**Week 14 Homework: Web Development**

**Overview**

In this homework, we will review the many of the concepts and tools covered in the Web Development unit. If needed, refer to the reference sheets provided to you.

* [HTTP Reference Sheet](/University-of-Minnesota-Boot-Camp/UofM-VIRT-CYBER-PT-12-2021-U-LOL/-/blob/main/14-Web-Development/homework/Unsolved/HTTP_Reference.md)
* [curl Reference Sheet](/University-of-Minnesota-Boot-Camp/UofM-VIRT-CYBER-PT-12-2021-U-LOL/-/blob/main/14-Web-Development/homework/Unsolved/cURL_Reference.md)

**Questions**

Before you work through the questions below, please create a new file and record your answers there. This will be your homework deliverable.

**HTTP Requests and Responses**

Answer the following questions about the HTTP request and response process.

1. What type of architecture does the HTTP request and response process occur in?

Client-service architecture

1. What are the different parts of an HTTP request?

Request line (which may contain query parameters), Headers, and Request Body

1. Which part of an HTTP request is optional?

Request Body

1. What are the three parts of an HTTP response?

Status Line, Headers, and Response Body

1. Which number class of status codes represents errors?

400 codes

1. What are the two most common request methods that a security professional will encounter?

GET and POST requests

1. Which type of HTTP request method is used for sending data?

POST request

1. Which part of an HTTP request contains the data being sent to the server?

Request Body

1. In which part of an HTTP response does the browser receive the web code to generate and style a web page?

Response Body

**Using curl**

Answer the following questions about curl:

1. What are the advantages of using curl over the browser? Compared to a browser where it’s not always possible to examine HTTP requests and responses through, curl has the ability to quickly test HTTP requests in a repeatable, and automated fashion. It can also be used to send customized HTP requests that ensures that web servers don’t leak sensitive data through HTTP responses and verifies that servers only respond to certain request types.
2. Which curl option is used to change the request method?

-X

1. Which curl option is used to set request headers?

-H

1. Which curl option is used to view the response header?

-v

1. Which request method might an attacker use to figure out which HTTP requests an HTTP server will accept?

OPTIONS

**Sessions and Cookies**

Recall that HTTP servers need to be able to recognize clients from one another. They do this through sessions and cookies.

Answer the following questions about sessions and cookies:

1. Which response header sends a cookie to the client?

Set-Cookies HTTP/1.1 200 OK Content-type: text/html Set-Cookie: cart=Bob

HTTP/1.1 200 OK

Content-type: text/html

Set-Cookie: cart=Bob

1. Which request header will continue the client's session?

GET /cart HTTP/1.1

Host: www.example.org

Cookie: cart=Bob

**'Connection: keep-alive'**

**Example HTTP Requests and Responses**

Look through the following example HTTP request and response and answer the following questions:

**HTTP Request**

POST /login.php HTTP/1.1

Host: example.com

Accept-Encoding: gzip, deflate, br

Connection: keep-alive

Content-Type: application/x-www-form-urlencoded

Content-Length: 34

Upgrade-Insecure-Requests: 1

User-Agent: Mozilla/5.0 (Linux; Android 6.0; Nexus 5 Build/MRA58N) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.132 Mobile Safari/537.36

username=Barbara&password=password

1. What is the request method?

POST

1. Which header expresses the client's preference for an encrypted response?

Upgrade-Insecure-Requests: 1

1. Does the request have a user session associated with it?

No, the session has not been established

1. What kind of data is being sent from this request body?

Login credentials

**HTTP Response**

HTTP/1.1 200 OK

Date: Mon, 16 Mar 2020 17:05:43 GMT

Last-Modified: Sat, 01 Feb 2020 00:00:00 GMT

Content-Encoding: gzip

Expires: Fri, 01 May 2020 00:00:00 GMT

Server: Apache

Set-Cookie: SessionID=5

Content-Type: text/html; charset=UTF-8

Strict-Transport-Security: max-age=31536000; includeSubDomains

X-Content-Type: NoSniff

X-Frame-Options: DENY

X-XSS-Protection: 1; mode=block

[page content]

1. What is the response status code?

200

1. What web server is handling this HTTP response?

Apache

1. Does this response have a user session associated to it?

Yes, sessionID=5

1. What kind of content is likely to be in the [page content] response body?

The details of the request and the page’s configuration can be seen through the page content’s response body.

1. If your class covered security headers, what security request headers have been included?

Authorization, Referer, Cookie

**Monoliths and Microservices**

Answer the following questions about monoliths and microservices:

1. What are the individual components of microservices called?

Services

1. What is a service that writes to a database and communicates to other services?

APIs - application programming interfaces

1. What type of underlying technology allows for microservices to become scalable and have redundancy?

Load Balancer

**Deploying and Testing a Container Set**

Answer the following questions about multi-container deployment:

1. What tool can be used to deploy multiple containers at once?

Docker

1. What kind of file format is required for us to deploy a container set?

YAML (.yml)

**Databases**

1. Which type of SQL query would we use to see all of the information within a table called customers?

SELECT \* FROM customers;

1. Which type of SQL query would we use to enter new data into a table? (You don't need a full query, just the first part of the statement.)

INSERT INTO table\_name (column\_1, column\_2, column\_3,…) VALUES (value\_1, value\_2, value\_3,…);

1. Why would we never run DELETE FROM <table-name>; by itself?

We would never run DELETE FROM <table-name> by itself as it will delete the entire table if the entries that need deleting are specified.