Assignment-4

Gontla Vasavi Sindhu

Date:14-03-24

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Step 1: -

1. **Broken Access Control**
   Potential Impact: -
   Broken access control can affect companies severely by hurting them financially as well as damaging their reputation and business relationships. To prevent broken access control, it's important to implement and validate that your access controls are working properly on a continuous basis.

2. **Cryptographic Failures**
   Potential Impact: -
   Attackers can get hold of a complete database having thousands of sensitive information, data theft, public listing, breaches, and many critical problems with business-related data.

3. **Injection**
   Potential Impact: -
   Injections into the circular flow of income are a result of money borrowed by households and firms from different external sources, like financial institutions. However, this additional income does not result in an immediate expenditure.

4. **Insecure Design**
   Potential Impact: -
   Insecure design vulnerabilities result from non-adherence to security best practices during the design process. Today, it is one of the leading causes of functionality failures, data breaches, broken policies, and tarnished reputations.

5. **Security Misconfiguration**
   Potential Impact: -
   Security misconfigurations can allow attackers to gain unauthorized access to the networks, systems and data which in turn can cause significant monetary and reputational damage to your organization.

6. **Vulnerable and Outdated Components**
   Potential Impact: -
   A vulnerable and outdated component is a software component that is no longer being supported by the developer, making it susceptible to security vulnerabilities. Many times, a component has known vulnerabilities that don't get fixed due to a lack of maintainer.

7. **Identification and Authentication Failure**
   Potential Impact: -
   The failure of a system to identify and/or authenticate leaves the application susceptible to attacks and leaves user accounts/data at risk. Authentication failure poses a stringent and profound threat to an organization's security.

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8. **Software and Data Integrity Failure**

   Potential Impact: -

   Addressing software and data integrity failures is crucial for maintaining the security of web applications. Failure to address these vulnerabilities can result in significant financial losses, reputational damage, legal liabilities, loss of customer trust, etc.

9. **Security Logging and Monitoring Failure**

   Potential Impact: -

   Insufficient logging and monitoring of systems can impact visibility, incident alerting, login failures, system failures and breaches. This makes it essential to have a fully operational logging and monitoring system to collect logs and give out alerts to Security Operation Center (SOC) staff and administrators.

10. **Server Side Request Forgery (SSRF)**

    Potential Impact: -

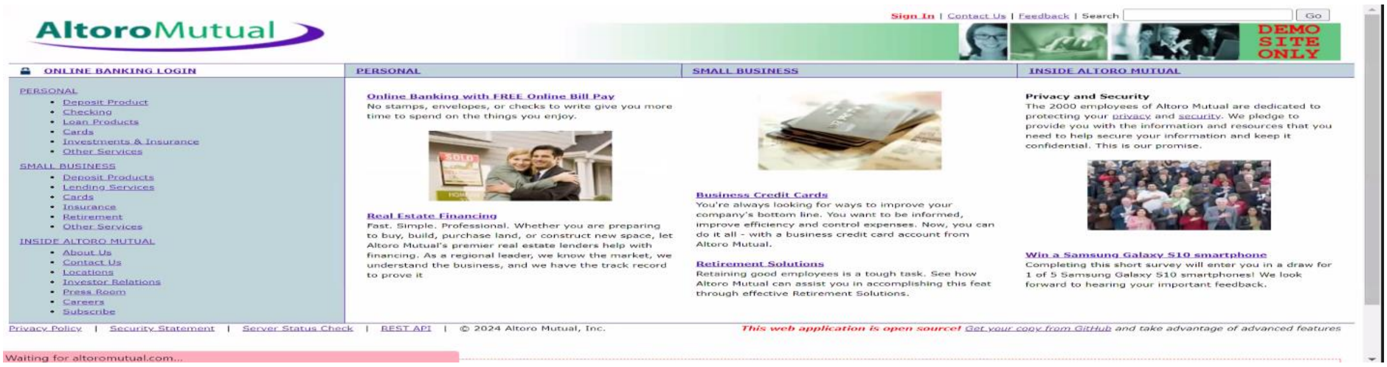
    successful SSRF attack can often result in unauthorized actions or access to data within the organization. This can be in the vulnerable application, or on other back-end systems that the application can communicate with.

Importance of addressing them to prevent exploitation by attackers.

