Phase 4: Testing and Refactoring

1. Introduction

1.1 Purpose

This document was written to demonstrate the testing & refactoring procedures conducted by the Chaotic Coders group, otherwise known as Group #3, in accordance with their hotel reservation application project. This application is designed to display hotel rooms from different hotels and allow users to create, edit, and cancel their reservations. In addition, it is designed to allow manager accounts for hotel moderation, with acts such as editing or adding rooms, or changing the details of a hotel. The program will also come with numerous other features, however this document will not go into the specifics of that but rather the process of how the code was refactored and tested to ensure proper efficiency. It was modified numerous times across development phases in order to exemplify an organized structure. The general look of the code has indeed changed thoroughly over time.

Each member contributed to this project phase, and here are the contributions in detail:

Alex: This phase I was able to get the database fully integrated with the application and start only using the database instead of using a lot of memory on objects.

Ethan: In this phase of the project, I mainly did refactoring work and modified reservations a lot, so they now hold IDs instead of the actual objects. In addition, reservation methods are now obtained from the managers rather than the actual classes to improve organization and readability. Although a couple things still need to be modified, I was able to accomplish quite a few aspects of the refactoring for reservations.

Minas: In this phase of the project, I finished “Edit my account” with its different options such as change name, password, delete account etc. I started working on “View all reservations” for the manager, which will allow us to see all current reservations. Also started working on “Edit Hotel”.

Nura: In this phase of the project, I completely finished the Login and Sign Up screens. I started working on View reservation, then I’ll work on Make reservation, and finally work on Select hotel for User and Manager.

In addition, each member has contributed to this report:

Alex: For this report, I wrote 4. Refactoring as well as added Junit tests for the account classes User and Manager.

Ethan: For this report, I wrote the introduction section and wrote the class testing for the reservation class. I also contributed to the validation testing section.

Minas: For this report, I was responsible for writing the class testing for the Hotel class.

Nura: For this report, I am responsible for writing the class testing for Room Class.

In all, the purpose of this document is to display how we are going about testing and refactoring this project's code. More details will be addressed in the sections below, which include unit testing, validation testing, and refactoring.

1.2 Definitions, Acronyms or Abbreviations

There are a few definitions, acronyms, or abbreviations that are included in this document.

List of definitions, acronyms and abbreviations:

JDBC - Java Database Connector

SQL - Structured Query Language

1.3 References – Any references used in this document

We have not used any references for this paper.

Note: If you are a group of four then split your group into two pairs. Each pair separately performs number 2 and 3 below. Compile the results in this report and submit.

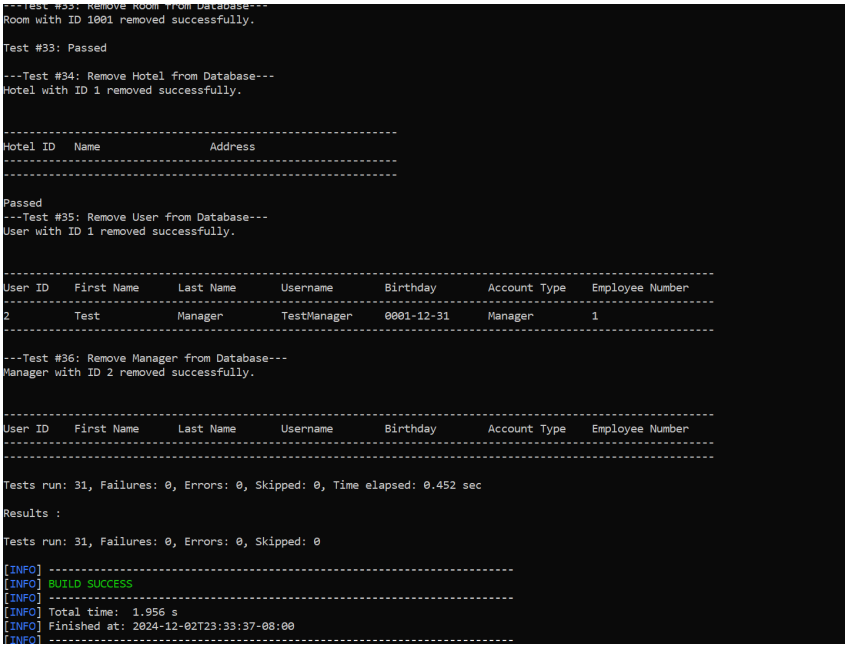
2. Unit Testing – (Provide screen shots of testing results)

You should perform automated unit testing such as use Junit in JAVA, PyUnit/PyTest in Python, etc.

