**Week 14 Homework: Web Development**

**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?

Answer: Client-Server

Diagram

Description automatically generated

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

Answer: Request line, header(s) and the body of the request

1. Which part of an HTTP request is optional?

Answer: The body of the request

Graphical user interface, application, Word

Description automatically generated with medium confidence

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

Answer: Status Line, Header(s) and the body of the response

A picture containing timeline

Description automatically generated

1. Which number class of status codes represents errors?

Answer: 4xx are a client error and then 5xx are a server error

Graphical user interface, text, chat or text message

Description automatically generated

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

Answer: GET and POST

Table

Description automatically generated

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

Answer: POST

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

Answer: PUT

Table

Description automatically generated

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

Answer:

**Using curl**

Answer the following questions about curl:

1. What are the advantages of using curl over the browser?

Answer: A big advantage for security professionals in utilizing the curl command vs a browser is to quickly test HTTP requests in a way that they can be automated, but also allows them to make adjustments. And browsers have limited tools to send and receive HTTP requests.

Diagram

Description automatically generated

1. Which curl option is used to change the request method?

Answer: --request or -x

For example:

Graphical user interface, text, application

Description automatically generated

<https://everything.curl.dev/http/requests>

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

Answer: --header or -H

For example:

Graphical user interface, text, application

Description automatically generated

<https://everything.curl.dev/http/requests>

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

Answer: -D

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

Answer: GET

**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?

HTTP/1.1 200 OK

Content-type: text/html

Set-Cookie: cart=Bob

Answer: 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

Answer: Cookie: cart=Bob

**Example HTTP Requests and Responses**

**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

Answer: username=Barbara&password=password

1. What is the request method?

Answer: POST /login.php HTTP/1.1

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

Answer: Upgrade-Insecure-Requests:

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

Answer: No, just logging in and is the first step after you have logged in you should get a cookie.

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

Answer: Username and password (Request Body)

**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?

Answer: 200 OK

1. What web server is handling this HTTP response?

Answer: Apache

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

Answer: Set-Cookie: SessionID=5

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

Answer: Content-Type: text/html; charset=UTF-8; which is telling the browser how to handle the content.

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

Answer: Several headers that deal with security within this HTTP Response including the following:

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

X-Content-Type: NoSniff

X-Frame-Options: DENY

X-XSS-Protection: 1; mode=block

**Monoliths and Microservices**

Answer the following questions about monoliths and microservices:

1. What are the individual components of microservices called?

Answer: Microservice Architecture (MSA) where there are 8 core components

1. Clients
2. Identity Providers
3. API Gateway
4. Messaging Formats
5. Databases
6. Static Contents
7. Management
8. Service Directory

https://www.optisolbusiness.com/insight/8-core-components-of-microservice-architecture

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

Answer: API Gateway

<https://www3.dbmaestro.com/blog/microservices-and-databases-the-main-challenges>

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

Answer: Virtual Operating System Environments assist in allowing microservices to become scalable and have redundancy while utilizing such technology as containers “Docker”. https://cloudacademy.com/blog/microservices-architecture-challenge-advantage-drawback/

**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?

Answer: There are a variety of tools that could be utilized such as Docker, CloudSlang, Fleet, Kiubernetes, Marathon, Nomad, OpenVZ, Packer, Solaris or Swarm.

Reference: <https://mindmajix.com/open-source-containerization-devops-tools>

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

Answer: The type of file format required to deploy a Docker container is 1, 2, 2.x and 3.x. There are currently several versions of the Compose file.

Reference: <https://docs.docker.com/compose/compose-file/>

**Databases**

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

Answer: 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.)

Answer: INSERT INTO

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

Answer: If you run that command you would delete the entire table.