Addressing OWASP vulnerabilities is crucial to prevent exploitation by attackers and ensure the security of software applications. OWASP (Open Web Application Security Project) identifies and categorizes common security risks in web applications, providing guidelines and best practices for mitigating these vulnerabilities. Failing to address OWASP vulnerabilities leaves applications susceptible to attacks such as SQL injection, cross-site scripting (XSS), and authentication bypass, which can lead to data breaches, financial losses, and reputational damage. By proactively addressing OWASP vulnerabilities through secure coding practices, regular security assessments, and timely patching, organizations can significantly reduce the risk of exploitation and protect sensitive data from malicious actors.

Step 2: -

Altro Mutual website



Online Banking with FREE Online Bill Pay
No stamps, envelopes, or checks to write give you more time to spend on the things you enjoy.

Real Estate Financing
Fast. Simple. Professional. Whether you are preparing to buy, build, purchase land, or construct new space, let Altoro Mutual's premier real estate lenders help with financing. As a regional leader, we know the market, we understand the business, and we have the track record to prove it

Business Credit Cards
You're always looking for ways to improve your company's bottom line. You want to be informed, improve efficiency and control expenses. Now, you can do it all - with a business credit card account from Altoro Mutual.

Retirement Solutions
Retaining good employees is a tough task. See how Altoro Mutual can assist you in accomplishing this feat through effective Retirement Solutions.

Privacy and Security
The 2000 employees of Altoro Mutual are dedicated to protecting your privacy and security. We pledge to provide you with the information and resources that you need to help secure your information and keep it confidential. This is our promise.

Win a Samsung Galaxy S10 smartphone
Completing this short survey will enter you in a draw for 1 of 5 Samsung Galaxy S10 smartphones! We look forward to hearing your important feedback.

Privacy Policy | Security Statement | Server Status Check | REST API | © 2024 Altoro Mutual, Inc.

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Waiting for altoromutual.com...

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Login Page: Allows registered users to securely access their accounts by entering their credentials, typically username/email and password.

User Registration: New users can create accounts by providing personalinformation like name and email, and setting up a password, often with optional additional details.

Payment Portal: Enables users to make secure payments for services or products, requiring input of payment details like credit/debit card informationin a protected environment.

Contact Forms: Users can send inquiries or feedback by submitting their name, email, and message details through a form, sometimes with optionalfields for additional information.

Identification of Vulnerabilities

SQL Injection - SQL injection, also known as SQLI, is a common attack vector that uses malicious SQL code for backend database manipulation to access information that was not intended to be displayed.

Cross Site Scripting (XSS) - Cross-site scripting (XSS) is an attack in which an attacker injects malicious executable scripts into the code of a trusted application or website.

Insecure Authentication Mechanism - Insecure Authentication exploits vulnerable authentication schemes by faking or bypassing authentication.

Insecure direct object references - Insecure direct object references (IDOR) are a type of access control vulnerability that arises when an application uses user-supplied input to access objects directly.

Step 3: -

Altoro Mutual Website IP address is **65.61.137.117.** Vulnerability scan is done on Altoro Mutual Website

```
Starting Nmap 7.40 ( https://nmap.org ) at 2024-03-20 06:26 UTC
Nmap scan report for 65.61.137.117
Host is up (0.046s latency).
PORT     STATE    SERVICE
21/tcp   filtered ftp
22/tcp   filtered ssh
23/tcp   filtered telnet
80/tcp   open     http
110/tcp  filtered pop3
143/tcp  filtered imap
443/tcp  open     https
3389/tcp filtered ms-wbt-server
```

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Website Structure and Functionality

1. **Homepage**: Provides an overview of Altro Mutual's services, promotions, andnews updates.
2. **Account Management**: Allows users to register, log in, view account details,and manage their profiles.
3. **Financial Products**: Showcases Altro Mutual's range of financial productssuch as savings accounts, loans, and investment options.
4. **Payment and Transactions**: Enables users to make payments, transfers, and view transaction history securely.
5. **Customer Support**: Offers customer service options such as FAQs, contact forms, and live chat for assistance.
6. **Educational Resources**: Provides resources like articles, guides, and tools tohelp users make informed financial decisions.

Potential Areas of Vulnerability

- **Input Validation**: Insufficient validation in forms may lead to SQL injection orXSS vulnerabilities.
- **Authentication:** Weak authentication measures or lax password policies cancompromise accounts.
- **Session Management**: Poor session handling may result in session hijacking.
- **Data Protection**: Inadequate encryption or storage practices can lead to databreaches.
- **Third-Party Integrations**: Vulnerabilities in plugins or APIs pose security risks.
- **Access Control**: Weak access controls may allow unauthorized access tosensitive information or functionality.

