NCYS-PROJECT REPORT (RFID BLOCKER)

The NCYS-PROJECT is a C++ application made to use QR codes and RFID cards for attendance management and tracking. The project ensures building an individual database, producing RFID cards, using RFID verification of attendance, and saving attendance information to a CSV file. For the purpose of authentication, the system also generates and displays QR codes.

Used Libraries:

1. iostream: The standard C++ library for input and output operations.

2. fstream: Required to save attendance data to a CSV file, this stream is used for file input and output operations.

3. string: A common C++ library for manipulating strings.

4. random: This function is essential for producing random RFID numbers as it generates random numbers.

5. qrcodegen/QrCode.hpp: The external library *qrcodegen/QrCode.hpp* is utilized to generate QR codes. *(Verify that the library is properly installed and configured)*

Functions:

1. toLowercase:

- *Description*: Produces a lowercase version of the supplied string.

 - *Apply*: used to standardize user-provided data for faculty and student roles.

2. readRFID:

- *Description:* Uses user input to simulate reading an RFID card.

- *Apply*: records user input for data from RFID cards.

3. generateRandomRFID:

- *Description*: Based on the input year, generates a random RFID string.

- *Apply:* generates a distinct RFID for every person when they are added to the database.

4. generateQRCode:

- *Description:* Creates a QR code and saves it as an SVG file using the qrcodegen library.

- *Apply*: called to generate a special QR code for authentication when a new user is added to the database.

5. authenticatePerson:

- *Description:* Verifies an individual's identity through their RFID card.

- *Apply*: determines whether the RFID entered matches any permitted RFID in the database.

6. addPerson:

- *Description*: Creates an RFID and QR code in addition to adding a new user to the database.

- *Apply*: Generates RFID, generates a QR code for authentication, and records user input for a new person's details.

7. exportAttendance:

- *Description:* Creates a CSV file with the attendance data exported in excel.

- *Apply:* writes each person's attendance information from the database to a CSV file.

8. userMenu:

- *Description:* Shows a menu for user interaction, mostly related to attendance tracking.

- *Apply*: explains how to indicate attendance and close the user menu to the user.

9. main:

- *Description:* The program's primary entry point.

- *Usage*: Executes a loop to display the main menu and directs the program based on user input.

Program Flow:

1. Admin Menu (Option 1):

- Adds a new person to the database by using the `addPerson` function.

- Records the name, role, and year entered by the user.

- Creates an RFID at random for the new user.

- Generates and stores a QR code for security.

2. User Menu (Option 2):

- Presents a user menu where users can indicate their attendance.

- For RFID-based authentication, calls the `authenticatePerson` function.

- If successful authentication, prints a success message.

3. Show Database (Option 3):

- Provides a list of every person's information in the database, such as name, role, present, and approved RFID.

4. Export Attendance (Option 4):

- This option writes each person's attendance information to a CSV file called "attendance.csv."

5. Exit (Option 5):

- Ends the application.

Conclusion:

For organizing and tracking attendance, the NCYS-PROJECT RFID Attendance System offers a comprehensive solution. The technology provides individuals with efficient and safe authentication through the use of QR codes and RFID cards. Because of the program's user-friendly design, administrators may add users, users can record attendance, and data can be exported for additional analysis.

Note: Proper installation and setup of the qrcodegen library is required for the program to function.

Group members:

1. Ovais Adnan [22K-4677]:

- Participated in the program's general layout and structure.

- Put into practice the feature for creating and displaying QR codes.

2. Hamza Khan [22K-4722]:

- Assisted with database administration and RFID authentication.

- Made a contribution to the main program loop and user interface.

3. Sohaib Jaber [22K-4751]:

 - Put the CSV export feature into practice.

 - Participated in the system's general design and testing.

The team recognizes that they worked together to create a strong RFID attendance system. The project combines a number of features to provide a comprehensive approach to tracking attendance.