UNIVERSITI MALAYA

PUSAT PENDIDIKAN BERTERUSAN
Centre for Continuing Education

UFH 2009

Application Development and Programming

INDIVIDUAL ASSIGNMENT

Name of the System:

UBAT TRACKER V0.0 (WITH DATABASE)

System Created By:

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Lecturer:

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2025

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1.0 INTRODUCTION

In modern healthcare, the transition from traditional paper-based methods to digital solutions is no longer a luxury but a necessity for patient safety and operational efficiency. A digitalized medicine tracker such as **UBAT TRACKER V0.0** serves as a vital bridge between the pharmacy and the patient, ensuring that the lifecycle of a prescription is monitored with precision.

The Need for a Digitalized System

Both pharmacists and patients face unique hurdles in the current manual landscape.

- For Pharmacies: Pharmacists often struggle with fragmented patient histories and the inability to verify if a patient is adhering to their regimen after leaving the counter.
- For Patients: Individuals, especially those with chronic conditions or complex "polypharmacy" needs, frequently struggle to remember exact dosages and timings, leading to inadvertent health risks.

A digital tracker centralizes this information, transforming a passive prescription into an active, monitored treatment plan (Cegedim Rx, 2023), (*10 Powerful Benefits of a Digital Patient Management System for Hospitals*, 2025).

Advantages of Digital Tracking

The shift to a digitalized system offers transformative benefits:

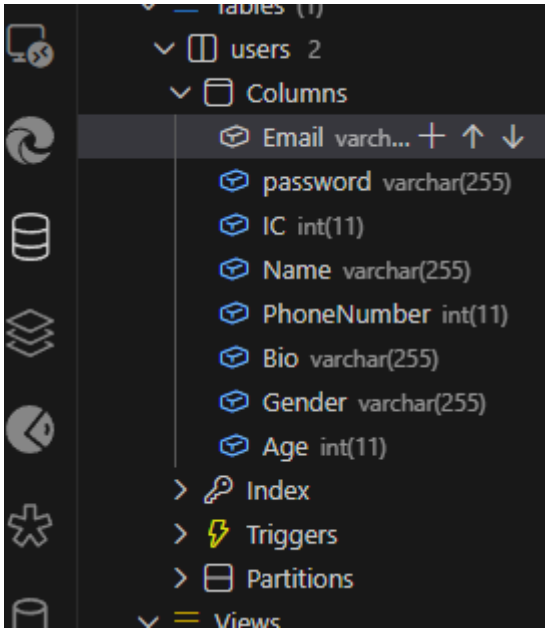
- Real-Time Data Accessibility: Pharmacists can monitor dispensing patterns instantly, while patients receive automated reminders via mobile devices to ensure timely intake.
- Error Reduction: By eliminating handwriting errors and providing automated contraindication alerts, the system significantly lowers the risk of adverse drug reactions.
- Inventory Efficiency: For the pharmacy, digital tracking allows for automated refills and better stock management, ensuring life-saving medications are always available without wasteful overstocking (*How Medication Management Systems Reduce Errors and Improve Patient Safety*, 2024).

1.1 ACKNOWLEDGEMENT

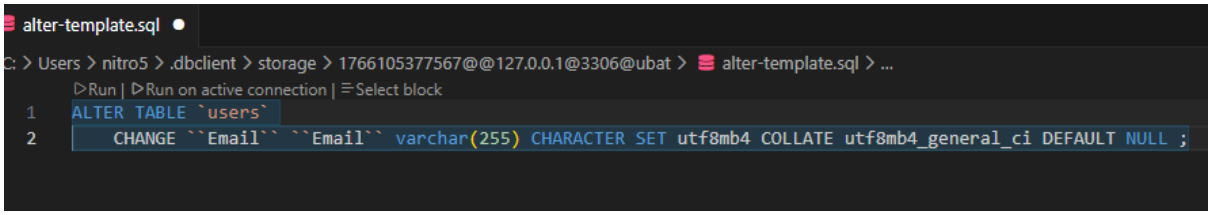
I would like to express my sincere gratitude to **Dr. Ang Tan Fong** for his invaluable guidance and mentorship throughout this project. His profound knowledge in the field of **Computer Programming** has been a constant source of inspiration. I am deeply grateful for his professional approach to teaching and his willingness to provide clarity and support at every stage of my project.

1.2 HISTORY OF THE PREVIOUS PROJECT UBAT TRACKER V0.0

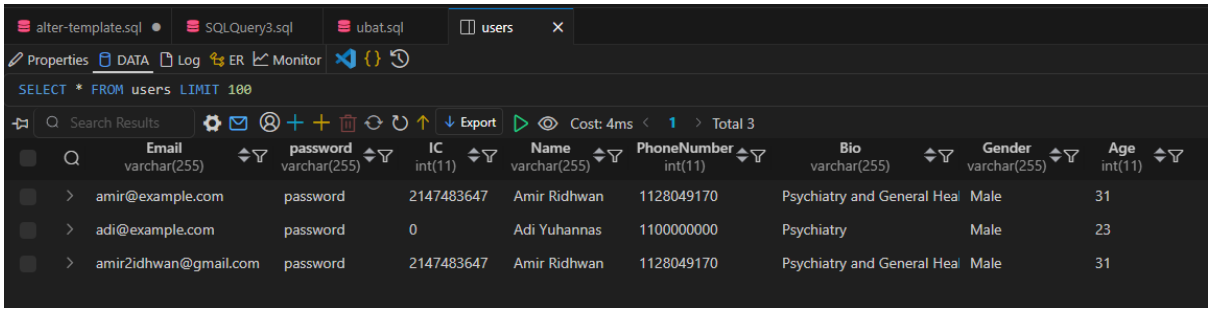
For my previous subject, "UFH1004 Programming Concepts", I already developed the prototype of the system. The system name is UBAT TRACKER V0.0. The system already implemented database design using MySQL and using MySQL Workbench 8.0 CE. To edit the database information, I use SQL syntax. By using Microsoft Visual Studio Code, I input the SQL syntax into the Query. It is much harder to implement as I am a beginner in using database.