Recommendations for mitigating Vulnerabilities

1. Secure Coding Practices: Follow secure coding guidelines such as OWASP's Secure Coding Practices Checklist, which covers topics like input validation, output encoding, authentication, and access control. Use secure coding frameworks and libraries that handle security concerns effectively.

2. Regular Security Assessments: Conduct regular security assessments, including penetration testing and code reviews, to identify and remediate vulnerabilities in your applications. Automated tools like OWASP ZAP (Zed Attack Proxy) can help scan for common vulnerabilities and provide actionable insights.

3. Patch Management: Keep your software and libraries up to date with the latest security patches and updates. Vulnerabilities in third-party components can expose your applications to attacks, so monitor vendor advisories and apply patches promptly.

4. Web Application Firewalls (WAF): Implement a WAF to filter and block malicious traffic, including attacks like SQL injection, XSS, and CSRF. Configure the WAF to enforce security policies and monitor for suspicious activity.

5. Secure Authentication and Session Management: Use strong authentication mechanisms (e.g., multi-factor authentication) to protect user accounts from unauthorized access. Implement secure session management practices to prevent session hijacking and fixation attacks.

6. Data Encryption: Encrypt sensitive data both at rest and in transit using strong encryption algorithms. Securely store and manage encryption keys to prevent unauthorized access to encrypted data.

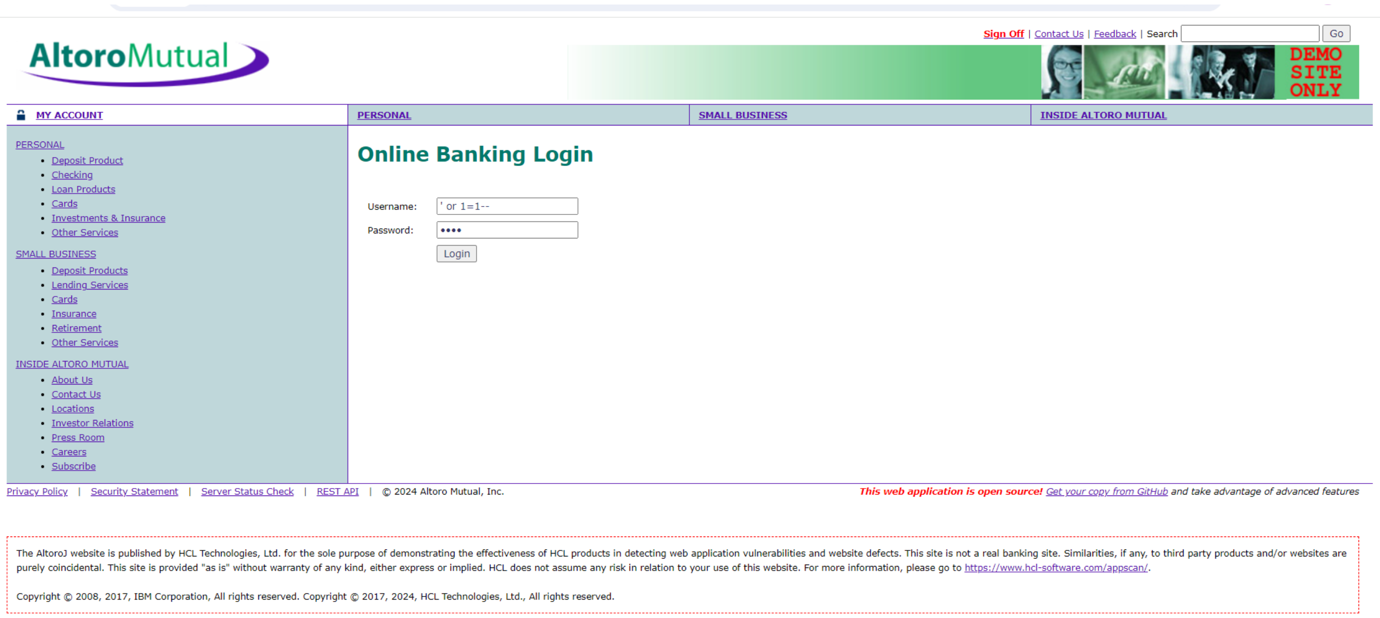
7. Security Headers: Utilize security headers (e.g., Content Security Policy, X-Content-Type-Options, X-XSS-Protection) to enhance the security posture of your web applications. Properly configure these headers to mitigate common attack vectors.

8. Security Training and Awareness: Educate developers, testers, and other stakeholders about OWASP vulnerabilities and best practices for secure software development. Foster a security-aware culture within your organization to prioritize security throughout the software development lifecycle.

