Experiment No. 4

Batch: A2 **Roll No.:16010421073** **Experiment No.:4**

Aim: Experimenting with BURP
(Any 3-5 VAPT-related tasks to be done on BURP).

Resources needed: Burp Suite, Web Application Target, Browser and Browser Configuration, Vulnerable Web Applications, Payloads and Wordlists, Proxy Configuration

---

Pre Lab/ Prior Concepts:
Students should have prior knowledge of Web Application Basics, HTTP Protocol and Requests/Responses, Proxy and Interception Concepts, HTTP Authentication Methods, Common Web Application Vulnerabilities, HTTP Session Management, HTML Forms and Input Validation, Security Headers.

Theory:
Burp Suite stands as a cornerstone in the arsenal of security professionals, offering a robust platform for Vulnerability Assessment and Penetration Testing (VAPT) on web applications. This section delves into key aspects of experimenting with Burp Suite, focusing on essential VAPT tasks that harness its capabilities.

1. **Automated Web Application Scanning**: Burp Suite's automated scanning feature empowers security analysts to identify vulnerabilities efficiently. By leveraging its crawler and scanner, security practitioners can initiate comprehensive scans, probing for common vulnerabilities such as SQL injection, Cross-Site Scripting (XSS), and more. The automated scanning process accelerates the identification of potential threats, providing a foundational understanding of the web application's security posture.

2. **Manual Web Application Testing**: The heart of Burp Suite lies in its manual testing capabilities. Analysts can intercept and manipulate HTTP requests and responses using the Proxy module, offering a hands-on approach to identify and exploit vulnerabilities. The "Repeater" tool enables detailed examination and modification of individual requests, allowing security professionals to craft targeted attacks, test input validation, and uncover subtle vulnerabilities that automated scan
3. ers might overlook.

4. **Session Handling and Authentication Bypass**: Burp Suite facilitates the examination of session management mechanisms and authentication controls within web applications. By intercepting and manipulating session tokens and cookies, security analysts can explore potential weaknesses. The suite's "Intruder" tool proves invaluable for testing authentication mechanisms, attempting brute force attacks, and validating the robustness of access controls. This task is instrumental in identifying vulnerabilities related to unauthorized access.

5. **Cross-Site Scripting (XSS) Detection**: Burp Suite excels in detecting and validating Cross-Site Scripting vulnerabilities. Analysts can use the suite to inject payloads into user input fields, testing the application's resistance to client-side attacks. The "Scanner" tool automates the identification of XSS vulnerabilities, while the "Repeater" tool allows for manual validation, understanding impact, and proposing mitigation strategies. This task enhances proficiency in identifying and addressing one of the most prevalent web application security risks.

Procedure:

Step 1: Download and Install Burp Suite

1. Visit the official Burp Suite website (https://portswigger.net/burp/communitydownload) and download the platform's appropriate version (Community or Professional).
2. Install Burp Suite following the on-screen instructions.

Step 2: Configure Browser and Proxy Settings

1. Launch Burp Suite.
2. Configure web browser to use Burp Proxy:
3. Set the browser's proxy settings to use Burp Suite's proxy (default port: 127.0.0.1:8080).
4. Install the Burp Suite CA certificate for SSL/TLS interception in the browser.

Step 3: Explore the Target Web Application

1. Identify and select a target web application for testing by ensuring proper authorization.
2. Navigate to the target application through the configured browser, allowing Burp to intercept traffic.

Step 4: Automated Web Application Scanning

1. In Burp Suite, go to the "Target" tab, right-click on the target URL, and select "Add to Scope."
2. Switch to the "Scanner" tab and initiate an automated scan on the selected target.
3. Review the scan results in the "Scan" tab, identifying and categorizing vulnerabilities discovered by Burp's scanner.

Step 5: Manual Web Application Testing

1. In the "Proxy" tab, intercept and manipulate HTTP requests and responses to identify potential vulnerabilities.
2. Use the "Repeater" tool to manually send and modify HTTP requests, observing the application's responses.
3. Explore the "Intruder" tool to perform parameter-based attacks, such as brute force or fuzzing, on selected requests.
4. Document and validate any vulnerabilities discovered through manual testing.

Step 6: Session Handling and Authentication Bypass

1. Capture and analyze login requests in the Burp Proxy history.
2. Use the "Intruder" tool to perform a password-spraying attack or brute force against the login page.
3. Explore session tokens and cookies using the "Session" and "Cookies" tabs in Burp.

4. Attempt to manipulate session data to bypass authentication or gain unauthorized access.
5. Document findings and propose recommendations for improving authentication controls.

Step 7: Cross-Site Scripting (XSS) Detection

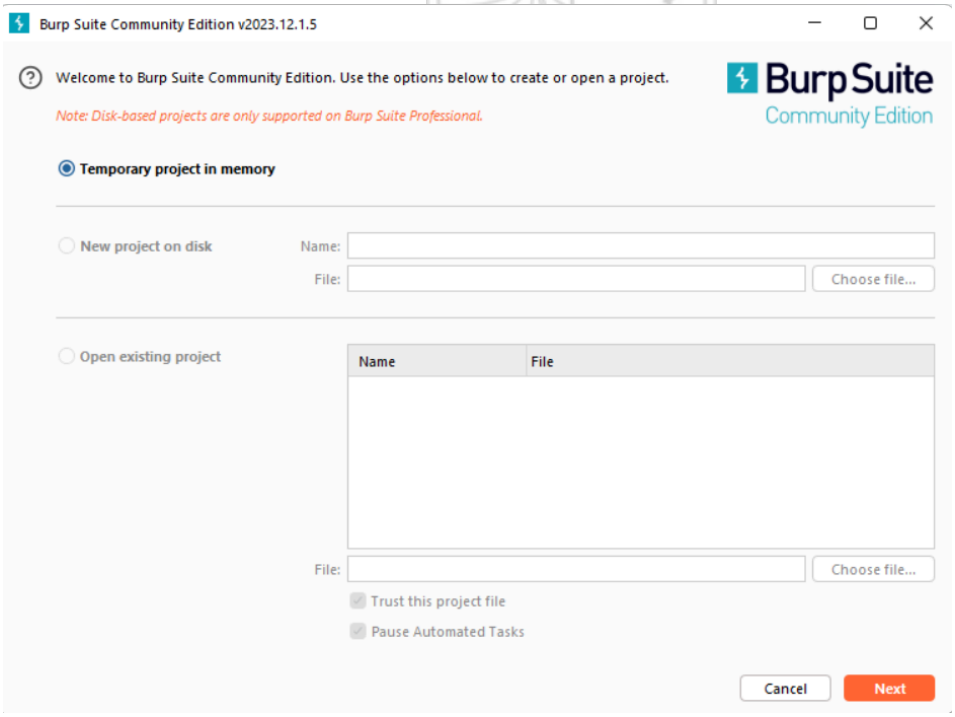
- Use Burp Proxy to intercept and analyze requests and responses while interacting with the web application.
- Identify user input fields and inject simple payloads to test for potential XSS vulnerabilities.
- Utilize Burp's "Scanner" tool to automate the detection of XSS vulnerabilities.
- Confirm and validate XSS vulnerabilities by exploiting them and executing benign payloads.
- Provide recommendations for remediation and secure coding practices.