I use extension in Microsoft Visual Studio Code called Database. It connects the database in MySQL Workbench 8.0 CE to Visual Studio Code.



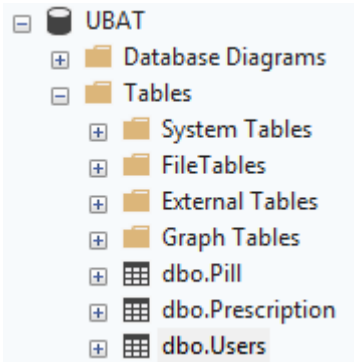
Second image showed how to run the SQL syntax to create, edit, update, and delete the database named UBAT. In my experience, even a slight mistake in spelling or wrong SQL Syntax can messed up the database.



All available data/information in the database named UBAT. This view is the same as SQL Server Management Studio > Select Top 1000 Rows. However key differences here are the view of the database in the old UBAT TRACKER V0.0, I can only view using Microsoft Visual Studio Code extension, meanwhile the SQL Server Management Studio can view on the interface itself. Perhaps there is a way to view the table of the database in the MySQL Workbench 8.0 CE, but for now I cannot find how to use it.

Exporting the Database

My old prototype system cannot export the database file. I for the life of me, cannot find a way on how to export MySQL database file to be used on another machine. That is why, with guidance from Professor Ang Tan Fong, I modify the system to implement the Microsoft SQL Server and use SQL Server Management Studio as GUI for designing the database. With SQL Server Management Studio, I can export the database to another machine. Thus, allowing the project to be run by my professor for evaluation.



2.0 OBJECTIVES

For now, the name UBAT TRACKER V0.0 WITH DATABASE will be just called system for simplicity's sake. To ensure the system has a strong foundation, the objectives should be SMART (Specific, Measurable, Achievable, Relevant, and Time-bound). Here are the key objectives for the system categorized by their focus area:

2.1 PRIMARY OBJECTIVE

The main objective of the system is to handle patient's data in focusing on list of medicines that the patients received from pharmacy. This system can track the number of pills and assign medicines according to diagnosis from the Doctor. This system can bridge the communication gap between pharmacists and patients by providing a centralized, real-time platform for medication monitoring to ensure therapeutic efficacy and patient safety.

2.2 FUNCTIONAL OBJECTIVES (SAFETY & ACCURACY)

- Eliminate Dosage Errors: To minimize the occurrence of overprescribing (by tracking refill frequencies) and under prescribing (by flagging missed doses or delayed refills).
- Digital Prescription Verification: To replace manual paper prescriptions with digital versions to prevent forgery and transcription errors.

2.3 OPERATIONAL OBJECTIVE

- Inventory Optimization: To enable pharmacies to predict medication demand based on real-time patient refill data, reducing waste and stockouts.

Objective	**Benefit to Pharmacy (PPUM)**	**Benefit to Patient (User)**
Tracking Refills	Prevents drug abuse/misuse.	Ensures continuous supply of medicine.
Automated Alerts	Reduces administrative follow-up calls.	Improves health outcomes via adherence.
Data Analytics	Provides insights into patient health trends.	Gives a clear history of their own treatment.

3.0 SYSTEM FEATURES

3.1 USER REGISTRATION

Users need to register details for the system. The main login system needs to be authenticated users securely. Different email addresses need to be using different passwords. The emails address cannot be used as the passwords to avoid breaching the main login system. The main login page needs to have input sanitization to avoid user inputting complex character that led to incorrect data input. The textbox fields need to be clear if the users input wrong email/password. The textbox field of password need to use password char masking to avoid the password being typed as plaintext. However, there is limitation of this system. This system uses unencrypted database because this is only prototype. Usually handling medical data requires strict adherence to privacy standards (like HIPAA or GDPR). Including a "Secure Data Encryption" feature would be an improvement for later assignment project.

