CYBER SECURITY INTERNSHIP

Task 4: Password Security & Authentication Analysis

Password security is one of the most common weaknesses in modern systems. In this task, I explored how passwords are stored, why weak passwords fail, and how attackers take advantage of poor authentication practices. The focus was on understanding real risks rather than only theoretical concepts.

1. Password Storage Methods

Passwords are not stored as plain text. Systems use hashing to convert passwords into fixed-length values. Hashing is a one-way process and cannot be reversed, which makes it safer than encryption for storing passwords.

2. Hash Types and Their Security

Different hashing algorithms provide different levels of security. Older algorithms like MD5 and SHA-1 are fast and easier to crack, while modern algorithms such as bcrypt are slower and more resistant to brute force attacks.

3. Hash Generation and Observation

Sample passwords were converted into hashes to observe how even small changes in a password create completely different hash values. This demonstrates how hashing protects the original password.

4. Password Cracking Analysis

Weak password hashes were tested using dictionary and brute force approaches. Short and common passwords were cracked quickly, showing how vulnerable poor password choices are in real-world scenarios.

5. Importance of Multi-Factor Authentication

Multi-factor authentication adds an additional layer of security beyond passwords. Even if a password is compromised, MFA helps prevent unauthorized access, making it an essential security control.

Authentication Best Practices

- Use long and unique passwords.
- Avoid predictable password patterns.
- Use secure hashing algorithms.
- Enable multi-factor authentication.
- Do not reuse passwords across services.
- Regularly review and update credentials.

Final Outcome

This task helped me understand how password-based attacks work and why strong authentication practices are necessary. It improved my awareness of password security risks and modern defense techniques.