2.1 Class Testing

```
-------------------------------------------------------
 T E S T S
-------------------------------------------------------
Running com.hotelapplication.TestClass
SLF4J: Failed to load class "org.slf4j.impl.StaticLoggerBinder".
SLF4J: Defaulting to no-operation (NOP) logger implementation
SLF4J: See http://www.slf4j.org/codes.html#StaticLoggerBinder for further details.
Connection to H2 database successful!
Hotels table created/found.
Users table created/found.
Rooms table created/found.
Reservations table created/found.
Database cleared successfully.
---Test #1: Create User---
---Test #2: Add User to Database---
User with ID 1 updated successfully.
User added successfully to the database with ID: 1

-----------------------------------------------------------------------------------------------------------
User ID    First Name      Last Name       Username        Birthday        Account Type    Employee Number
-----------------------------------------------------------------------------------------------------------
1          Test            User            TestUser        0001-12-31      User            N/A
-----------------------------------------------------------------------------------------------------------

---Test #3: Sign in---
---Test #4: Sign out---
---Test #5: Create Manager---
---Test #6: Add Manager to Database---
User with ID 2 updated successfully.
User added successfully to the database with ID: 2

-----------------------------------------------------------------------------------------------------------
User ID    First Name      Last Name       Username        Birthday        Account Type    Employee Number
-----------------------------------------------------------------------------------------------------------
1          Test            User            TestUser        0001-12-31      User            N/A
2          Test            Manager         TestManager     0001-12-31      Manager         1
-----------------------------------------------------------------------------------------------------------

---Test #7: Sign in Manager---
---Test #8: Sign out Manager---
---Test #9: Edit User First Name---
User with ID 1 updated successfully.
---Test #10: Edit User Last Name---
User with ID 1 updated successfully.
---Test #11: Edit Username---
User with ID 1 updated successfully.
---Test #12: Update User in Database---
User with ID 1 updated successfully.

-----------------------------------------------------------------------------------------------------------
User ID    First Name      Last Name       Username        Birthday        Account Type    Employee Number
-----------------------------------------------------------------------------------------------------------
1          User            Test            NewUsername     0001-12-31      User            N/A
2          Test            Manager         TestManager     0001-12-31      Manager         1
-----------------------------------------------------------------------------------------------------------

---Test #13: Create Hotel---
Passed
---Test #14: Add Hotel to Database---
Hotel with ID 1 updated successfully.
New hotel added successfully with Hotel ID: 1


-------------------------------------------------------------
Hotel ID   Name                Address
-------------------------------------------------------------
1          TestHotel           123 Address St, City, State
-------------------------------------------------------------

Passed
---Test #15: Edit Hotel Name---
Hotel with ID 1 updated successfully.
Passed
---Test #16: Edit Hotel Address---
Hotel with ID 1 updated successfully.
Passed
---Test #17: Update Hotel in Database---
Hotel with ID 1 updated successfully.
Passed
---Test #18: Create Room---
Test #18: Passed

---Test #19: Add Room to Database---
New room added successfully
```