Step 8: Generate Reports and Document Findings

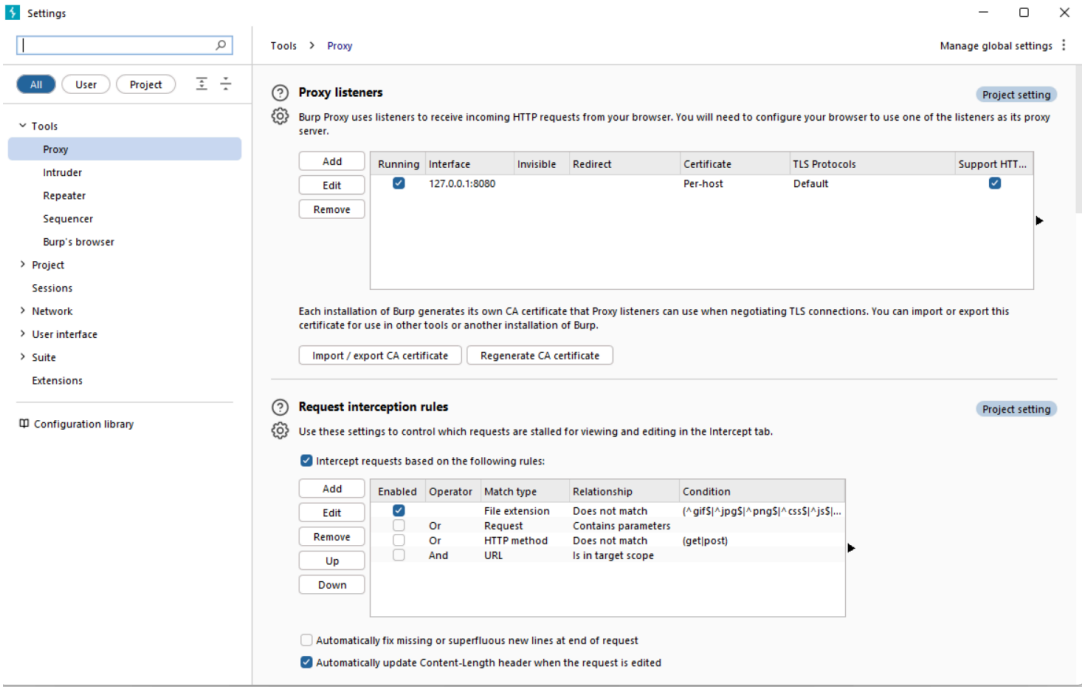
1. Generate detailed reports in Burp Suite summarizing the identified vulnerabilities, their severity, and recommended mitigations.
2. Document the entire testing process, including steps taken, tools used, and vulnerabilities discovered.
3. Collaborate with relevant stakeholders to address and remediate the identified vulnerabilities.

Output (Code with result Snapshot)

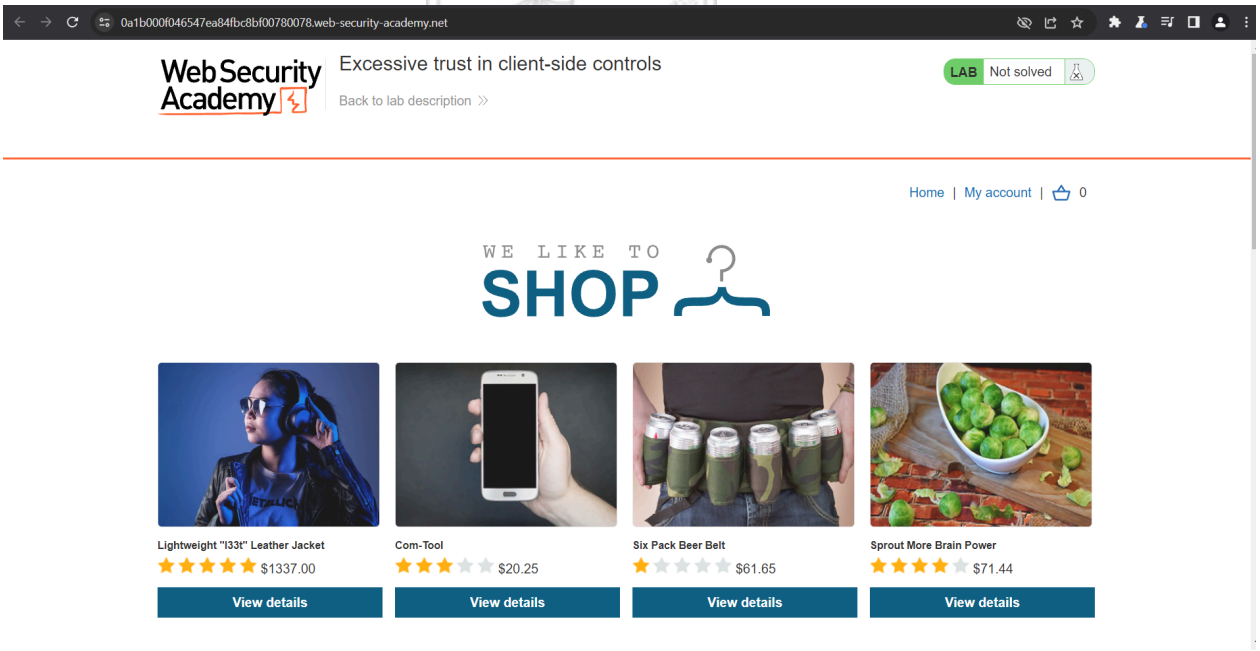
1) Launch Burp Suite.