3.2 DATA MANAGEMENT

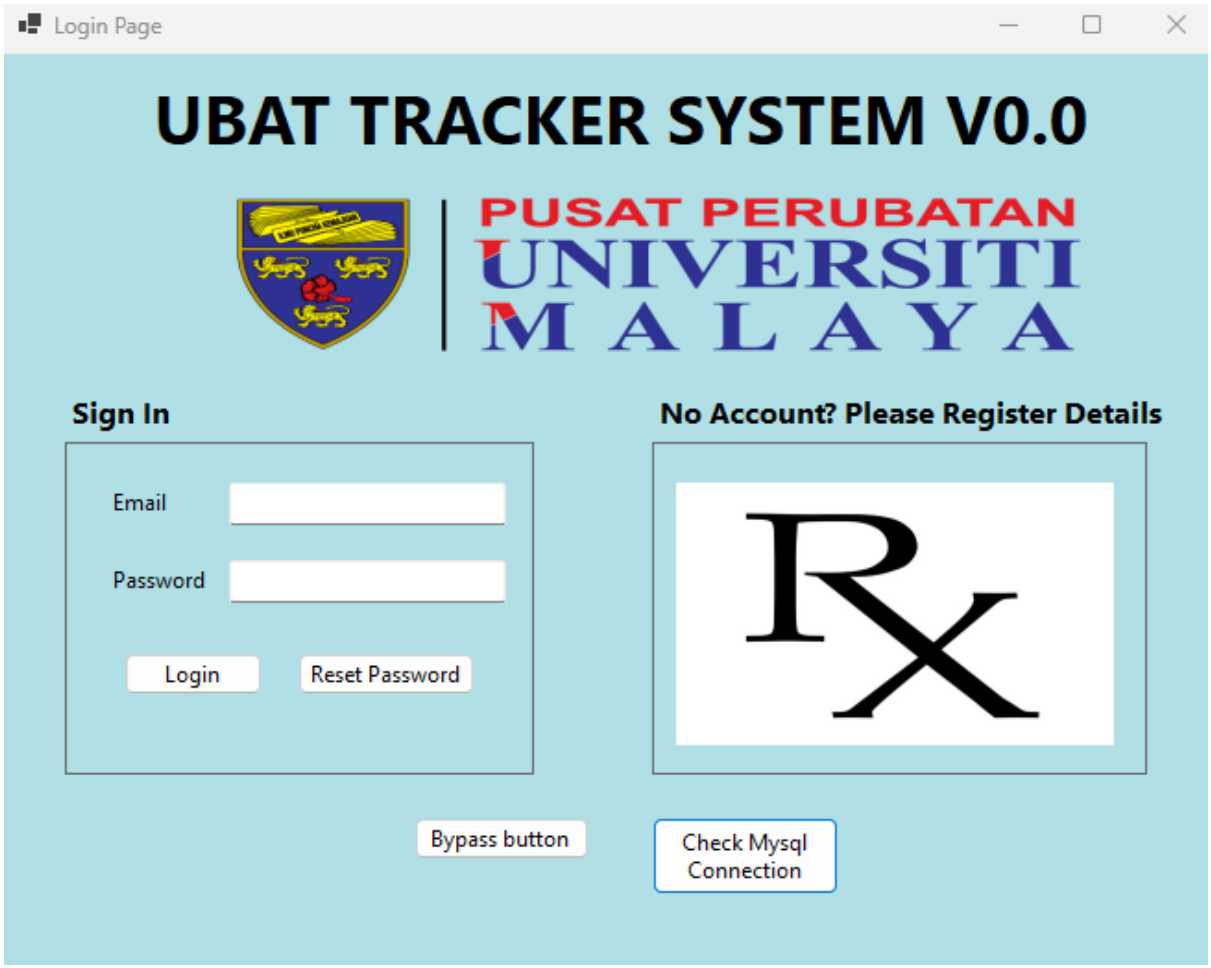
The data management Main Dashboard has been upgraded. The data can be managed from Main Dashboard that categorized the data according to categories. For example, New pictureBox of “Add New Pill” function as dashboard for pharmacist to add new pill, update pill information and delete pill in the inventory of the system. pictureBox “Change Details” will edit existing patient’s details such as Full Name, IC, Age, and other information details. I am also adding pictureBox Prescription. This dashboard link patient’s IC with his/her pill, what kind of disease, pill dosage and pill quantity. This information with alongside patient’s details will be linked together in the database.

3.3 REPORTING AND ANALYTICS

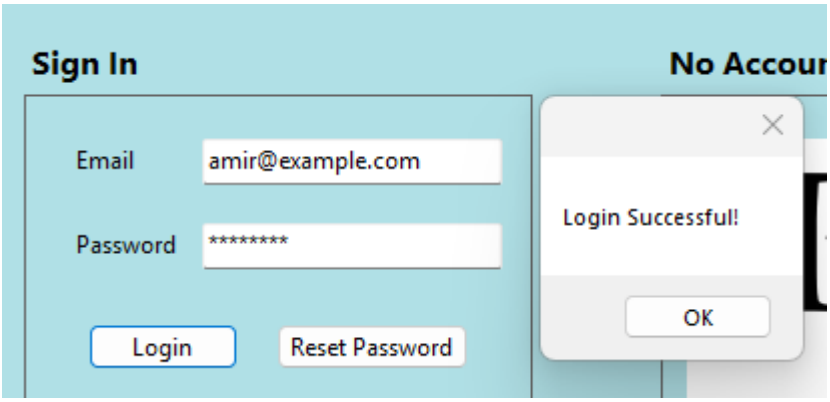
This is upgraded version of the system reporting interface. It uses Microsoft RDLC Report Designer which can create interface that combine different tables in database UBAT to create a meaningful information. Which in this case, a prescription/dispenser medicine report. Old version of prototype of the system can only generate report using one table in database. That is because I lack knowledge on how to merge table using SQL query syntax in MySQL Workbench 8.0 CE.

4.0 USER INTERFACE DESIGN

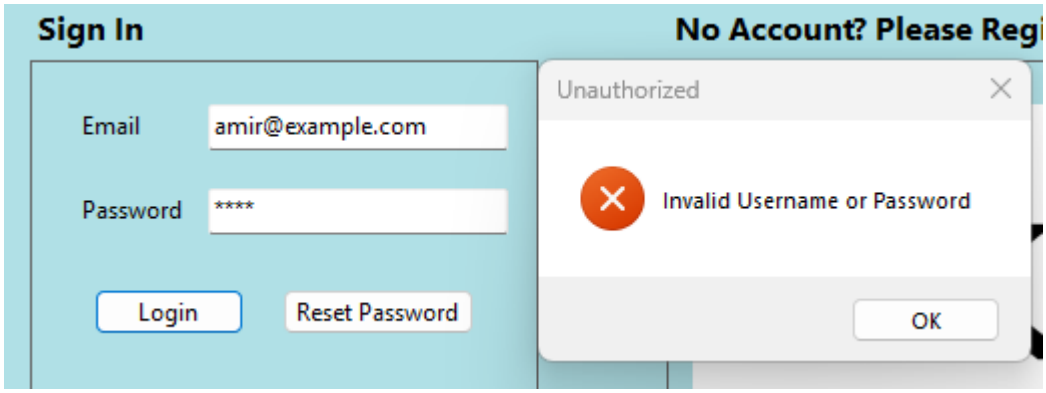
4.1 LOGIN PAGE



Sign In for Users that have registered in the system. No Account? Please Register Details is for new Users that have no details in the system.

