

Web Stepp by Stepp
Self-Check Questions Chapter 12
Instructions: type answers in **red** or **blue**.

- 1) What does the term “AJAX” stand for?

Asynchronous JavaScript and XML

- 2) Is AJAX a programming language? What language(s), and technologies are involved in AJAX?

AJAX is not considered to be a programming language. It is just a particular way of using JavaScript and HTML DOM

- 3) Name three situations in which it would be useful to use AJAX on a web site.

Lack of UI responsiveness.
Allows dynamically updating a page without making the user wait
Aids in the creation of rich, user-friendly web sites

- 4) What is the difference between synchronous and asynchronous communications between a web browser and web server? Which style does AJAX use, and why is this helpful in the web world?

Synchronous: creates the request object, opens a connection, and sends the request.
Asynchronous: attaches an event handler to the request's event, and the code will run when the request is completed.
AJAX uses the asynchronous style, meaning that the browser will not need to reload the entire page when some data is changed.

- 5) Who created the technologies necessary to do AJAX? Which browsers support AJAX today in 2021? Which browser(s) failed to support AJAX well in 2005 – 2013?

Jesse James Garrett was the inventor of AJAX and the one who incorporated technologies like HTML or CSS to AJAX. The browsers that support AJAX nowadays are Google Chrome, Mozilla Firefox, Netscape, Apple Safari, Microsoft Internet Explorer, Konqueror, and Opera.

- 6) The XMLHttpRequest object has several important properties. How are each of the following properties used: onreadystatechange, readyState, and status. Describe them in detail.

readyState holds the status of the XMLHttpRequest.
onreadystatechange contains the event handler to be called
status returns the numerical HTTP status code of the XMLHttpRequest's response.

- 7) How does your JavaScript code know when the result of an AJAX request arrives? How does the answer differ depending on whether you're performing a synchronous or asynchronous request? How do you access the test data that has been retrieved from the web server?

User invokes an event handler. Hnadler's code creates an XMLHttpRequest object that requests the page from the server. The server retrieves appropriate data and sends it back. The XMLHttpRequest would fire an event when the data arrives (often called a callback). The callback event handler processes the data

and displays it. Doing this process asynchronously means that there should be a callback function that returns the results. In the case that the process is synchronous, you can think of doing a phone call to get the results.

- 8) In what ways does Prototype make AJAX programming easier? Give a specific example.

Prototype allows us to deal with AJAX calls in a simpler and safer way. This module also deals with JavaScript code returned from a server and provides helper classes for polling. Ex: `AJAX.Request`

- 9) When creating an AJAX request with Prototype, how do you specify whether the request is an HTTP GET or POST? (Show examples of short code snippets.)

When creating an AJAX request with Prototype there are these options called "method" and "parameters" that fetch the request from the server and query parameters to pass the server. Ex:

```
new AJAX.Request("url",
{
  method: "get",
  onSuccess: functionName,
  onFailure: AJAX.Failure,
  onException: AJAX.Failure
})

new AJAX.Request("url",
{
  method: "post", // optional
  parameters: { name: value, name: value, ..., name: value },
  onSuccess: functionName,
  onFailure: functionName,
  onException: functionName
});
```

- 10) What is the difference between Prototype's `Ajax.Request` and `Ajax.Updater`? When is it appropriate to use each of them?

`AJAX.Request` is a class that initiates and processes the AJAX request

`AJAX.Updater` is a class that performs an AJAX request and updates a container's content with the contents of the response.

`AJAX.Request` should be used when small amounts of information may be saved from the server.

`AJAX.Updater` should be used when we want to fetch a file content into an element as `innerHTML`.

- 11) What security restrictions are placed on AJAX code, and why was AJAX designed with these security restrictions? How can you detect when your program has violated such a restriction?

AJAX code cannot be run from a web page stored on your hard drive. It only runs on a web page stored on a web browser and only fetches files from the same site that the page is on. If the program does not run and some error message pops up, we will understand that our program violates some of the security restrictions.

