Summary Post
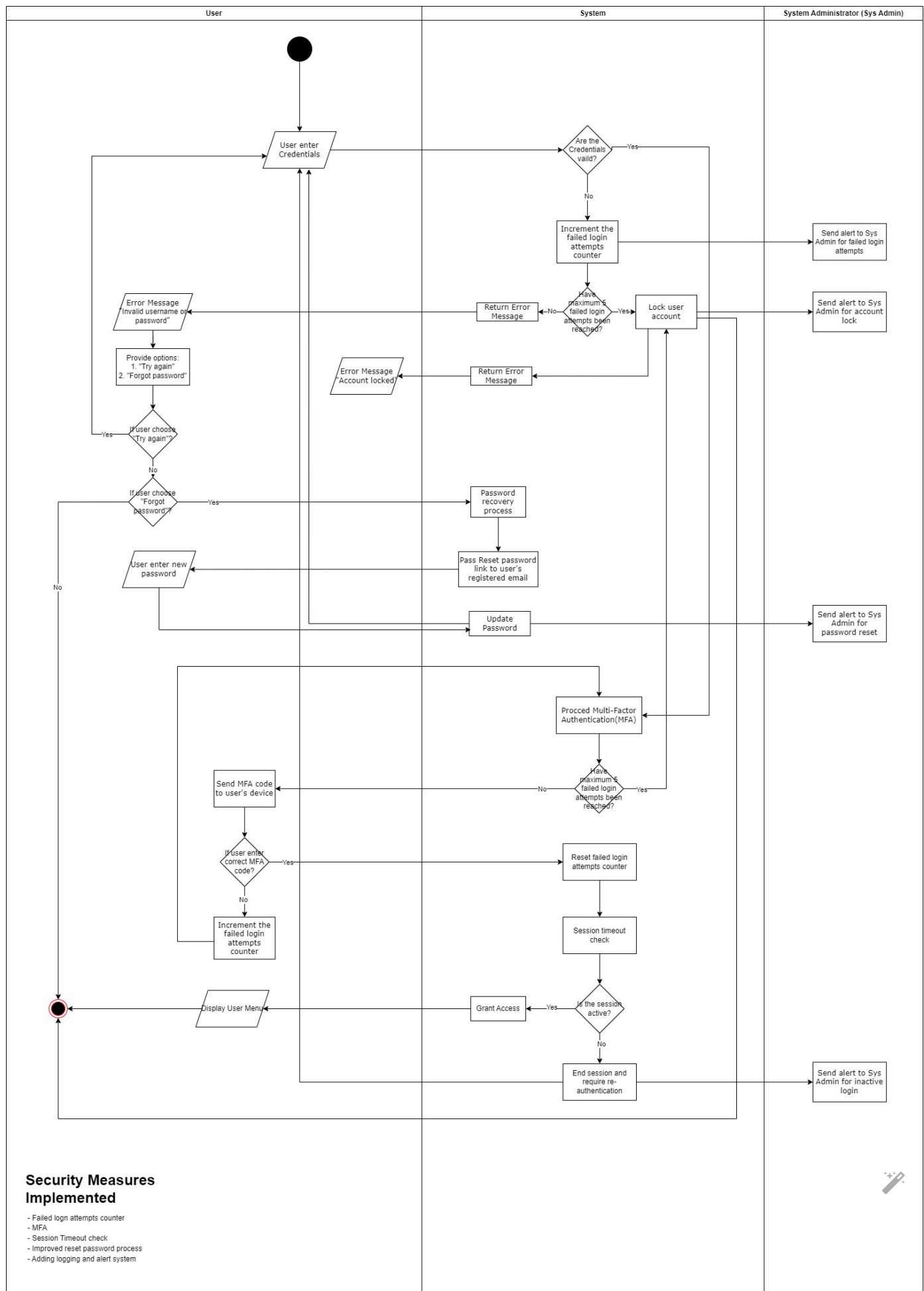
Display replies in nested form

Settings ⌄

Summary Post

by Oi Lam Siu - Friday, 8 November 2024, 6:12 AM

After reviewing the tutor and peer feedback for optimising the UML Activity Diagram and suggested security measures, I have created a new Activity Diagram (Figure 1) that implements several security measures to enhance the security of the website login process, aligned with the OWASP Top 10 Proactive Controls (OWASP, 2024).

User	System	System Administrator (Sys Admin)

User enter Credentials

Are the Credentials vaild?
— Yes

No

Increment the failed login attempts counter

Send alert to Sys Admin for failed login attempts

Error Message "Invalid username or password"

Return Error Message — No

Have maximum 5 failed login attempts been reached?

Lock user account

Send alert to Sys Admin for account lock

Provide options:
1. "Try again"
2. "Forgot password"

Return Error Message

Error Message "Account locked"

If user choose "Try again"? — Yes

No

If user choose "Forgot password"? — Yes

Password recovery process

User enter new password

Pass Reset password link to user's registered email

Update Password

Send alert to Sys Admin for password reset

No

Procced Multi-Factor Authentication(MFA)

Have maximum 5 failed login attempts been reached?

Send MFA code to user's device — No

Yes

If user enter correct MFA code? — Yes

Reset failed login attempts counter

No

Session timeout check

Increment the failed login attempts counter

Is the session active? — Yes

Grant Access — Yes

Display User Menu

No

End session and require re-authentication

Send alert to Sys Admin for inactive login

Security Measures Implemented

- Failed logn attempts counter
- MFA
- Session Timeout check
- Improved reset password process
- Adding logging and alert system

Figure 1: Activity Diagram for Website Login

Below are the details of the security measures implemented:

Failed Login Attempts Counter

The system increments a counter each time a user fails to log in successfully. After a maximum of 5 failed attempts, the account is locked.

Aligned with OWASP Proactive Control C7: Secure Digital Identities (OWASP, 2024), which emphasises protecting user identities by implementing strong authentication mechanisms, including account lockout policies to prevent unauthorised access through brute force attacks.

Multi-Factor Authentication (MFA)

Users must enter a correct MFA code sent to their registered device after providing valid credentials.

Aligned with OWASP Proactive Control C7: Secure Digital Identities (OWASP, 2024), adding an additional layer of security beyond passwords, reducing the risk of unauthorised access even if credentials are compromised.

Session Timeout Check

The system checks if the session is active and ends the session, requiring re-authentication after inactivity or a predefined time.

Aligned with OWASP Proactive Control C1: Implement Access Control (OWASP, 2024), ensuring that user access is appropriately managed and that sessions are securely maintained and terminated to prevent unauthorised use.

Improved Reset Password Process

Password reset links are sent to the user's registered email without revealing whether the account exists, accompanied by alerts to the system administrator.

Aligned with OWASP Proactive Control C7: Secure Digital Identities (OWASP, 2024), securing the process of handling digital identities, including password resets, and preventing account enumeration by not disclosing account validity.

Adding Logging and Alert Systems

Alerts are sent to system administrators for failed login attempts, account locks, password resets, and inactive logins.

Aligned with OWASP Proactive Control C9: Implement Security Logging and Monitoring (OWASP, 2024), enabling detection and response to suspicious activities, facilitating timely intervention and incident response.

By aligning the security measures in the activity diagram with the OWASP Top 10 Proactive Controls 2024, particularly focusing on C1: Implement Access Control, C7: Secure Digital Identities, and C9: Implement Security Logging and Monitoring, the risks associated with A07: Identification and Authentication Failures (OWASP, 2021) can be effectively mitigated.

References

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