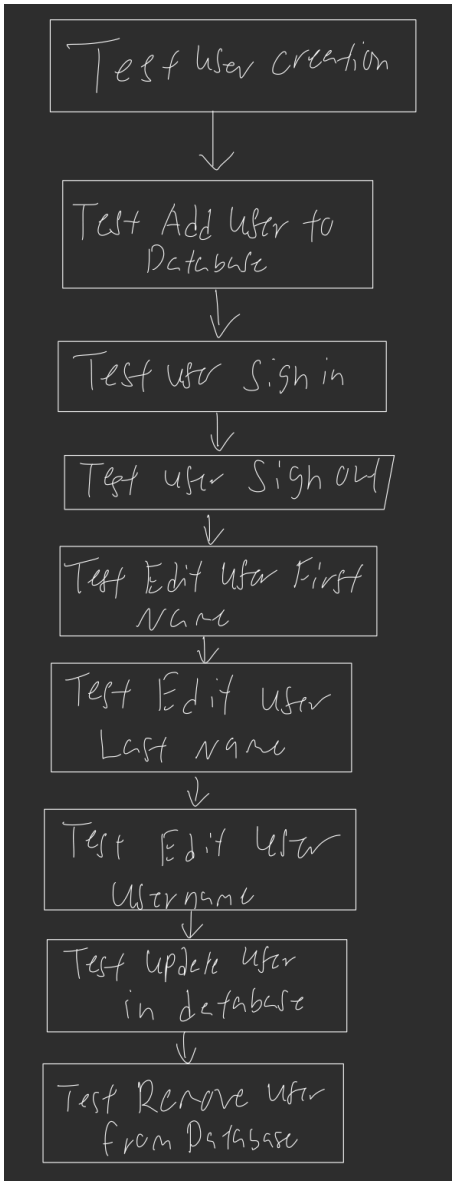
```
Test #18: Passed

---Test #19: Add Room to Database---
New room added successfully
Test #19: Passed

---Test #20: Add Room to Hotel---
Test #20: Passed

---Test #21: Edit Room Bed Type---
Test #21: Passed

---Test #22: Edit Number of Beds in Room---
Test #22: Passed

---Test #23: Edit Room Price Per Night---
Test #23: Passed

---Test #24: Edit Room Description---
Test #24: Passed

---Test #25: Update Room in Database---
Room with ID 1001 updated successfully.
Test #25: Passed

---Test #26: Create Reservation---
Passed
---Test #27: Add Reservation to Database---

**********
User: User Test
Username: NewUsername
Birthday: 12/02/2024
Number of Reservations: 0
**********
Reservation added successfully to the database.
Passed
---Test #28: Edit Reservation Start Date---
Passed
---Test #29: Edit Reservation End Date---
Passed
---Test #30: Edit Reservation Total Price---
Passed
---Test #31: Update Reservation in Database---
Reservation with ID 1 updated successfully.
Passed

------------------------------------------------------------
Hotel ID   Name                Address
------------------------------------------------------------
1          New Hotel Name      New Address
------------------------------------------------------------


-------------------------------------------------------------------------------------------------------
Room ID    Hotel ID   Room Number     Bed Type        Num of Beds     Price per Night Room Description
-------------------------------------------------------------------------------------------------------
1001       1          1               twin            1               130.00          Updated Room Description
-------------------------------------------------------------------------------------------------------


-------------------------------------------------------------------------------------------------------------
User ID    First Name      Last Name       Username        Birthday        Account Type    Employee Number
-------------------------------------------------------------------------------------------------------------
1          User            Test            NewUsername     0001-12-31      User            N/A
2          Test            Manager         TestManager     0001-12-31      Manager         1
-------------------------------------------------------------------------------------------------------------


-----------------------------------------------------------------------------------------
Reservation ID  User ID    Room ID    Hotel ID   Check-In Date   Check-Out Date  Total Cost
-----------------------------------------------------------------------------------------
1               1          1001       1          1111-01-10      2222-02-22      150.00
-----------------------------------------------------------------------------------------

---Test #32: Remove Reservation from Database---
Reservation with ID 1 removed successfully.

Passed
---Test #33: Remove Room from Database---
Room with ID 1001 removed successfully.

Test #33: Passed

---Test #34: Remove Hotel from Database---
```


