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Security Issues in Modern Web Applications followed by OWASP-2021

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Abstract:

Over the last decade, there has been a considerable growth in the use of web-based applications that process sensitive data, such as personal, financial, and medical data. As the use of such applications has grown, the security of such applications has become increasingly important in ensuring the data's safety, integrity, and validity. Web applications can be run from an internet browser without the need to download or establish, however these require modules. Modern web applications allow users to access data from any location at any time. As a result, Hackers will be able to access the information. In this paper, we try to demonstrate the security issues in the web application followed by the OWASP Security Standards.

Keywords: Security, Internet, Web, Business

Introduction:

The Open Web Application Security Project 10 (OWASP-Top10) is a testing framework for web applications that focuses on web application security to find vulnerabilities in websites. The goal of the Open Web Application Security Project 10 is to ensure that the website in form checklists is safe.

- Injection attacks
- Attacks of broken authentication
- sensitive data disclosure
- External entities – XML (XXE)
- access control issues
- security misconfigurations
- (XSS)cross-site scripting
- insecure deserialization vulnerabilities
- Components/Libraries with known vulnerabilities
- insufficient logging & monitoring

are ten of the most hazardous website vulnerability categories that the OWASP 10 - (Open Web Application Security Project 10) has identified. This project examines and evaluates the web's security, as well as the security of an application, with the goal of determining and assessing a website's security level, whether extra protection is required, and website recommendations.

Research Method:

In order to avoid data theft and dissemination by negligent parties and to ensure the long-term viability of the website and website-based information systems, the application of OWASP 10 has criteria for analyzing website security needs and website-based information systems. To demonstrate the security vulnerabilities in the modern web applications followed by OWASP 10 the intentionally vulnerable web application has been developed. To develop the intentionally vulnerable web app the below steps are followed:

- Step1

- Step2

- Step3

- Step4

- Step5

- Step6

Research Flow

The next step comprises reading up on all subjects related to the notion of creating a vulnerable app, security testing, and website security. By researching and reading books, theses, final projects, scientific research, and a variety of internet information sources, you can perform a literature study.

The following stage entails selecting a test method based on literature searches that have been done to identify an appropriate method. The finished target will next be set through the testing process. The test data will be analyzed to determine the outcomes and the best course of action.

Research Tool

Hardware and software are used as instruments. The device is a MacBook laptop, with Burp Suite and macOS serving as the operating system and applications, respectively.

The minimal requirements and the laptop's specifications are listed in the following table.

Software Tools

S No	Phase	Tools
1.	Development	Visual Studio Code
2.	Scanning/Vulnerability Assessment	Nmap Nessus OWASP ZAP
3.	Exploitation/Penetration Testing	Burpsuite

Hardware Tools

Processor	Minimum Pentium 4 orAMD64
RAM	Minimum 1GB RAM & above
Hard Disk	50GB & above

Proposed System with Features

The most recent Open Web Application Security Project (OWASP) 10 2021 has not been used to create intentionally vulnerable web applications. The purpose of this study is to develop the intentionally vulnerable web app and perform penetration testing from the viewpoint of the general public using the most recent OWASP 10 2021 standard.