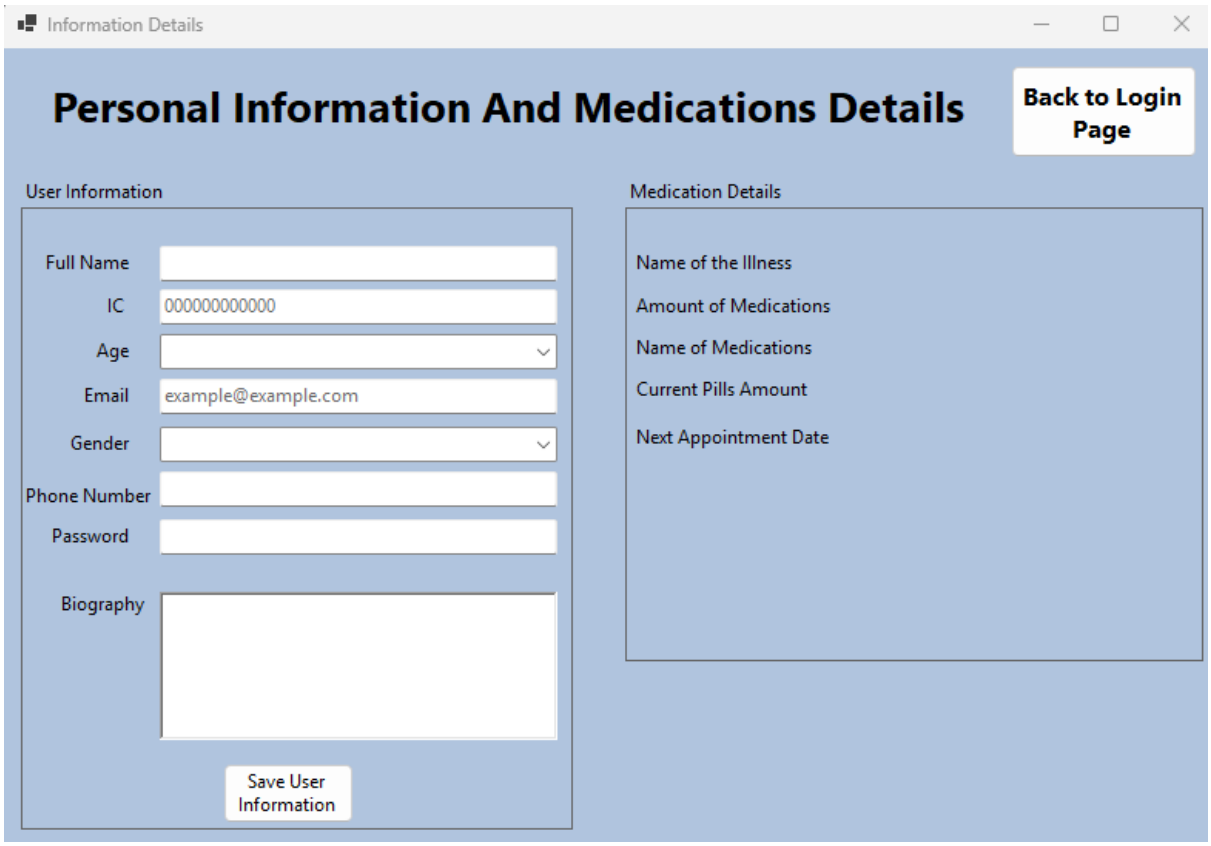


Example of successful login. The password text field is masked by character * to avoid plaintext input.

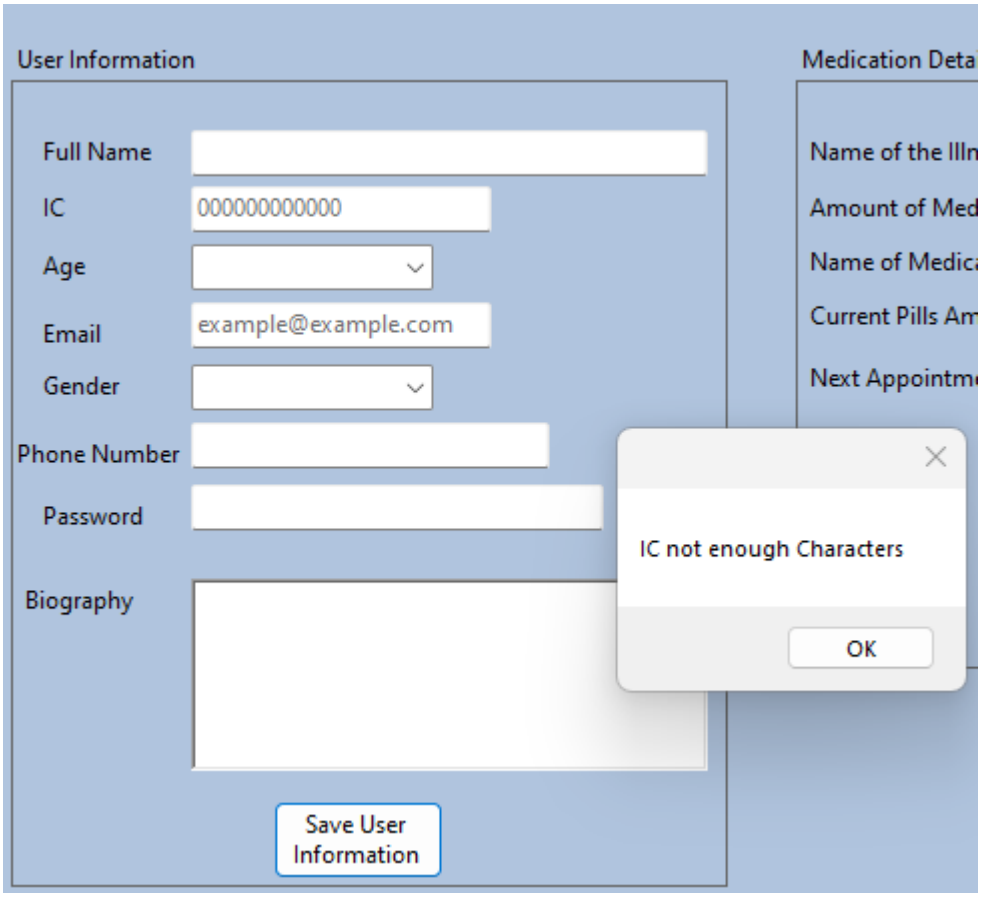


Example of failed login. Reset Password button function as clearing both textbox Email and Password for User to login again.

