Project Report – libmansys (Library Management System)

Course: Object-Oriented Language and Theory (Java)

1. Introduction

This project aims to create a software to serve a small library with basic functions for readers and a librarian/administrator. The reason why we choose this topic to create the software is that the problem gives us a lot of potential to apply the object-oriented thinking to construct the software itself.

This software is the work of 4 people: Nguyen Dang Ninh, Nguyen Truong An, Luong Minh Triet and Truong Tuan Nghia

2. Technology used in the software

* Java: For object-oriented programming
* Swing: For GUI construction
* PostgreSQL: For database management

3. Project description

Here’s an overview of the software functions and targets

* We have two targets: NormalUser (Readers) and Librarian (Admin)
* Both NormalUser and Librarian can login, logout, register for new account and view all the books the library currently having. For viewing current books borrowing and history of borrowing books, Librarian and NormalUser has their own implementation since the two functions are abstract

\* General use case diagram:

Diagram

Description automatically generated

4. What we have learned from this project

It took many weeks for us to finish this project. Throughout the process, we have learned a lot about:

* Teamwork
* Using Github to collaborate
* The gist of object-oriented programming
* Learned how to use Java, how to create a GUI using Java Swing
* Learned how to hook a database to our software and how to manipulate the database using the software

5. Java OOP techniques applied in the software

* Inheritence: Here, NormalUser and Librarian is inherited from User
* Override: NormalUser and Librarian override two functions of User: viewHistory and viewCurrentBooks
* Encapsulation:
  + Using private fields to hide sensitive information. Access to those fields is only possible using getters/setters
  + Data abstraction: Has a separate class for handling Database connection, which hides information of the database (database’s login information)
* Exception handling: Frequent use of try/catch blocks for handling exceptions (usually in database-related functions)
* Using ActionListener to react to user’s interaction to the software
* Manipulation of results obtained from using SQL queries on the database