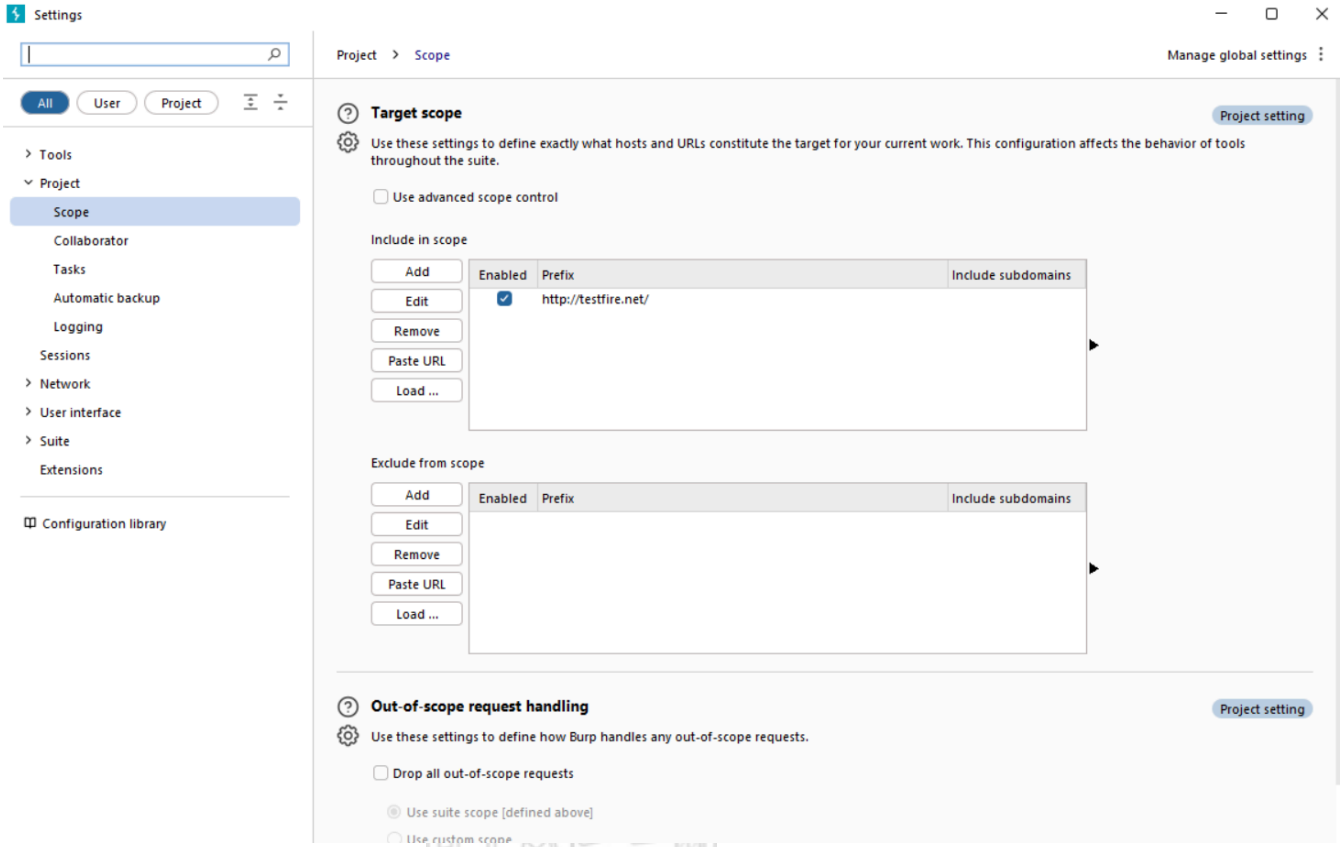


2) Set the browser's proxy settings to use Burp Suite's proxy (default port: 127.0.0.1:8080).



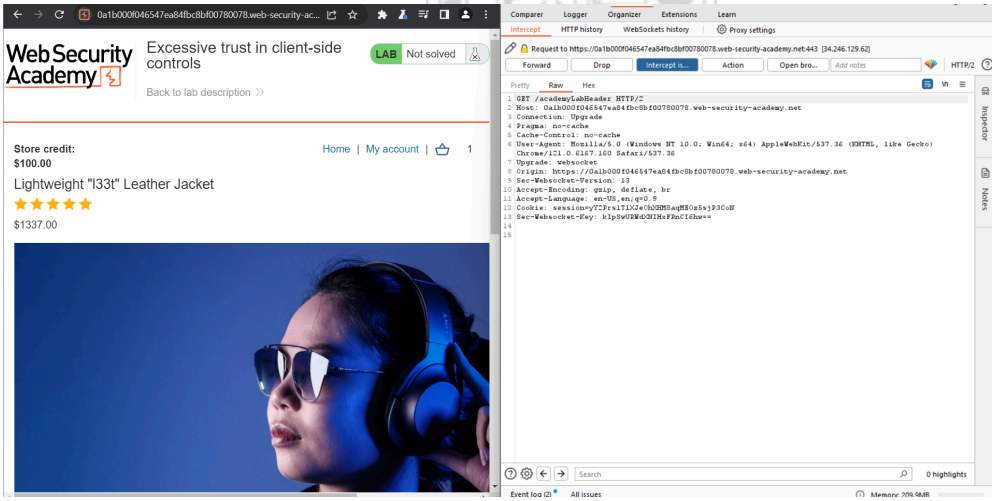
3) Navigate to the target application(portswigger.net) through the burpsuite browser, allowing Burp to intercept traffic.



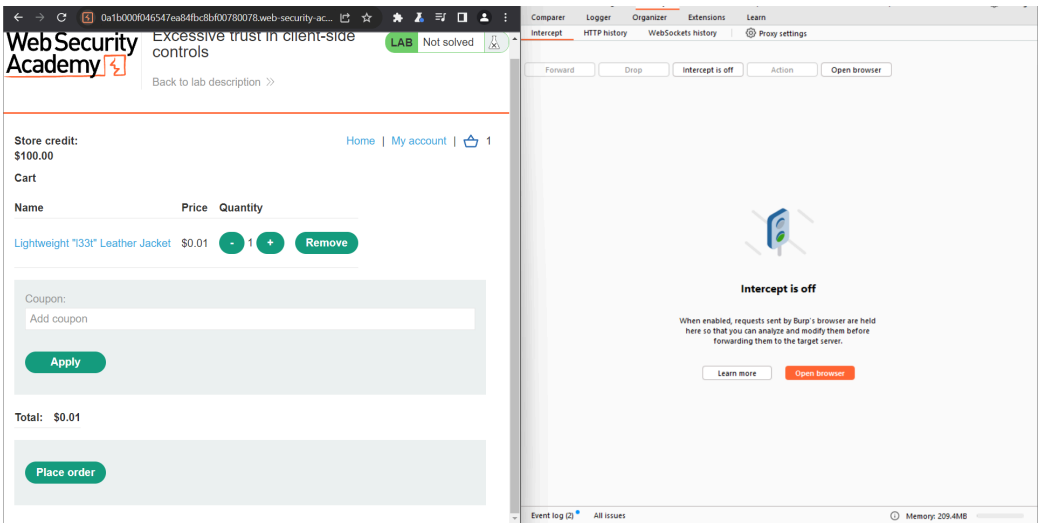


4) **Manual Web Application Testing:**

- **In the "Proxy" tab, intercept and manipulate HTTP requests and responses to identify potential vulnerabilities.**

