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Abstract

This assignment focuses on developing a Secure Marketing Application in Python with SQLite, QR codes, and user authentication.

Ct4029 – Principles of programming

Developing a Secure Marketing Application with Python, SQLite, QR Codes, and User Authentication

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# Introduction

The Secure Marketing Application project challenges me to create a software application that embodies several vital features. This application aims to deliver a user-friendly graphical interface, robust user authentication, QR code functionality, and a secure SQLite database. It is centred on empowering users to explore marketing promotions, access additional information through QR code scanning, and securely manage their interactions with promotions.

My core focus is designing and developing a practical, secure, and user-centric marketing application that aligns with the project's outlined requirements. This introduction sets the stage for a thorough exploration of the design, implementation, testing, and conclusion of this Secure Marketing Application.

# Design of the System

Regarding the logic and functionality of the program itself, it is going to have to be separate python files for each page, and using a \_\_init\_\_() function containing the setup of the design and layout. Alongside this code will be any logic required for the GUI to function, e.g., writing the data the user has inputted into an SQL database. The user-friendly graphical interface design follows best practices outlined by (Lukin, Dzyubenko and Chechikov, 2020) ensuring a seamless and intuitive user experience. The robust user authentication and security measures are in line with recommendations from 'Web Application Security Best Practices' (OWASP, 2021) to safeguard user data and interactions. The database management utilizes the principles found in the official SQLite documentation (SQLite, 2022), ensuring data integrity and security. The GUI development is based on the PyQt5 framework, which aligns with the guidelines in 'Mastering PyQt5' by Harrison (2020), providing a reliable foundation for the application's interface.

## Wireframe Designs

A screenshot of a computer

Description automatically generated

Figure - Application Wireframe Drawings.

* GUI Design and Wireframes
  + User Authentication Design
  + QR Code Generation and Scanning
  + SQLite Database Structure
  + Implementation Logic
  + Code Snippets, Diagrams, Screenshots

# Testing the System

* + Test Cases and Test Scenarios
  + Test Results
  + Discussion on Failed Tests
  + Test Coverage Evaluation

# Conclusion

* + Summary of Achievements
  + Lessons Learned
  + Future Enhancements

# References

Lukin, V.N., Dzyubenko, A.L. and Chechikov, Y.B. (2020) ‘Approaches to User Interface Development’, *Programming and Computer Software*, 46(5), pp. 316–323. Available at: https://doi.org/10.1134/S0361768820050059/FIGURES/1.

# Appendices

# Appendix: User Guide

* + - Instructions for Registration
    - Viewing Promotions
    - Generating and Scanning QR Codes
    - Tracking Interactions with Promotions

# Appendix 2: Source Code

* + - GUI Code
    - SQLite Database Code

# Appendix 3: Test Suites

* + - Detailed Test Cases and Scenarios

# Video Demonstration

* + Link or Embed the 5-minute Video Demonstration