4.2 PERSONAL INFORMATION DETAILS

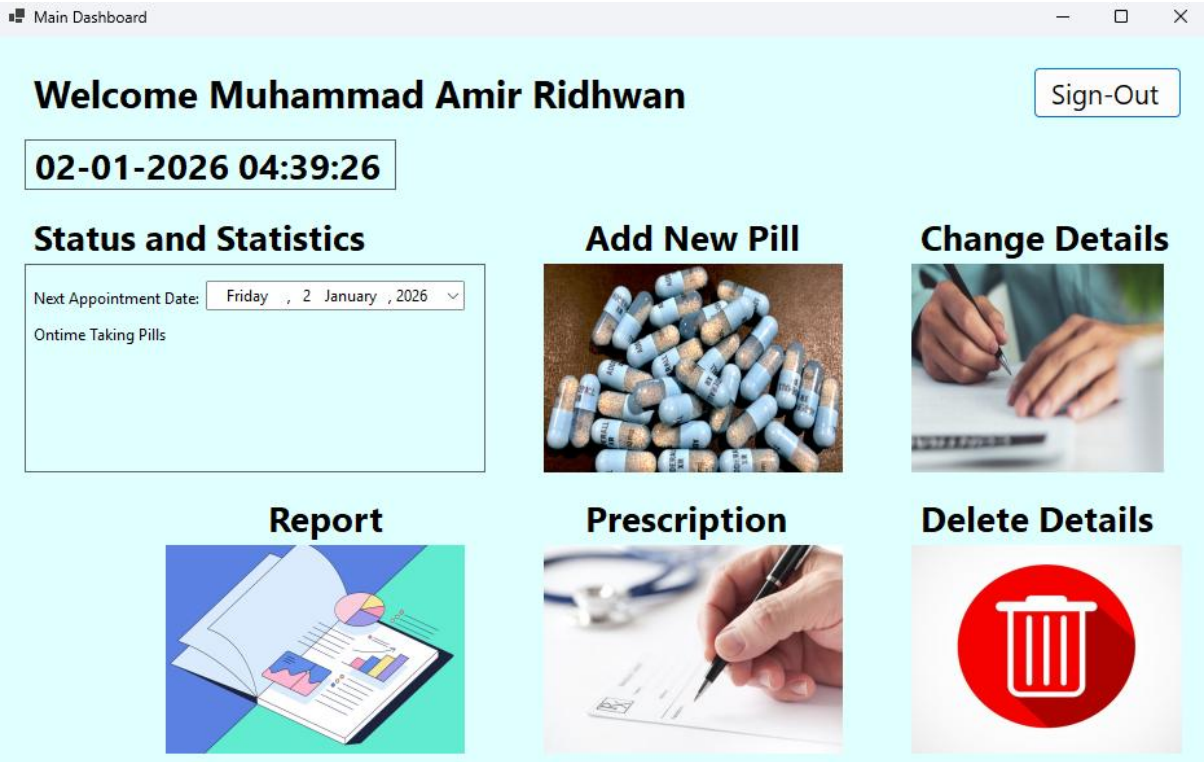


This section is for user to key in their details. Because it contains sensitive information, input sanitization is being used for different types of textboxes. For example, for the textbox IC, the user can only input number and restricted to 12 digits. This is because IC is unique identifier for each user. The Medication Details was my old attempt to create a user inputting information about their medication. But it is now replaced with new category in the Main Dashboard.

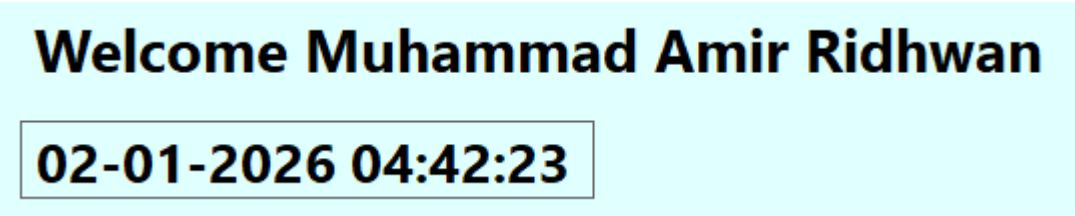


Example of input sanitization for field IC. Each field have different input sanitization for different input data. This is ensuring the users did not make a mistake during the process of registration of the system.

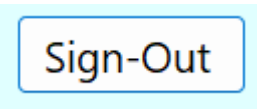
4.3 MAIN DASHBOARD



Main Dashboard for data management. For Status and Statistics, it still not functioning because I do not have knowledge on how to link datetime variable to make a scheduling appointment. But other data management categories are working.