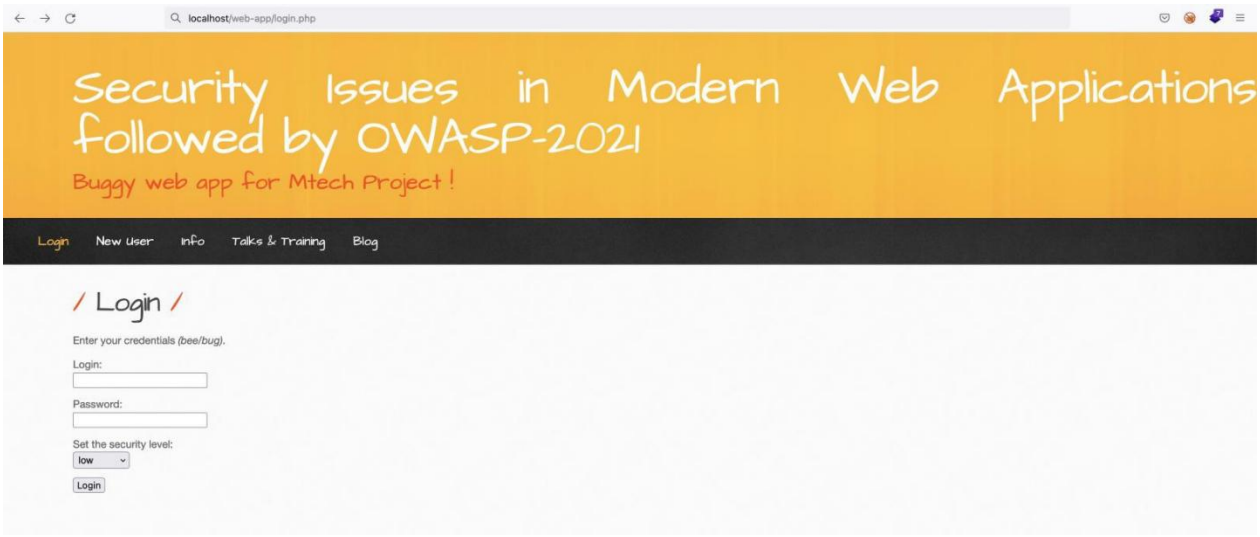
Utilizing this most recent Open Online Application Security Project (OWASP) 10 2021 framework allows for penetration testing of websites using the most recent and cutting-edge web assaults, protecting user data from being stolen by hackers and sold on the dark web or compromised.

Implementation Results

The overall results of the application development, implementation and penetration testing execution of some of the OWASP top-10 vulnerabilities can be shown in the screenshots below

For the application hosting and implementation the setup has been done using some tools such as XAMPP, mySQL etc.