Step 4: -

Vulnerability Exploitation

SQL Injection - SQL injection, also known as SQLI, is a common attack vector that uses malicious SQL code for backend database manipulation to access information that was not intended to be displayed. Performing SQL Injection on Altoro Mutual Website by giving username as **‘ or 1=1—** and password as **1234** in the login page.



Online Banking Login

Username: ' or 1=1--

Password: ••••

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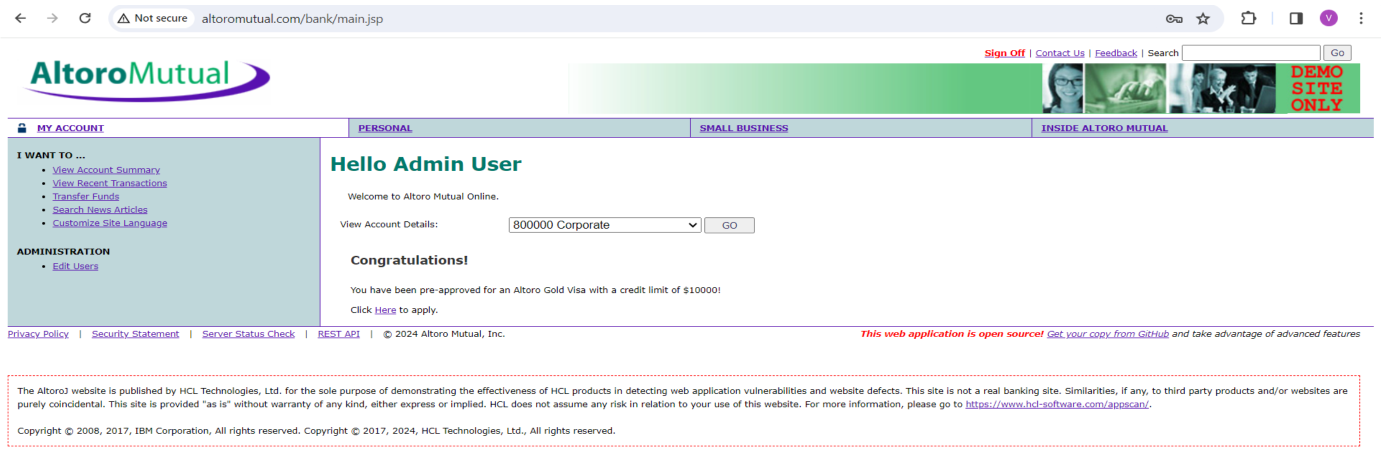

Hello Admin User

Welcome to Altoro Mutual Online.

View Account Details: 800000 Corporate

Congratulations!

You have been pre-approved for an Altoro Gold Visa with a credit limit of $10000!

Click Here to apply.

