

IT Infrastructure and Security (COSC2737)

Industrial focused project

Option 1

Design and development of a web-based library management systems for community library, include:

1. Design and implement a user-friendly interface (UI) for users to secure login (register and log in) (8 marks)
 - a. Design and develop a simple user sign up and secure login interfaces (UIs), to collect the username and password and store into the database (details in 2a).
 - b. Design and implement password reset functionality, in case user may want to reset the password if s/he is forgotten.
2. Implement a role-based access to the back-end database. (12 marks)
 - a. Design and implement secure password storage mechanism. Keep the input of username and hashed password (collected in 1a) into the backend database of your choice, e.g, [SQLite](#).
 - b. Assume that the books (digital copy of books) are already in the system, to implement.
 - Registered users can search, access and download books anytime.
 - Design and implement secure communication between client and server when user searching, accessing and downloading books.
3. Technical documentation includes: (16 marks)
 - a. Draw a diagram of the overall architecture design of the security features (i.e., secure login, secure communication, and secure search/access/download) in the Library management system.
 - b. Explain through a diagram (provided in 3. a) how users can securely communicate (including secure search/access/download) through your secure client-server implementation.
 - c. Explain systematically (i.e., step by step) how the Diffie-Hellman protocol produces the shared key between a client and a server.
 - d. Explain through an example, how a digital signature is used to guarantee the integrity during secure communication between client and the server.

Option 2

Design of a web-based Secure Chat Application, include:

1. Create a QR code. (6 marks)
 - a. Embed the URL <http://titan.csit.rmit.edu.au/~e73581/itis/index.html> to a QR code generator <https://www.qrcode-monkey.com/> to create a QR code.
 - b. Design a web-based Secure Chat Application (**provided 2**), and link it to the QR code.

You are encouraged to implement the URL and add an item of “student ID”.
2. Design a user-friendly interface (UI) for users to secure login (register and log in). (8 marks)
 - a. Design intuitive user interfaces (UI) for user registration, login, profile management, and chat messaging window.
 - b. Design security best practices (i.e., secure login) for user authentication.
 - c. Design secure password storage mechanism.
 - d. Design password recovery functionality, in case user may want to recover the password.
3. Authentication and Encryption (8 marks)
 - a. Design secure authentication mechanisms, such as multi-factor authentication (MFA)
 - b. Design end-to-end encryption using strong cryptographic algorithms to protect message content between two chat entities.
4. Technical documentation includes: (14 marks)
 - a. Draw a diagram of the overall architecture design of the Secure Chat Application (i.e., secure login, secure communication, and secure password storage) in the Library management system.
 - b. Explain through a diagram (provided in 3. a) how users can adhere to strong passwords through your implemented Secure Chat Application.
 - c. Explain through a diagram (provided in 3. a) how users can store strong passwords through your implemented Secure Chat Application.
 - d. Explain through a diagram (provided in 3. a) how users can securely communicate (chat messages) through your implemented Secure Chat Application.
 - e. Explain systematically (i.e., step by step) how the Diffie-Hellman protocol produces the shared key between a client and a server.

- f. Explain how novel and secure your developed Chat Application is and who (e.g., industry or businesses) will benefit from having your secure chat application.
- g. Explain how resilient your developed secure chat application is against common security threats, such as SQL injection and cross-site scripting (XSS).