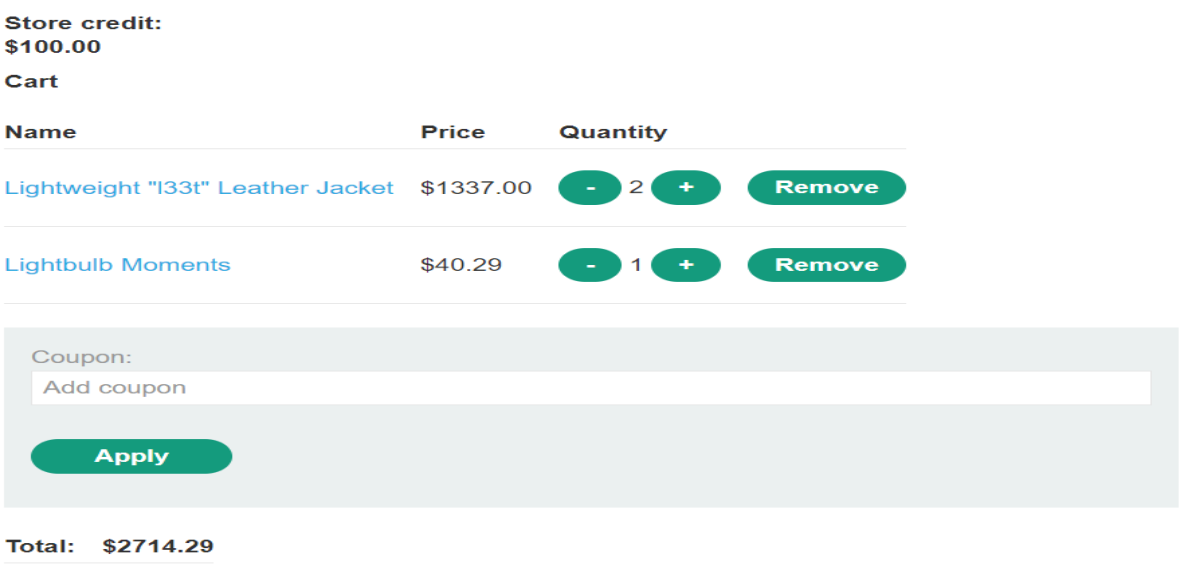


- **The price of 1 leather jacket is 1337$ but after changing the parameters in burpsuite ,now it is just 0.01$.(Business Logic Vulnerability)**



- **Use the "Repeater" tool to manually send and modify HTTP requests, observing the application's responses.**

i) Using this request to manipulate and sending it to repeater.

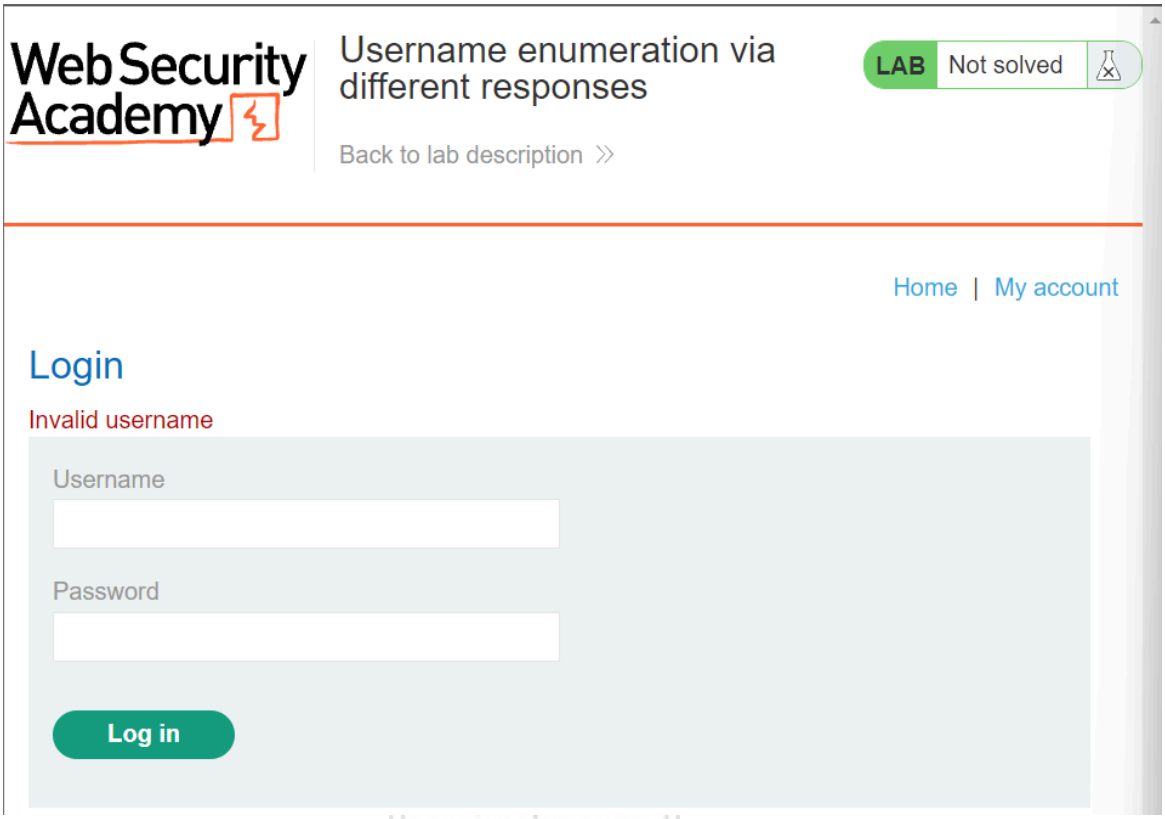


#	Host	Method	URL	Params	Edited	Status code	Length	MIME type	Extension	Title	Notes	TLS	IP	Cookies	Time	Listener port
501	https://0a1b000f046547ea...	GET	/academyLabHeader		✓	400	130	text				✓	34.246.129.62		16:12:08 18...	8080
502	https://0a1b000f046547ea...	POST	/cart	✓		302	100					✓	34.246.129.62		16:12:20 18...	8080
503	https://0a1b000f046547ea...	GET	/product?productId=1	✓		200	5283	HTML		Excessive trust in cli...		✓	34.246.129.62		16:12:23 18...	8080
504	https://0a1b000f046547ea...	GET	/academyLabHeader		✓	400	130	text				✓	34.246.129.62		16:12:24 18...	8080
505	https://0a1b000f046547ea...	GET	/cart			200	8467	HTML		Excessive trust in cli...		✓	34.246.129.62		16:12:28 18...	8080
507	https://0a1b000f046547ea...	GET	/academyLabHeader		✓	400	130	text				✓	34.246.129.62		16:12:31 18...	8080
508	https://0a1b000f046547ea...	GET	/cart			200	8467	HTML		Excessive trust in cli...		✓	34.246.129.62		16:13:16 18...	8080
509	https://play.google.com	POST	/log?format=json&hasfast=true...	✓		200	980	JSON				✓	172.217.166.46	NID=511=kyGp...	16:14:33 18...	8080
510	https://play.google.com	POST	/log?format=json&hasfast=true...	✓		200	980	JSON				✓	172.217.166.46	NID=511=K6eH...	16:14:33 18...	8080
511	https://0a1b000f046547ea...	POST	/cart	✓		302	85					✓	34.246.129.62		16:17:19 18...	8080
512	https://0a1b000f046547ea...	POST	/cart	✓		302	85					✓	34.246.129.62		16:17:22 18...	8080
513	https://0a1b000f046547ea...	GET	/cart			200	8467	HTML		Excessive trust in cli...		✓	34.246.129.62		16:17:38 18...	8080
514	https://0a1b000f046547ea...	GET	/academyLabHeader		✓	400	130	text				✓	34.246.129.62		16:17:46 18...	8080

ii) Manipulating the product id from 1 to 3 and response is HTTP/2 302 found.