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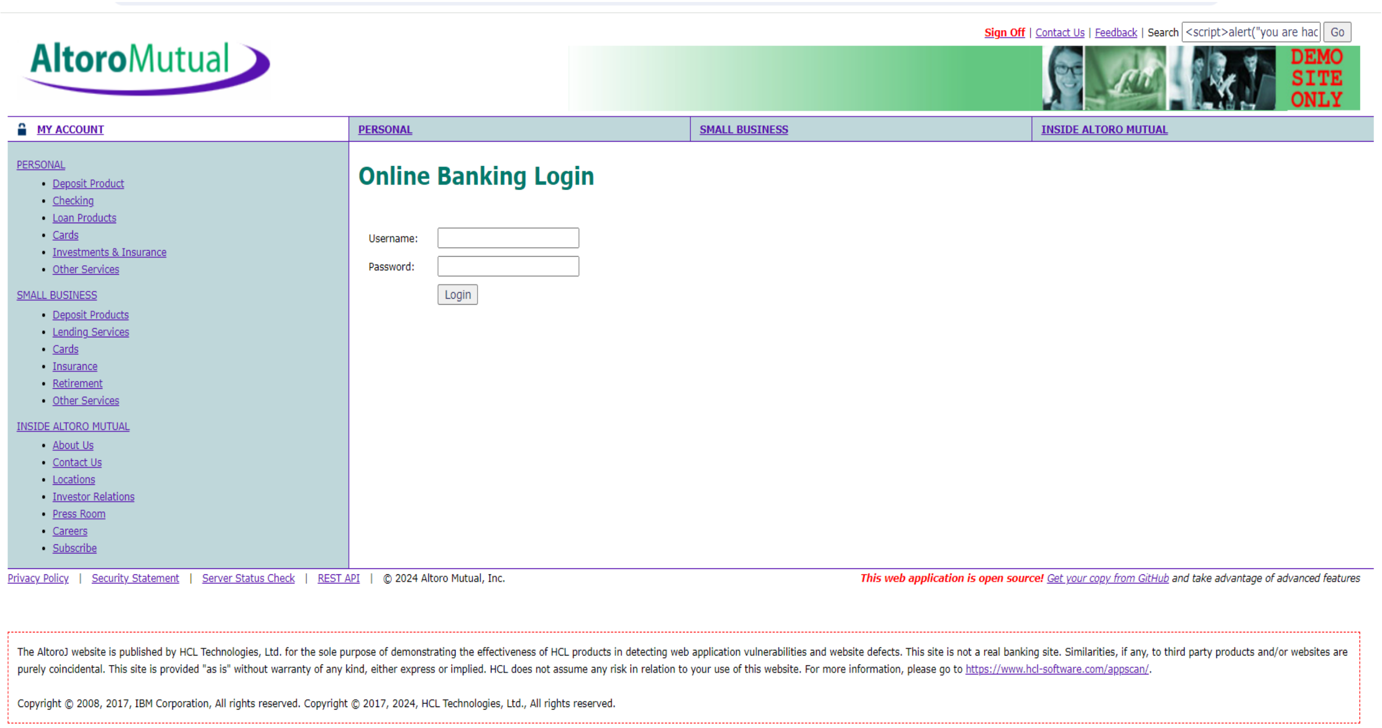
Cross Site Scripting (XSS) - Cross-site scripting (XSS) is an attack in which an attacker injects malicious executable scripts into the code of a trusted application or website. Performing XSS on Altoro Mutual Website by using the command **<script>alert(“you got hacked”)</script>** in search bar.



<script>alert("you are hac

Online Banking Login

Username:

Password:

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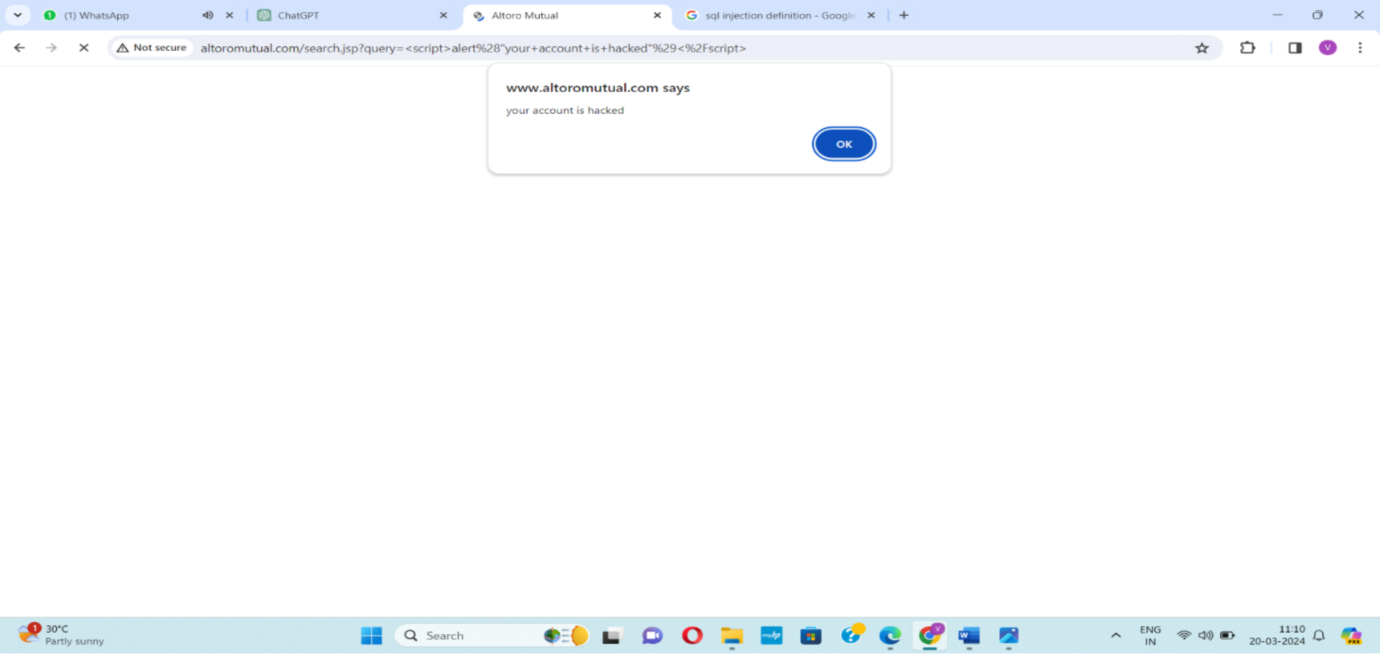