Login page



Reflected Cross Site Scripting

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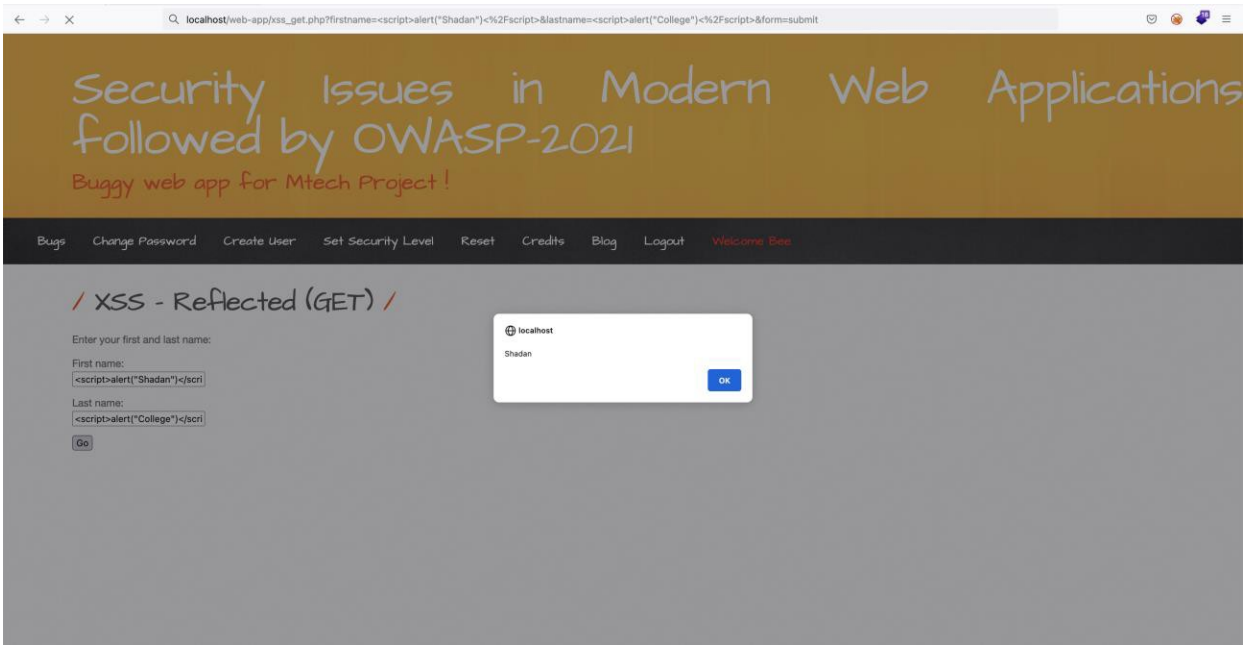
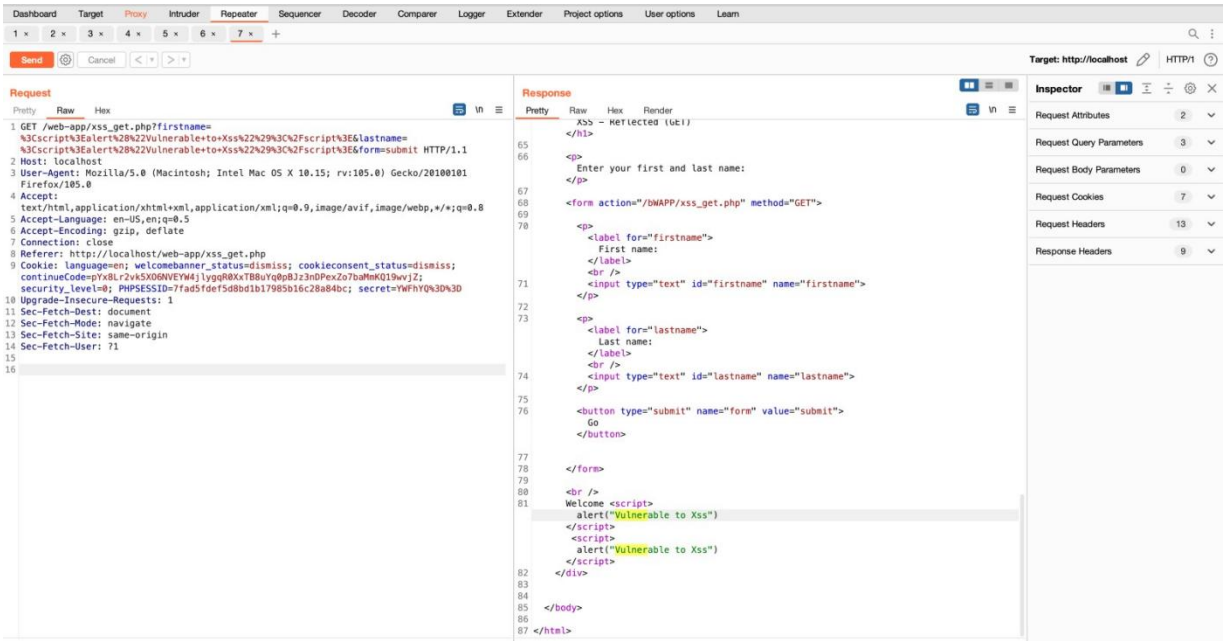
Reflected XSS Execution



Burp Suite Results



Conclusion

The use of web-based applications that process sensitive data, such as personal, financial, and medical data, has increased significantly. As the use of such apps has expanded, so has the security of such applications in assuring the data's safety, integrity, and validity. Web apps can be run directly from a browser without the requirement for download or installation, but they do require modules. Users can access data from any location and at any time using modern web applications. As a result, hackers will have access to the data. In this project, we attempt to demonstrate security vulnerabilities in the modern web application using the OWASP Security Standards 2021. The application has been developed to exploit and understand these vulnerabilities in a way that an attacker can exploit. Based on earlier research, there are numerous websites with security values of 60%, indicating a risk of interference; this requires the installation of security measures such port closures or the addition of SSH Security, as well as logging in open ports.

Future Improvement:

It is a good idea to integrate logging & monitoring so that you can keep track of the history of user activity on websites, network traffic, and network traffic generation to stop these vulnerabilities and attacks.

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