- 12) What is XML? What is the primary motivation for using XML to represent data?

XML is a "skeleton" for creating markup languages. The primary motivation for using XML is to present complex data in human-readable form. XML is the universal format for exchange of data and it is used for music, math, or vector graphs

13) XML looks a lot like HTML. What is the relationship between the two? How are the syntaxes of XML and HTML similar and how are they different? What tags are legal in XML?

XML and HTML are both similar because they come from the same earlier markup language called SGML. The syntax of XML is the same as XHTML, and any tag you want is legal, as the person storing the data can make up their own tag language.

14) How are schemas and DTDs useful when dealing with XML data?

Schemas and DTDs are used to validate XML files to make sure they follow the rules; specifying which tags are valid or how they can be used together.

15) How do you fetch XML in JavaScript? What objects represent XML data from a server?

ajax.responseText contains the XML data in plain text and then ajax.responseXML is a pre-parsed DOM object representing the XML file as a tree.

16) Name two methods that every XML DOM node object contains, and three useful properties.

Every XML DOM node object contains getElementByTagName and getAttribute methods; and firstChild, lastChild, and childNodes for some useful properties.

17) What statement would retrieve all vehicle tags from an XML data set sent back from a server using AJAX? What statement would access the model attribute of the first vehicle?

```
function vehicles {  
    var ajax;  
    var vehicles = ajax.responseXML.getElementsByTagName("vehicle");  
    var model = vehicles[0].getAttribute("model");  
}
```

18) What is JSON? What are some similarities and differences between JSON and XML?

JSON is a lightweight text-based data-interchange format completely independent from other languages. It is easy to manipulate and generate. JSON differs from XML as it is not a markup language with generalized serialization format, it is lighter and faster than XML, and it uses typed objects. JSON is not a programming language as well.

19) In what way does JSON represent data? Why is it represented in this way?

JSON data is written as value pair, same as JavaScript object properties. The value pair consists of a field name with a colon followed by the value. Ex: "Name": "Paul". It is represented this way because it is easier to transform a string formatted in JSON into a functional object in JavaScript.

20) What JavaScript function converts JSON data into an equivalent JavaScript object? Why is this function better than the previous eval function for converting JSON data?

JSON.parse() function converts JSON text into JavaScript object. This function is very useful when we want to transmit data across a network.

21) What is wrong with the following malformed JSON data? (There are 5 total kinds of errors.)

```

messages: {
  {
    time = 1:57,
    sender = Jessica Miller,
    body = "So do we have a title for the book yet?",
  },
  {
    time = 1:58,
    sender = Marty Stepp,
    body = "So do we have a title for the book yet?",
  },
}

```

1st Error: change the equal sign to a colon when referring to some value.

2nd Error: field names and values must contain " "

3rd Error: if messages is an array, then change the colon for an equal sign

4th Error: change the comma for a ";" at the end of the array

5th Error: include "var" next to messages.

For the next two questions, suppose a service returns JSON data in the following format:

```

{
  "firstName" : "Billy",
  "lastName" : "Gates",
  "age" : 12,
  "address" : "1234 5th Street",
  "phoneNumbers": ["888-555-1234", "888-555-5678"]
}

```

- 22) If the above JSON data is stored in the variable `ajax.responseText`, write a line(s) of JavaScript code that would pop up the person's full name, Billy Gates, in an alert box. (Did you test it out in ATOM?)

```

function GetData() {
    var = data;
    var json = JSON.parse(data.responseText);
    document.getElementById("").innerHTML = json.collection.array[0].firstName;
}

```

- 23) If the above JSON data is stored in the variable `ajax.responseText`, write a line(s) of JavaScript code that would pop up information about both the persons phone numbers in an alert box. (Did you test it out in ATOM?)

```

function GetData() {
    var = data;
    var json = JSON.parse(data.responseText);

```

```
} document.getElementById("").innerHTML = json.collection.array[0].phoneNumbers[1, 2];
```