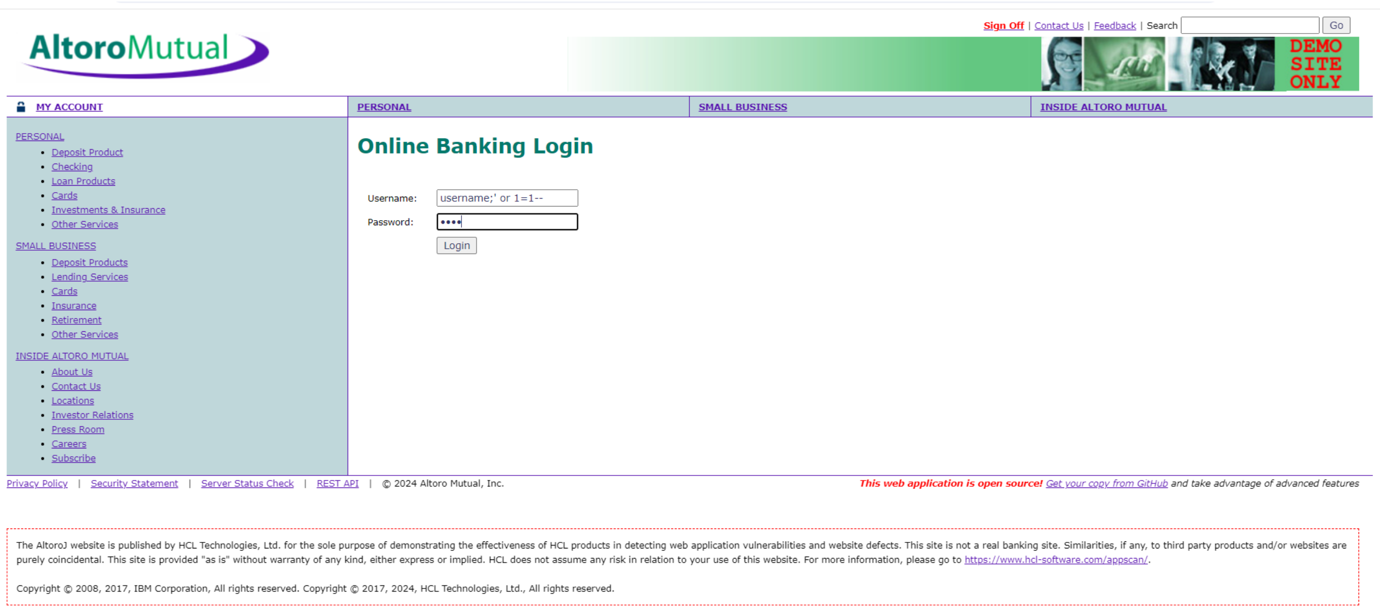
altoromutual.com/search.jsp?query=<script>alert%28"your+account+is+hacked"%29<%2Fscript>

www.altoromutual.com says

your account is hacked

OK

Insecure Authentication Mechanism - Insecure Authentication exploits vulnerable authentication schemes by faking or bypassing authentication. Performing Insecure Authentication Mechanism on Altoro Mutual Website by giving username as **username;' or 1=1--** and password as **1234** in the login page.