- **Explore the "Intruder" tool to perform parameter-based attacks, such as brute force or fuzzing, on selected requests.**

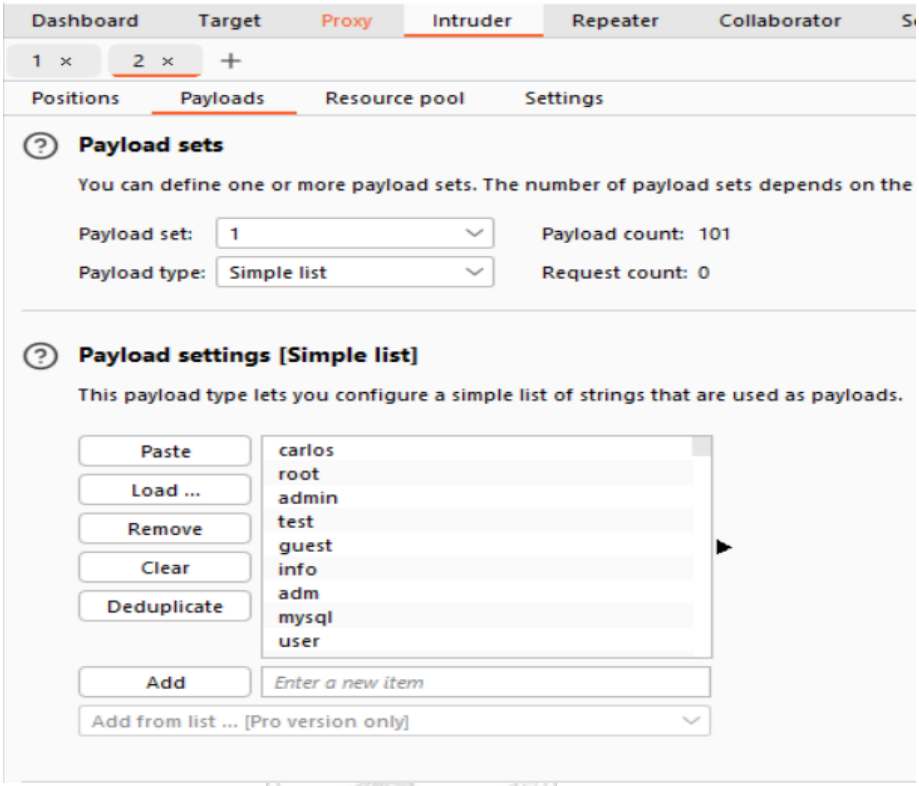
- **This is the Login page for which we have to perform parameter based attack**



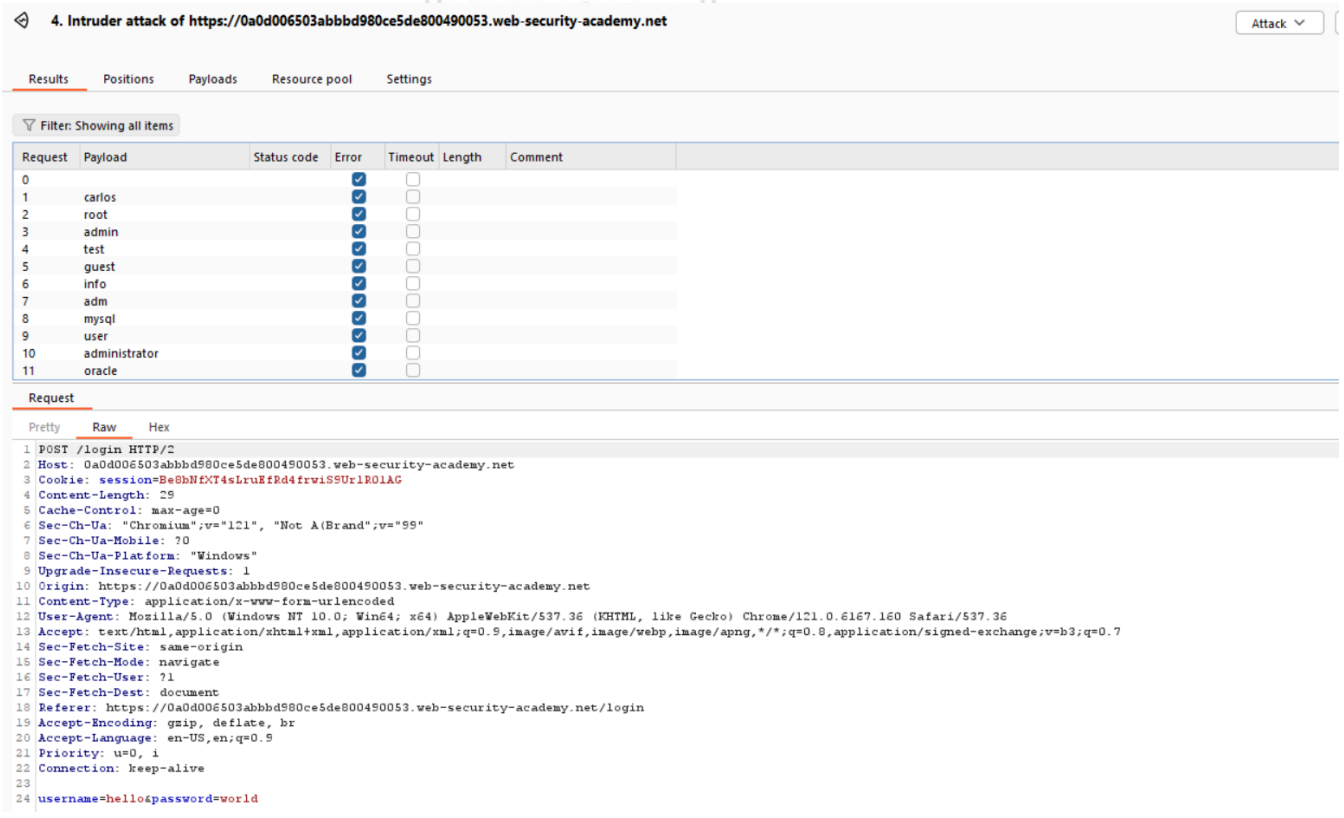
- **This is raw URL information from HTTP history consisting of username and password.**

```
15 Sec-Fetch-Mode: navigate
16 Sec-Fetch-User: ?1
17 Sec-Fetch-Dest: document
18 Referer: https://0a0d006503abbbd980ce5de800490053.web-security-academy.net/login
19 Accept-Encoding: gzip, deflate, br
20 Accept-Language: en-US,en;q=0.9
21 Priority: u=0, i
22
23 username=hello&password=world
```

- **Setting the payload with various different usernames after sending the URL to intruders.**