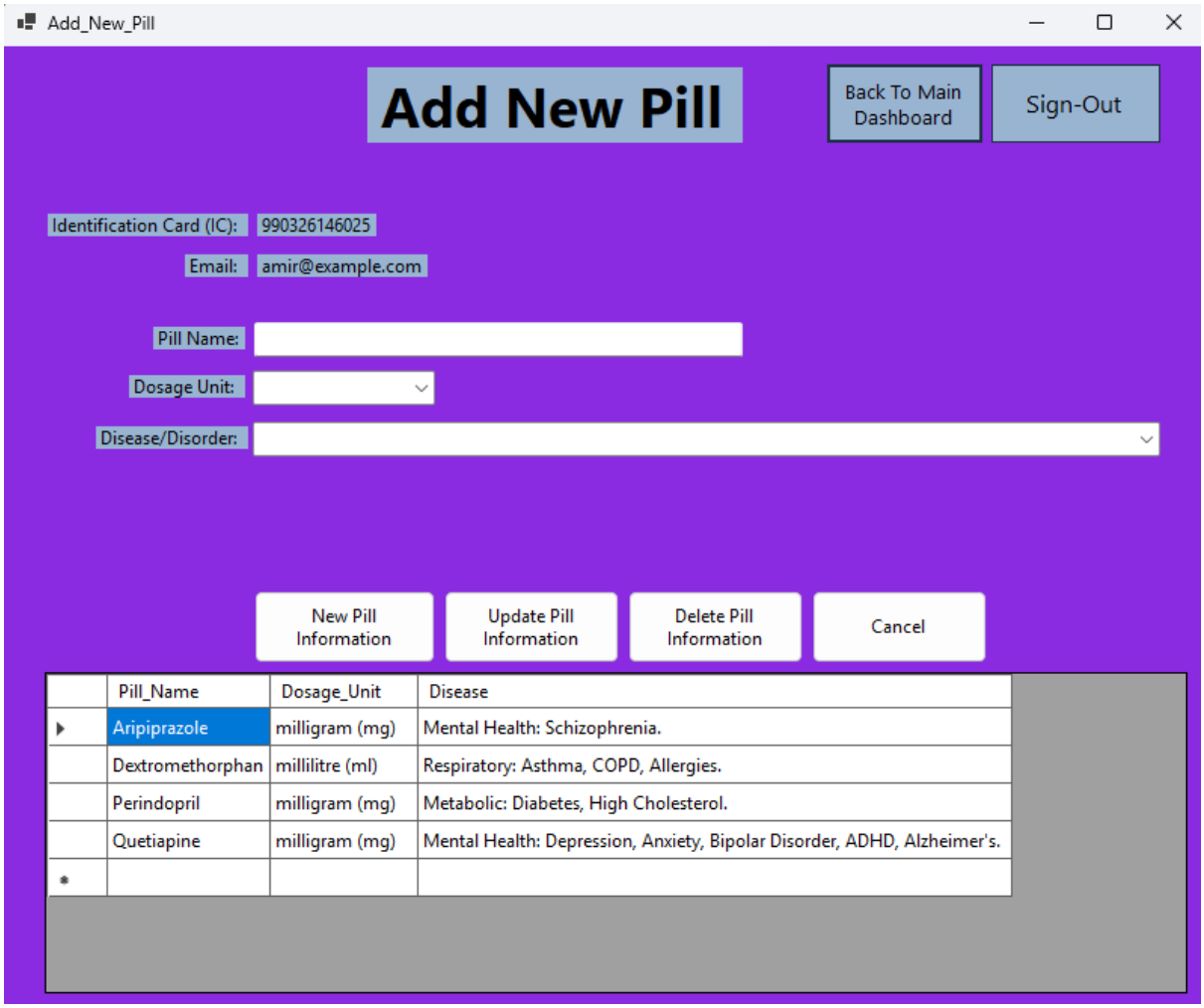


Good thing about database is the integration of information. I can pull the data from specific column in the database. Which in this case, the name of the patient/user. And then I can display it on the Main Dashboard to ensure that the right patient/user using the right data management. I also integrate the datetime below the name to check the time.

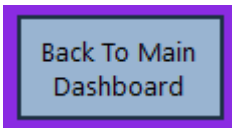


Every page/Form have dedicated Sign-Out button for exiting the system.