Online Banking Login

Username: username;' or 1=1--

Password: ••••

Login

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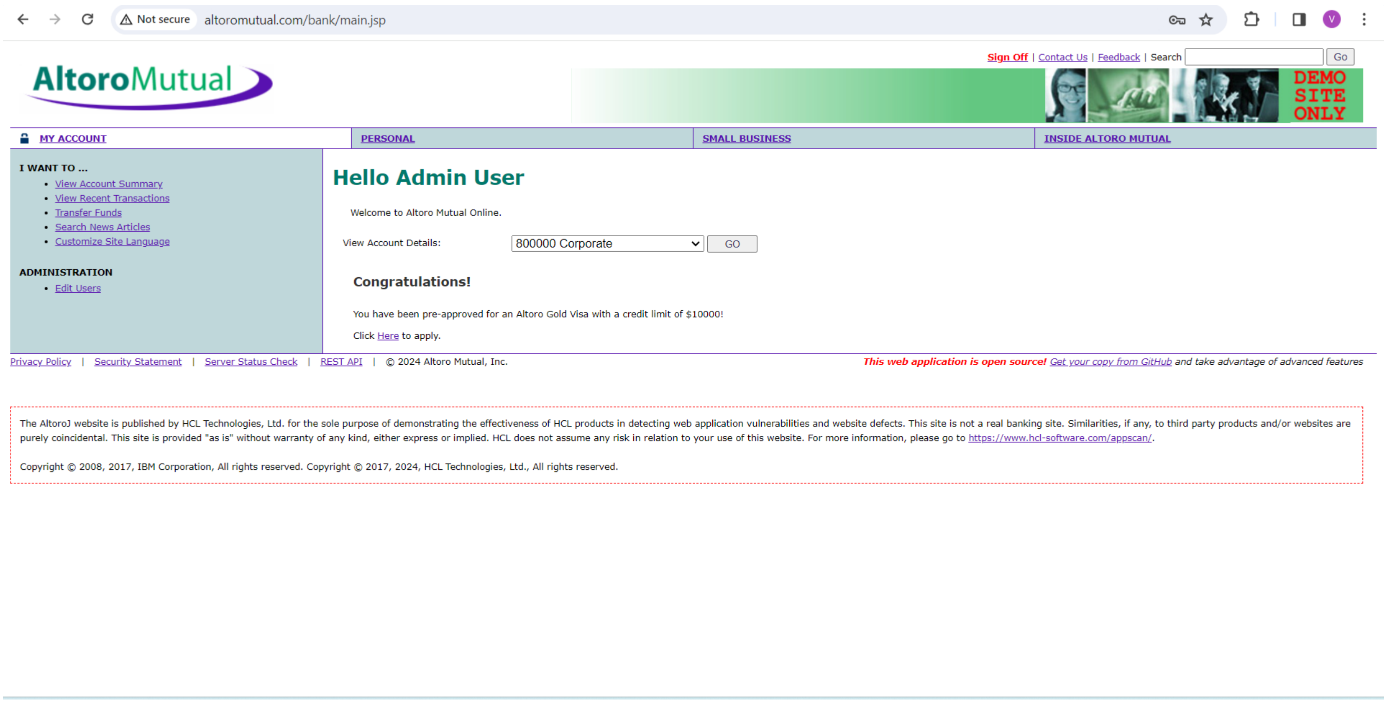

Hello Admin User

Welcome to Altoro Mutual Online.

View Account Details: 800000 Corporate

Congratulations!

You have been pre-approved for an Altoro Gold Visa with a credit limit of $10000!

Click Here to apply.

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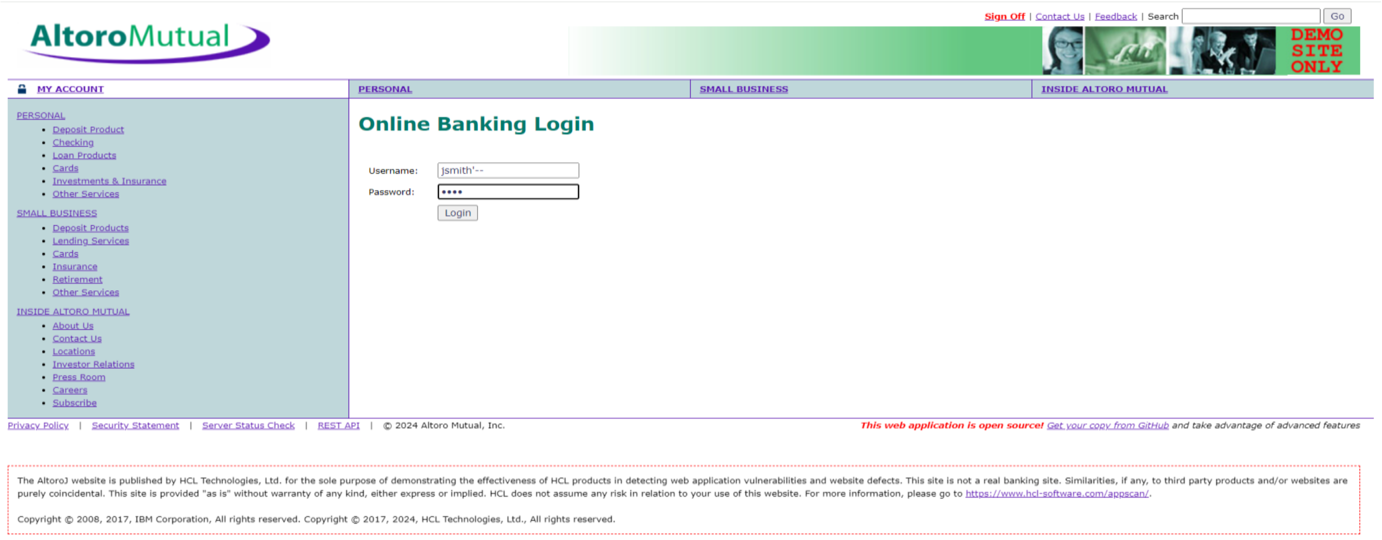
Insecure direct object references - Insecure direct object references (IDOR) are a type of access control vulnerability that arises when an application uses user-supplied input to access objects directly. Performing IDOR on Altoro Mutual Website by giving username as **jsmith'--** and password as **1234** in the login page, with this attack we can enter into the public bank accounts and do whatever the transactions we want.



