



Cybersecurity

Module 12 Challenge Submission File

Web Development

Make a copy of this document to work in, and then respond to each question below the prompt. Save and submit this completed file as your Challenge deliverable.

HTTP Requests and Responses

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

Client-Server architecture

2. What are the parts of an HTTP request?

According to edX Boot Camps LLC(2022), the following are the parts of an HTTP request:

Request line: The request line has the method, resource name, and HTTP version, and it can include query parameters for sending data to the server.

Header: Headers hold extra information about the requested resource, including important actions like authentication and resource management.

Whitespace: A blank line that signifies the request's completion.

Body: The body contains data or content to be sent to the server, often used in POST requests.

3. Which part of an HTTP request is optional?

Request body

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

According to edX Boot Camps LLC(2022), the following are the parts of an HTTP request:

Status line: The Status Line indicates whether the request was successful or encountered an error.

Headers: Headers provide additional information about the response, such as content type or length.

Body: The body contains the actual data or content being sent as part of the response.

5. Which number class of status codes represents errors?

400 codes indicate client errors

500 codes indicate server errors

6. What are the two most common request methods a security professional encounters?

GET request

POST request

7. Which type of HTTP request method is used to send data?

POST request

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

Request body

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

Response body

Using curl

10. What are the advantages of using `curl` over the browser?

According to ReqBin (2022), the following are advantages of using `curl` over the browser:

- Manage HTTP Requests/Responses in a repeatable, programmatic way.
- Quick and automated testing of HTTP requests.
- Adjustments can be made as needed by security professionals.
- Supports numerous protocols, even without a graphical user interface.
- Automation and scripting capabilities.
- Lightweight and efficient for specific tasks.
- Non-interactive for raw data retrieval.
- Ideal for headless testing of web applications and automated API testing.

11. Which `curl` option changes the request method?

-X

12. Which `curl` option sets request headers?

-H

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

-I

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

OPTIONS

Sessions and Cookies

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

```
HTTP/1.1 200 OK
```

```
Content-type: text/html
```

```
Set-Cookie: cart=Bob
```

The **Set-Cookie** response header sends a cookie to the client.

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

```
GET /cart HTTP/1.1
```

```
Host: www.example.org
```

```
Cookie: cart=Bob
```

The **Cookie** response header will continue the client's session.

Example HTTP Requests and Responses

Use the following sample HTTP request and response to answer the questions in this section:

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
```

17. What is the request method?

POST

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

Upgrade-Insecure-Requests: 1

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

No. The request does not include the 'Cookie' header.

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

Login credentials: username=Barbara&password=password

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]

21. What is the response status code?

200 (OK)

22. What web server is handling this HTTP response?

Apache

23. Does this response have a user session associated with it?

Yes, the "Set-Cookie" header with the value "SessionID=5" in the HTTP response suggests that this response is setting a user session cookie.

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

An HTML web page that has been compressed using gzip encoding.

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

The security request headers included in the response are:

Strict-Transport-Security: Helps enforce secure (HTTPS) connections.

X-Content-Type-Options: Prevents content type sniffing.

X-Frame-Options: Prevents clickjacking attacks.

X-XSS-Protection: Enables cross-site scripting (XSS) protection.

Monoliths and Microservices

26. What are the individual components of microservices called?

Microservices/Services

Microservice (Front-end server)

Microservice (Back-end application service)

Microservice (Database)

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

Database service

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

Microservices can become scalable and have redundancy through the use of containerization.

Deploy and Test a Container Set

29. What tool can you use to deploy multiple containers at once?

You can use Docker Compose to deploy multiple containers at once.

30. What kind of file format is required to deploy a container set?

A Docker Compose file in YAML format (.yaml) is commonly used to define and deploy a set of containers.

Databases

31. Which type of SQL query would you use to view all the information in a table called `customers`?

```
SELECT * FROM customers;
```

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

```
INSERT INTO
```

33. Why would you never run `DELETE FROM <table-name>;` by itself?

Running "DELETE FROM <table-name>;" without a "WHERE" clause can delete all records in the table, posing a significant risk of data loss, so it should be avoided in a production environment. Instead, use a "WHERE" clause to specify which records to delete.

Optional Additional Challenge Activity: The Cookie Jar

Question 1: Did you see any obvious confirmation of a login? (Y/N)

[Enter answer here]

Question 2: How many items exist in this file?

[Enter answer here]

Question 3: Is it obvious that you can access the dashboard? (Y/N)

[Enter answer here]

Question 4: Look through the output where Dashboard is highlighted. Does any of the wording on this page seem familiar? (Y/N) If so, you should be successfully logged in to your Editor's dashboard.

[Enter answer here]

Question 5: What happens this time?

[Enter answer here]

References

Curl.(2022). ReqBin
<https://reqbin.com/Article/Curl>

edX Boot Camps LLC. (2022). HTTP with sessions and cookies

edX Boot Camps LLC. (2022). Microservices and web application architecture