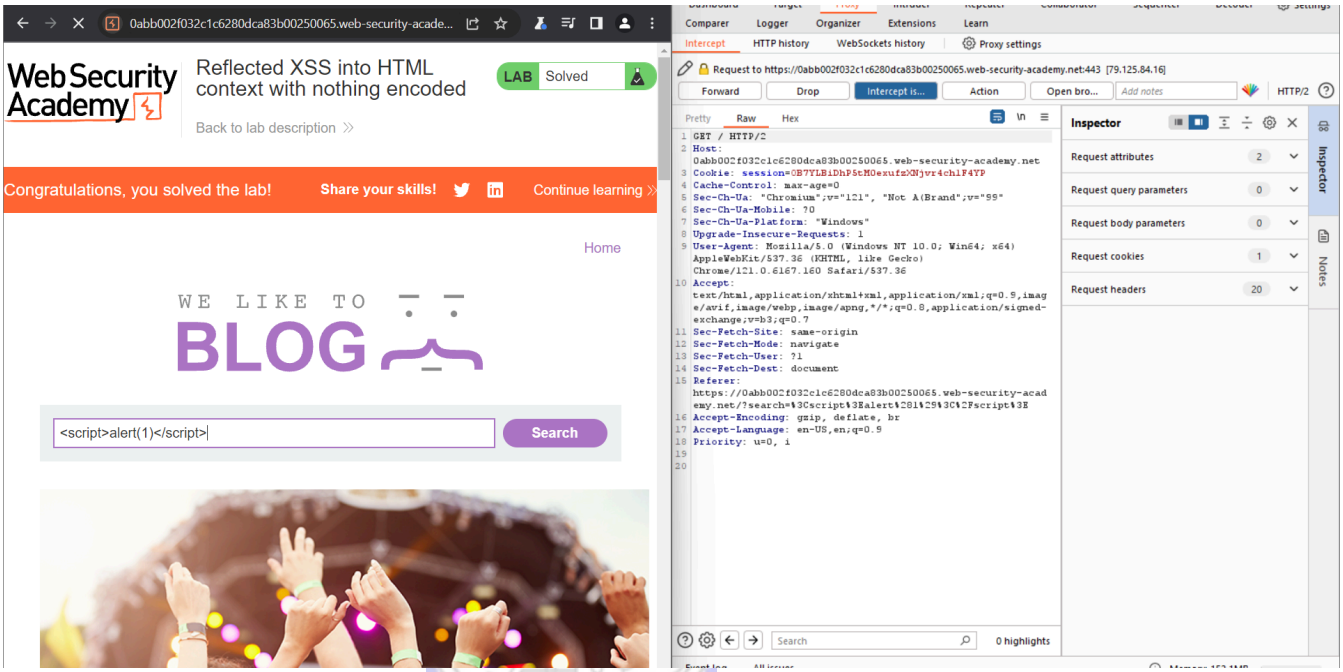
❖ **Intruder Attack of the raw URL.**



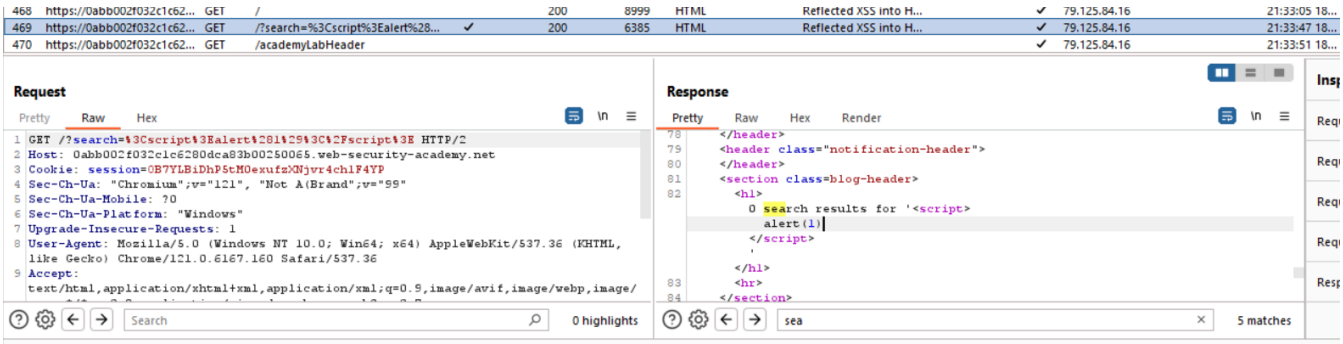
4) Cross-Site Scripting (XSS) Detection.

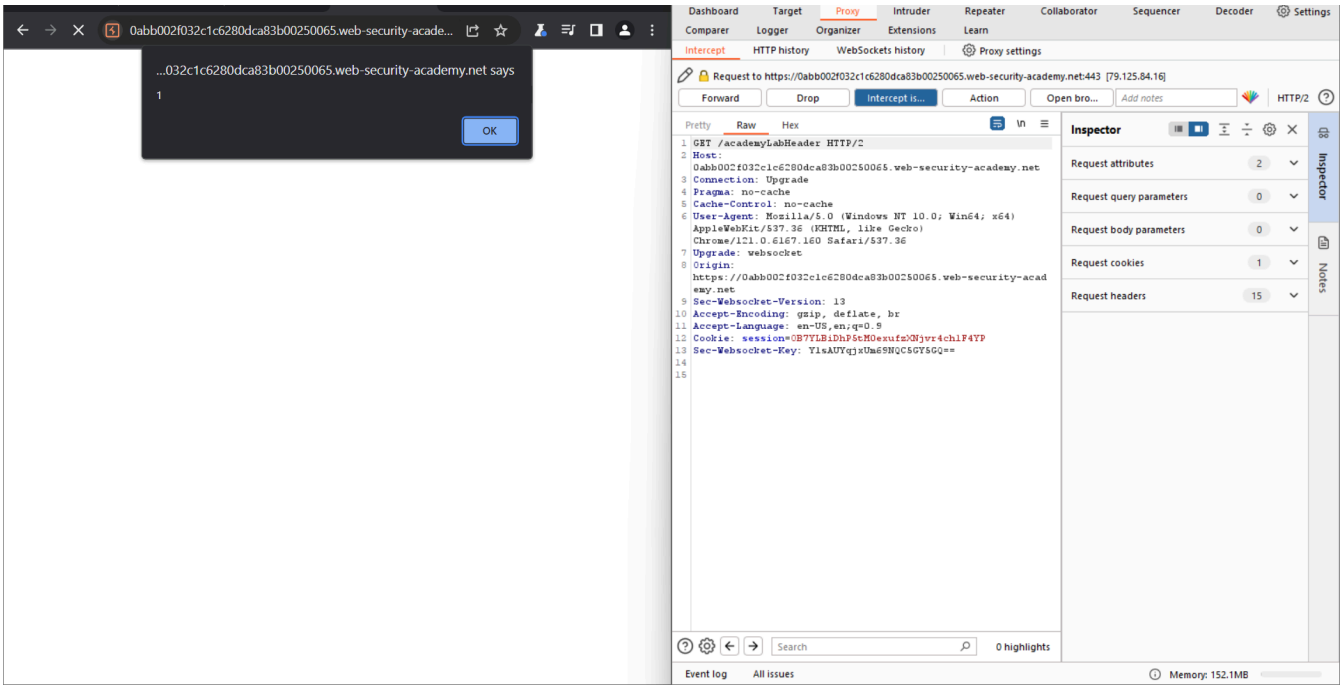
- **Use Burp Proxy to intercept and analyze requests and responses while interacting with the web application.(vulnerability in search functionality)**

  - **This is a blog website where we have to inject <script>alert(1)</script> in search functionality and it will show pop-up box on top.**