4.4 ADD NEW PILL

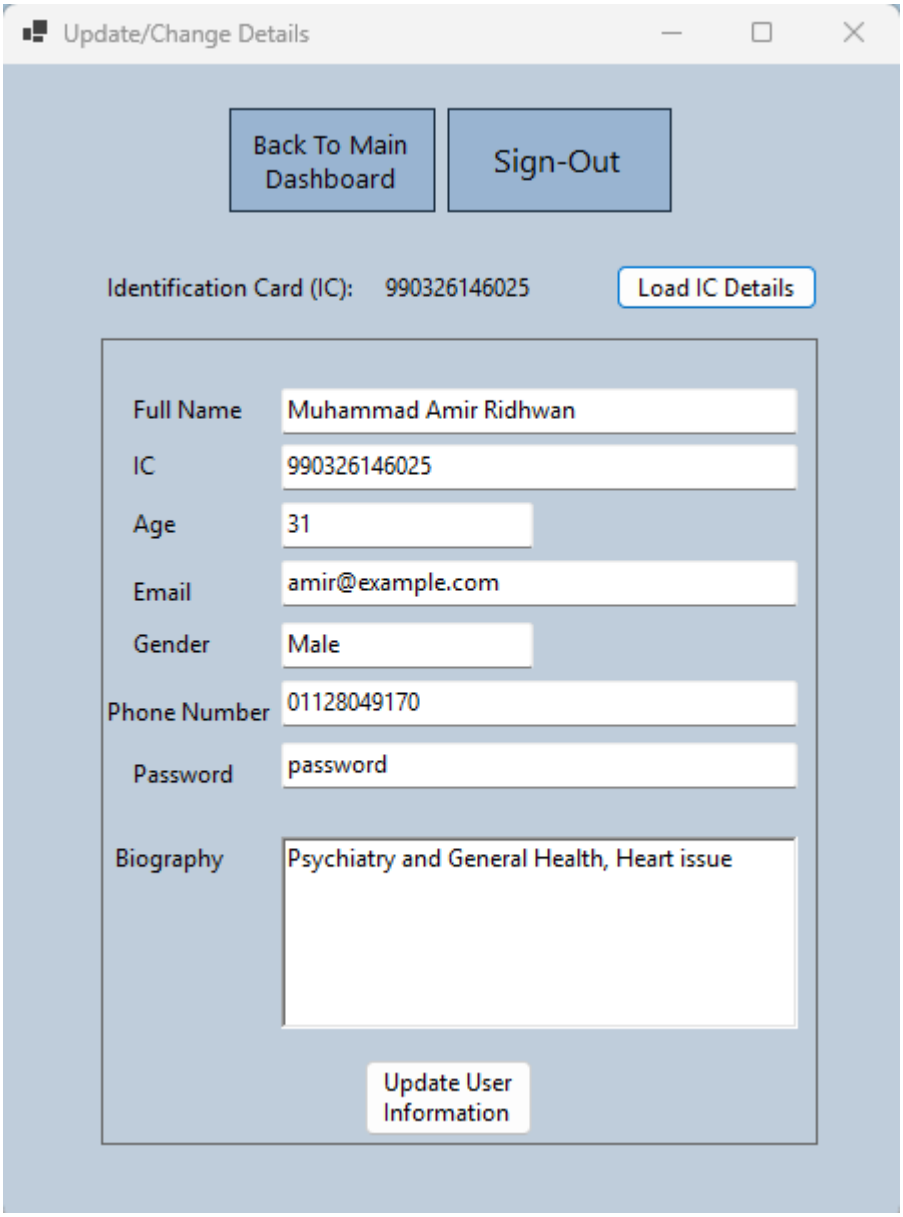


Old prototype has incomplete section of this data management. In this upgraded prototype system, Add New Pill functioning as collection of pill data, from pill name, dosage unit of the pill and what treatment the pill to treat disease/disorder. This section of data management can enable pharmacist to add new pill information, update pill information and delete pill from inventory. This information will be saved into different table called “Pill”. Why is this table important? Because adding pill information to table “Users” can lead to overflow of data which redundancy can occur. Because one user can have many pills. So table “Pill” is created to segregate the information between the users and pill.

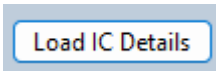


Some Form have this button to enable Users to go back to Main Dashboard.

4.5 CHANGE DETAILS

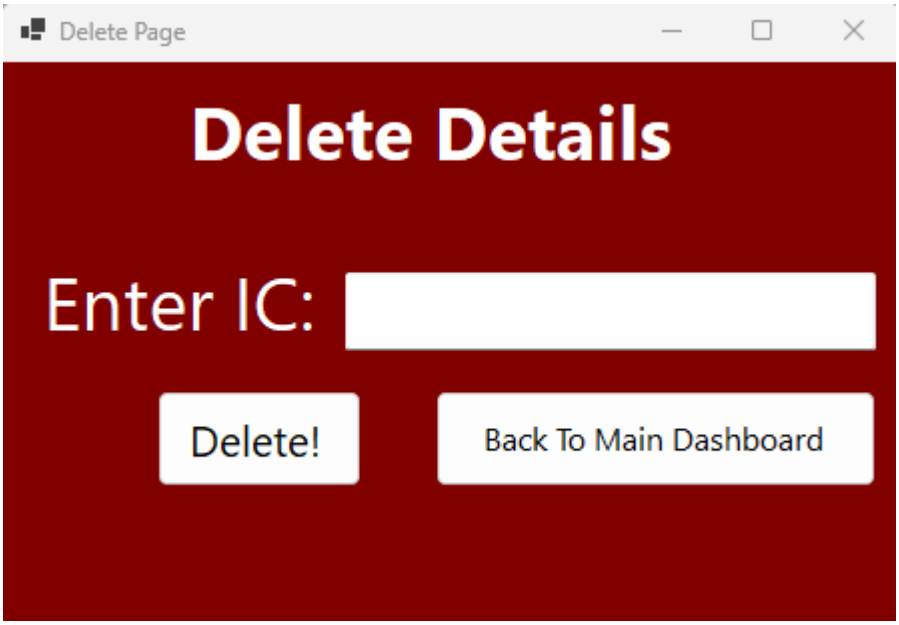


Change Details data management relate to User's information. To avoid User, edit or make unauthorized changes to other users' data, the Change Details hardcoded code that only registered user IC can edit his/her information. Thus, this increases the security of the system.



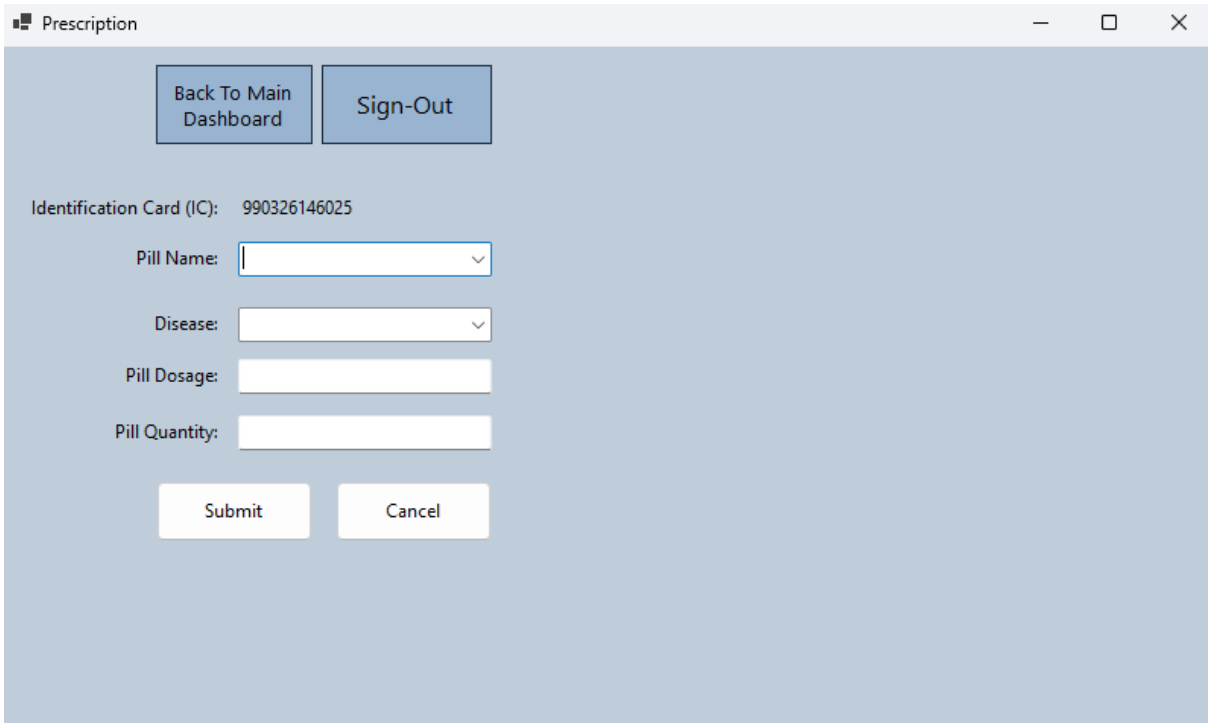
To make it simpler for the User to edit data, this button loads the data stored in the database that saved before User want to make edit. This button only loads the data available according to the User's IC. So there no cross information saved in the database.

