = new XMLHttpRequest(); // browser build-in object`
2. `xhr.open("GET", "data/myData.json", true);  // POST (send)`
3. `xhr.send();`

1. Creates a new **instance** of the XMLHttpRequest object and stores the object in a variable
2. The XMLHttpRequest object's **open()** method prepares the request. The 3 parameters are: the HTTP method, the URL of the page and the Boolean to indicate asynchronous
3. Uses the **send()** method, is the one that sends the prepared request to the server. Information can be passed to the server in the parentheses, you may also see xhr.open(null)

The AJAX Response

```
1   xhr.onload = function() { // could use onreadystatechange

2     if (this.readyState == 4 && this.status == 200) {

                  // Code to process the results from the server
      }
};
```

1. When the browser has received and loaded a response from the server, that will trigger the anonymous function
2. The function checks the **readyState** and the **status** property of the object, to make sure the server's response was OK, also the data has arrived and available

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The parse() & stringify() Methods

```
1   xhr.onload = function() { // could use onreadystatechange
2     if (this.readyState == 4 && this.status == 200) {
3               var myData = JSON.parse(this.responseText);
    }
};
```

3. **JSON.parse()** processes a string containing JSON data. It converts the JSON data into a JavaScript objects ready for the browser use. **JSON.stringify()** converts a JavaScript object into a string formatted using JSON, allows to send JavaScript objects from the browser to another application

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AJAX Code Example

```
function loadMyData() {

var myRequest = new XMLHttpRequest();

myRequest.open("GET",
"https://raw.githubusercontent.com/biatoSalo/JSONANDAJAX/master/JSONANDAJAX/expensiveLuxuryCars.json", true);

    myRequest.onload = function() {
        if (myRequest.readyState == 4 && myRequest.status == 200) {
            var myData = JSON.parse(myRequest.responseText);
        }
    };
        myRequest.onerror = function() {
        }
    myRequest.send();
}
```

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XMLHttpRequest Methods

Method	Description
new XMLHttpRequest()	Creates a new XMLHttpRequest object
abort()	Cancels the current request
getAllResponseHeaders()	Returns header information
getResponseHeader()	Returns specific header information
open(*method, url, async, user, psw*)	Specifies the request *method*: the request type GET or POST *url*: the file location *async*: true (asynchronous) or false (synchronous) *user*: optional user name *psw*: optional password
send()	Sends the request to the server Used for GET requests
send(*string*)	Sends the request to the server. Used for POST requests
setRequestHeader()	Adds a label/value pair to the header to be sent

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XMLHttpRequest Properties

Property	Description
onreadystatechange	Defines a function to be called when the readyState property changes
readyState	Holds the status of the XMLHttpRequest. 0: request not initialized 1: server connection established 2: request received 3: processing request 4: request finished and response is ready
responseText	Returns the response data as a string
responseXML	Returns the response data as XML data
status	Returns the status-number of a request 200: "OK" 403: "Forbidden" 404: "Not Found" For a complete list go to the Http Messages Reference
statusText	Returns the status-text (e.g. "OK" or "Not Found")

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AJAX resources

W3SCHOOLS AJAX INTRODUCTION

MOZILLA DEVELOPER NETWORK - AJAX

Use the JSON practice example to practice AJAX

Now hands-on coding

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What is an API

API stands for **A**pplication **P**rogramming **I**nterface

An Interface used by **P**rograms to interact with an **A**pplication

API is a set of commands, protocols and tools that allows one piece to software to talk to another, literally is a think for computers to talk together**.**

There are all kinds of API such as **Twitter API, Google API, Weather API, TFL API** etc**.**

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REST API

All the API's above are know as REST API

- REST stands for:
- **RE**presentational **S**tate **T**ransfer
- It works almost the same way a website does

http://maps.googleapis.com/maps/api/geocode/json?address=london

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API's Directory

Click the button for a list of Web based API's

ProgrammableWeb

- API's are consumed by **Programs** and not **HUMANS**
- An API is only good if it's documentation is GREATE, e.g. sample code, live examples and simple to read and understand text.

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Querying an API

API Call:
api.openweathermap.org/data/2.5/weather?q=London,uk

Query the API:
?q=

Multiple queries:
?q=……&……..&…….

End points – This is given to you by the API service

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API resources

PLURALSIGHT TUTORIAL

Now hands-on coding