Online Banking Login

Username: jsmith'--

Password: ••••

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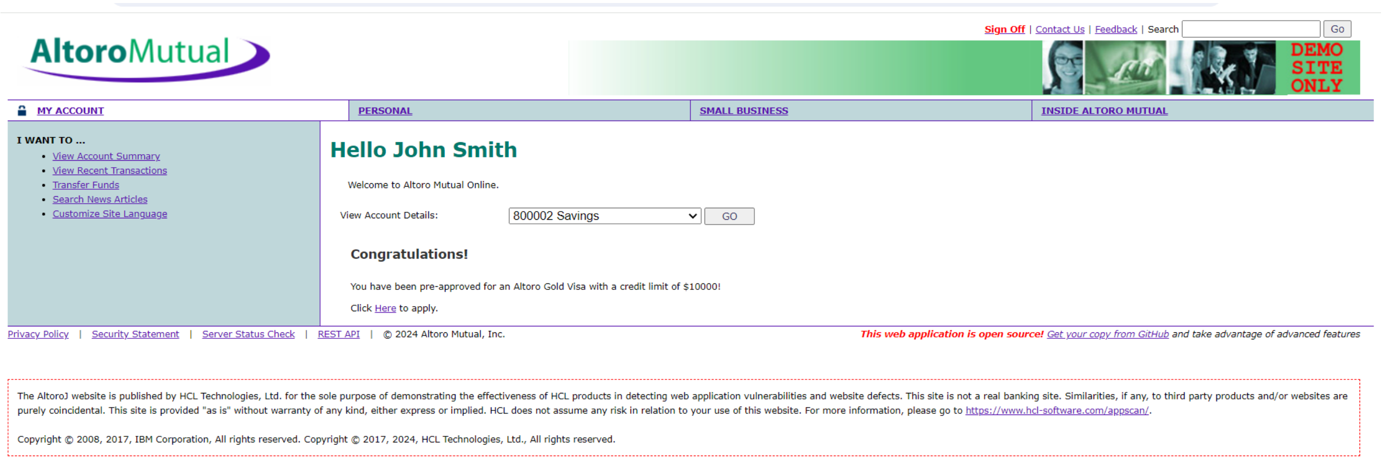

Hello John Smith

Welcome to Altoro Mutual Online.

View Account Details: 800002 Savings

Congratulations!

You have been pre-approved for an Altoro Gold Visa with a credit limit of $10000!

Click Here to apply.

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Step 5: -

Mitigation Strategy Proposal

1. **Identify High-Risk Vulnerabilities:** Use vulnerability assessments to findcritical vulnerabilities.

2. **Assess Risks:** Evaluate the impact and likelihood of exploitation for eachvulnerability.

3. **Prioritize based on Severity**: Use industry-standard metrics like CVSS to rankvulnerabilities.

4. **Establish Criteria**: Set clear criteria for prioritizing vulnerabilities, consideringfactors like system criticality and patch availability.

5. **Patch Management:** Quickly deploy patches for high-risk vulnerabilities andregularly monitor effectiveness.

6. **Remediation Plan:** Develop a plan to systematically address high-riskvulnerabilities, considering operational constraints.

7. **Continuous Monitoring:** Keep an eye on the effectiveness of mitigationefforts and adapt strategies as needed.

8. **Communication:** Maintain open communication with stakeholders to keep them informed about prioritized vulnerabilities and mitigation progress.

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Step 6: -

Documented the Exploitation process and the commands used in the exploitation and attached the output the respective exploitations.