4.6 DELETE DETAILS



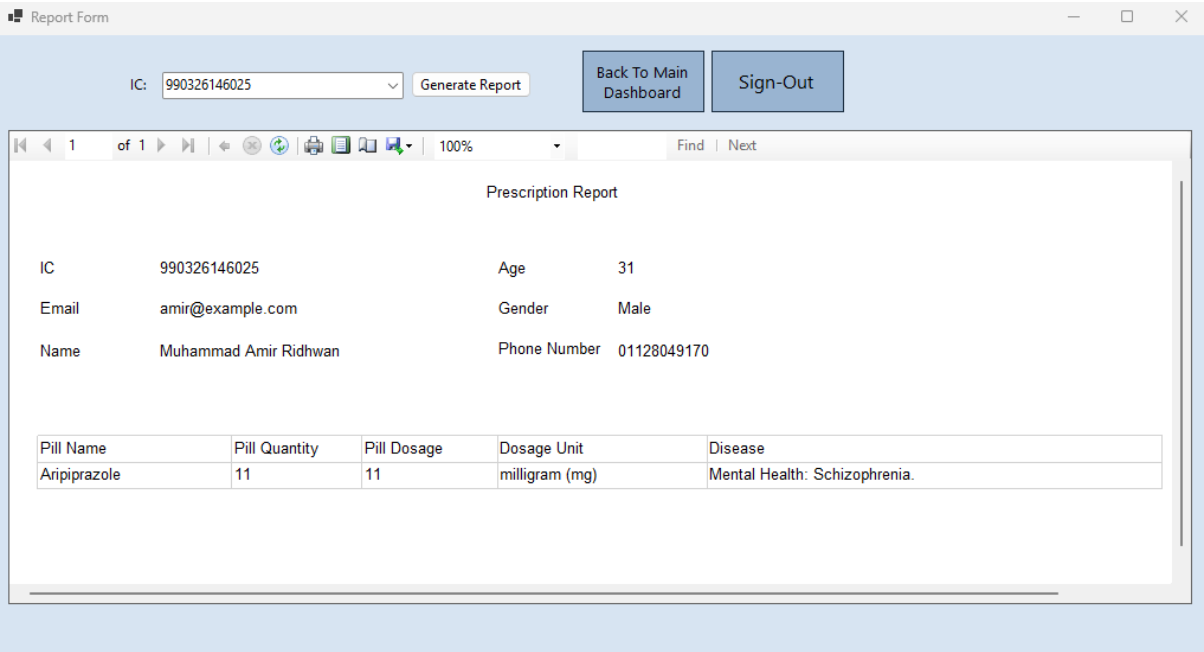
This Delete Page is to enable Admin to delete all details of the User information. But because I change the database system from MySQL Workbench 8.0 CE to Microsoft SQL Server Management Studio, this function is now obsolete. But for future development, this can be developed to add functionality of the system.

4.7 PRESCRIPTION



This Prescription page is for linking the user with pill information. This is where the two table make a connection. According to Entity Relationship Diagram, one user can have many pills. Same as Update/Change Details page, only one IC can be assigned to avoid mix-up between users. Prescription contain Pill Name, Disease, Pill Dosage and Pill Quantity. Submit button will save the details into new table called Prescription. Prescription table is important in Report section.

4.8 REPORT



Report Form contain Prescription Script. This report can be used as prescription slip for user to buy medicine from pharmacy. Generate Report Button create a list of pills and add user information to ensure the right user information get the right pill.

5.0 CONCLUSION

The development of UBAT TRACKER V0.0 WITH DATABASE provide me as a student a valuable learning experience in software development design and implementation. Using VB.Net platform open possibility for quick prototype of software development that can cater to different requirements.

To summarize, the implementation of this system addresses the systemic inefficiencies found in manual pharmaceutical tracking. By leveraging real-time synchronization and secure database management, the system creates a robust framework for medication safety. The integration of features such as refill frequency locks provides a technical solution to the human errors of over- and under-dosage. As the field of Computer Science continues to transform healthcare, this tracker stands as a scalable and secure model for modernizing the relationship between pharmaceutical technology and patient well-being.

6.0 REFERENCES

References

10 Powerful Benefits of a Digital Patient Management System for Hospitals. (2025, February 12). SoftClinic GenX | Hospital Management Software. https://www.softclinicsoftware.com/digital-patient-management-system-benefits/#:~:text=%E2%9C%85%20Cloud%2Dbased%20storage%20allows,5.

Cegedim Rx. (2023, August 8). *Saving Time and Money: The Advantages of a Prescription Tracking System for Your Pharmacy*. Cegedimrx.co.uk; Cegedim Rx Limited. https://cegedimrx.co.uk/blog/saving-time-and-money-the-advantages-of-a-prescription-tracking-system-for-your-pharmacy#:~:text=This%20serves%20as%20the%20single,tracking%20system%20for%20your%20pharmacy

How Medication Management Systems Reduce Errors and Improve Patient Safety. (2024). Omnicell.co.uk. https://www.omnicell.co.uk/resource-library/article/how-medication-management-systems-reduce-errors-and-improve-patient-safety/#:~:text=Real%2DTime%20Inventory%20Tracking%3A%20Automated,or%20overstocking%20issues%20are%20avoided.