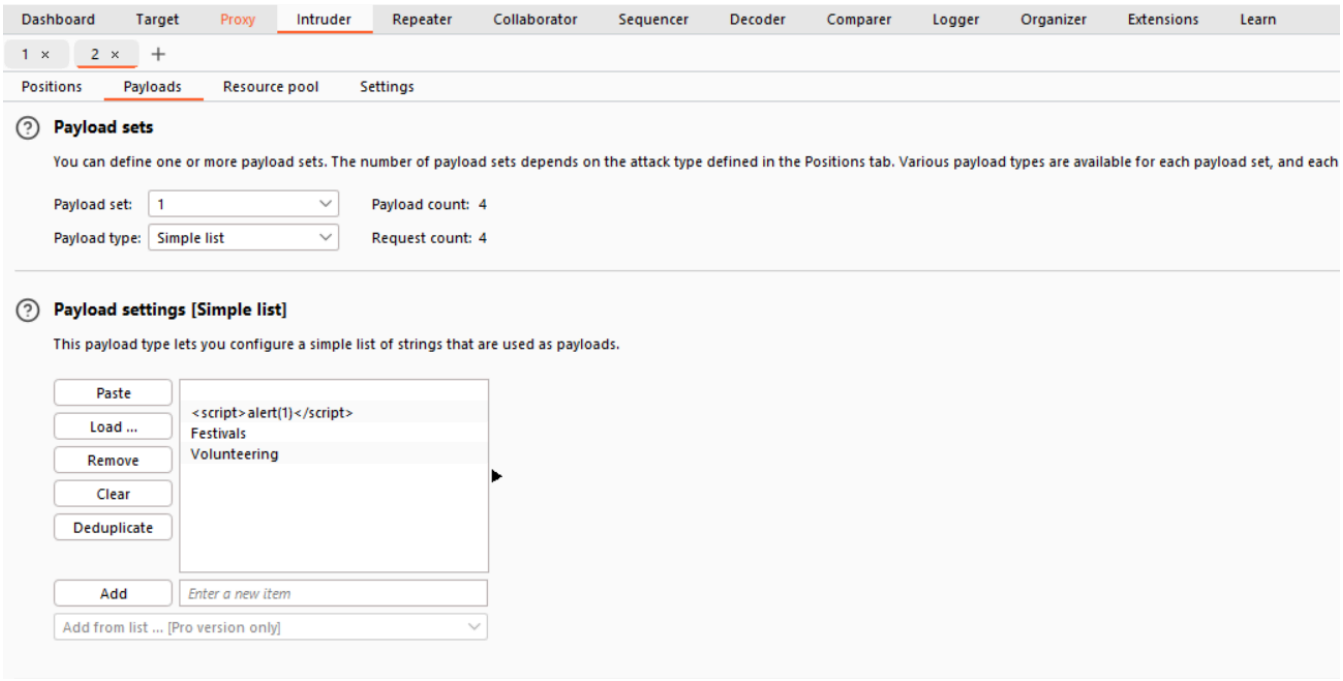
  - **Sending the raw URL to intruder.**



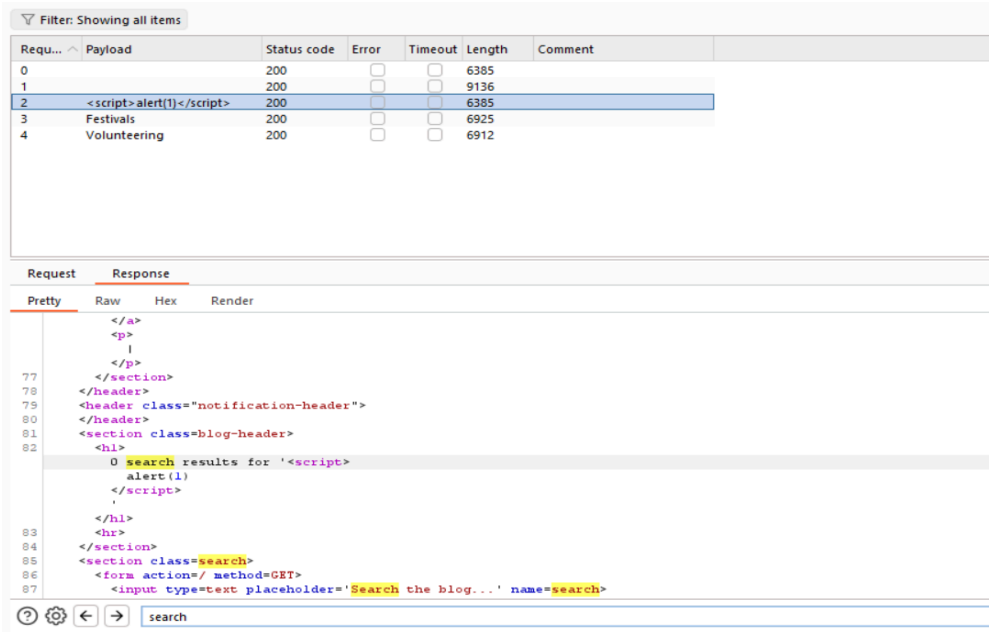


- **Identify user input fields and inject simple payloads to test for potential XSS vulnerabilities.**

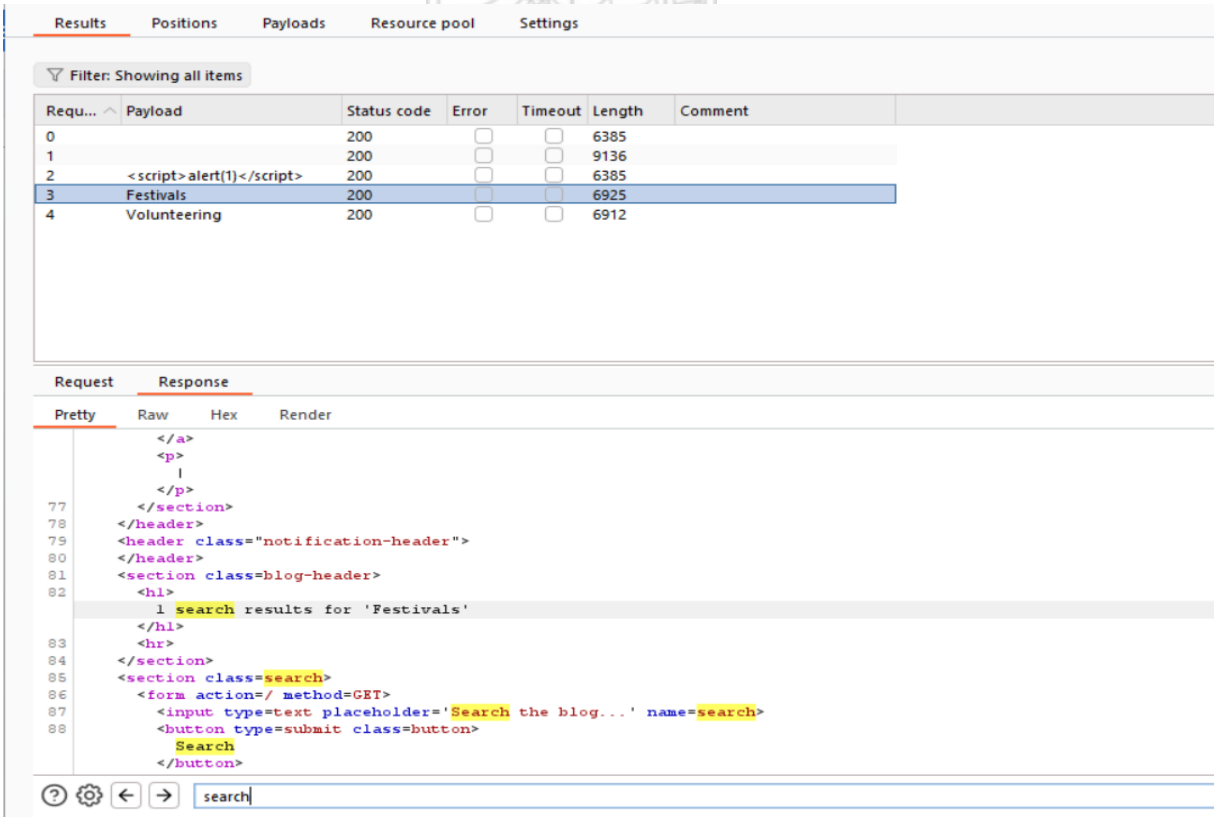
  - **Setting the payload with different results in search functionality.**



  - **Initiliaze the attack.**
  - **In 2nd request you can see in response that the search result is ‘0’ but still shows pop-up exploiting the vulnerability.**



- **In 3rd request you can see in response that the search result is '1' for Festivals in blog website.**



Post Lab Questions: -

1. **How does Burp Suite fit into the broader VAPT workflow? Discuss its role in conjunction with other security tools and methodologies. Consider how the information obtained from Burp Suite can inform decision-making in the context of enhancing web application security.**

   Ans: Burp Suite's Role in the VAPT Workflow

   Burp Suite is a critical tool within the Vulnerability Assessment and Penetration Testing (VAPT) workflow, particularly for web application security assessments. Here's how it fits in:

1. **Vulnerability Scanning:**
   - Identify vulnerabilities: Burp Scanner automates vulnerability detection in web applications, identifying common issues like SQL injection, XSS, and broken authentication.
   - Complement vulnerability scanners: While powerful, standalone scanners sometimes miss vulnerabilities. Burp Suite allows manual testing and deeper analysis to complement them.
   - Targeted testing: Information from Burp's sitemap and interception tools can guide focused vulnerability scans on specific areas of the application.
2. **Manual Penetration Testing:**
   - Interception and manipulation: Burp Proxy intercepts and modifies HTTP traffic, enabling testers to manipulate requests and responses, test for logic flaws, and bypass security controls.
   - Fuzzing and brute-forcing: Burp Intruder automates fuzzing and brute-forcing attacks on various application parameters, aiding in discovering hidden vulnerabilities.
   - Sequence testing: Burp Sequencer helps analyze the randomness of session tokens and other security-sensitive values, uncovering potential weaknesses.
3. **Integration with other tools:**
   - Web vulnerability scanners: Burp integrates with scanners like Nessus and Acunetix for consolidated reporting and streamlined workflows.
   - Security frameworks: Tools like Metasploit and Kali Linux can leverage Burp for advanced exploitation and post-exploitation activities.
   - Web development tools: Integration with developer tools like browser extensions allows for seamless debugging and vulnerability verification.

4. **Decision-making for enhanced security:**
   - Prioritization: Burp helps prioritize vulnerabilities based on severity, exploitability, and potential impact, guiding remediation efforts.
   - Exploitation and impact testing: By manually exploiting vulnerabilities through Burp, testers can assess their practical impact and guide mitigation strategies.
   - Proof-of-concept creation: Burp enables testers to create proof-of-concept attacks, demonstrating the vulnerability's existence and urgency to stakeholders.

Limitations of Burp Suite:

- Not a silver bullet: Burp requires skilled users and can be complex for beginners.
- Focus on web applications: It's not designed for other attack vectors like network or system vulnerabilities.
- False positives: Scanner results need manual verification to avoid wasting time on non-existent vulnerabilities.

2. **What methods did you employ in the XSS detection task to identify and validate potential vulnerabilities? How did the Scanner tool and manual validation with the Repeater tool contribute to the overall XSS testing process? Discuss the impact and potential risks associated with XSS vulnerabilities.**

Ans:

XSS Detection Methods:

1. Static Analysis:
- **Source Code Review:** Analyzing the application's source code for instances where user input is not properly sanitized before being outputted.

2. Dynamic Analysis:
- **Fuzzing and Payload Injection:** Sending various payloads through input fields to identify potential points of injection where user-controlled data may be reflected or stored without proper sanitization.
- **Browser-based Testing:** Using tools like Burp Suite's Scanner, which automatically sends payloads and analyzes responses for indications of XSS vulnerabilities.

Burp Suite Scanner and Repeater in XSS Testing:

1. Scanner Tool:

- **Automated Scanning:** The Scanner tool in Burp Suite automates the process of sending malicious payloads to various input points in the application.
- **Identification of Potential XSS:** It identifies potential XSS vulnerabilities by analyzing how the application responds to injected payloads.

2. Repeater Tool:

- **Manual Validation:** The Repeater tool allows security professionals to manually validate and explore potential XSS vulnerabilities identified by the Scanner.
- **Fine-tuning Payloads:** Security analysts can use Repeater to fine-tune payloads, observe how the application reacts, and confirm the existence of XSS vulnerabilities.
- **Contextual Understanding:** Repeater provides a more interactive and contextual understanding of how user-input is processed and how potential vulnerabilities can be exploited.

Impact and Risks Associated with XSS Vulnerabilities:

1. Data Theft: Attackers can steal sensitive user data, such as login credentials or personal information, by injecting malicious scripts that capture and send data to a remote server.

2. Session Hijacking: XSS can be used to hijack user sessions, allowing attackers to impersonate legitimate users and perform unauthorized actions.

3. Malicious Redirection: Attackers can redirect users to malicious websites, potentially leading to phishing attacks or the delivery of malware.

4. Defacement: XSS can be used to deface websites by injecting malicious scripts that modify the content displayed to users.

5. Cookie Theft: If session cookies are not properly secured, attackers can use XSS to steal these cookies and gain unauthorized access to user accounts.

6. Client-Side Attacks: XSS attacks occur on the client side, impacting users directly and making them susceptible to various client-side attacks.

In summary, Burp Suite's Scanner and Repeater tools contribute to the overall XSS testing process by automating the identification of potential vulnerabilities and providing a platform for manual validation and fine-tuning. XSS vulnerabilities pose significant risks, including data theft, session hijacking, and client-side attacks, highlighting the importance of thorough testing and mitigation measures. It's crucial for organizations to address XSS vulnerabilities promptly to ensure the security of their web applications and user data.

Outcomes: CO2: Comprehend purpose of Anonymity and Foot printing.

Conclusion: (Conclusion to be based on the objectives and outcomes achieved)

In this experiment learnt about various vapt tasks using burpsuite.

Signature of faculty in charge with date

References:

1. https://portswigger.net/burp/documentation
2. https://tryhackme.com/room/burpsuitebasics
3. https://www.softwaretestinghelp.com/how-to-use-burp-suite/