---Test #33: Remove Room from Database---
Room with ID 1001 removed successfully.
Test #33: Passed
---Test #34: Remove Hotel from Database---
Hotel with ID 1 removed successfully.
Hotel ID Name Address
Passed
---Test #35: Remove User from Database---
User with ID 1 removed successfully.
User ID First Name Last Name Username Birthday Account Type Employee Number
2 Test Manager TestManager 0001-12-31 Manager 1
---Test #36: Remove Manager from Database---
Manager with ID 2 removed successfully.
User ID First Name Last Name Username Birthday Account Type Employee Number
Tests run: 31, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.452 sec
Results :
Tests run: 31, Failures: 0, Errors: 0, Skipped: 0
[INFO] BUILD SUCCESS
[INFO] Total time: 1.956 s
[INFO] Finished at: 2024-12-02T23:33:37-08:00

2.2 Independent Path Testing

Each pair in the team draws the Flow Graph, determine the independent paths, prepare test cases and compare the results.

2.2.1 Flow Graph and Independent paths



2.2.2 Test cases and Test results – compare the test results with the expected values. If it is difficult to automate such tests then perform manual testing.

a) Test case b) Expected Value c) Test Results d) Conclusion: Passed/Not Passed

Test case 1:

a) Test user creation
b) Expected value: user is created successfully
c) Test result: test passed, user is created
d) Conclusion: passed

Test case 2:

e) Test hotel creation
f) Expected value: hotel is created successfully
g) Test result: test passed, hotel is created
h) Conclusion: passed

Test case 3:

i) Test room creation
j) Expected value: room is created successfully
k) Test result: test passed, room is created
l) Conclusion: passed

Test case 4:

m) Test reservation creation
n) Expected value: reservation is created successfully
o) Test result: test passed, reservation is created
p) Conclusion: passed

3. Validation Testing

Each pair in the team chooses at least one requirement from Requirement Analysis and performs validation tests. Provide appropriate screenshots of GUI to show the test being carried out.

First validation test:

(3.1) Requirement name: The requirement is allowing users to log in with valid credentials.

(3.2) ECs:

1. Valid EC: Username exists, and password matches
2. Invalid EC: Username exists, but password is incorrect / Username does not exist / Empty username or password fields / Password length below the minimum required

(3.3) Test Cases and Test Results:

Test case 1:

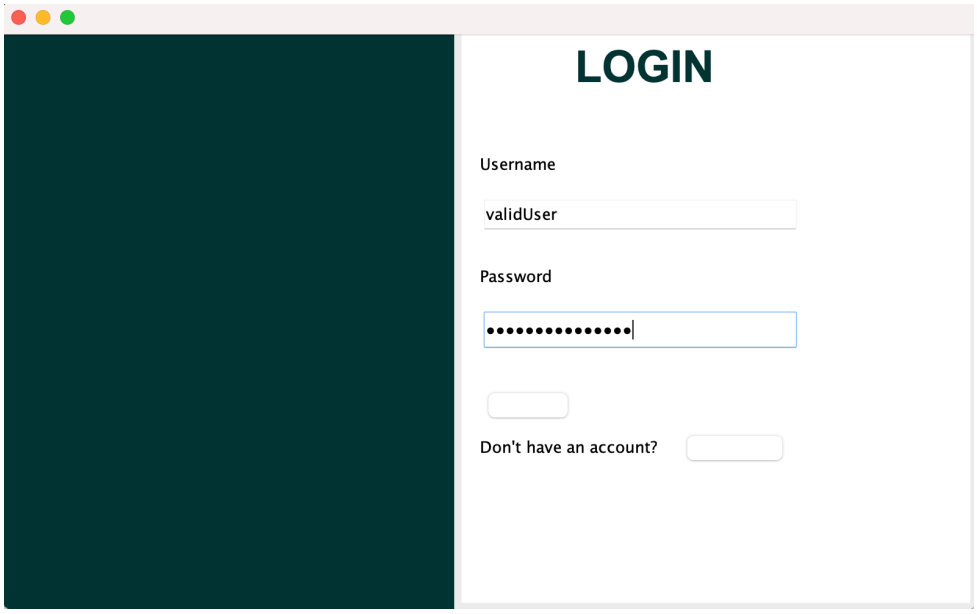
Input: Username: validUser | Password: correctPassword

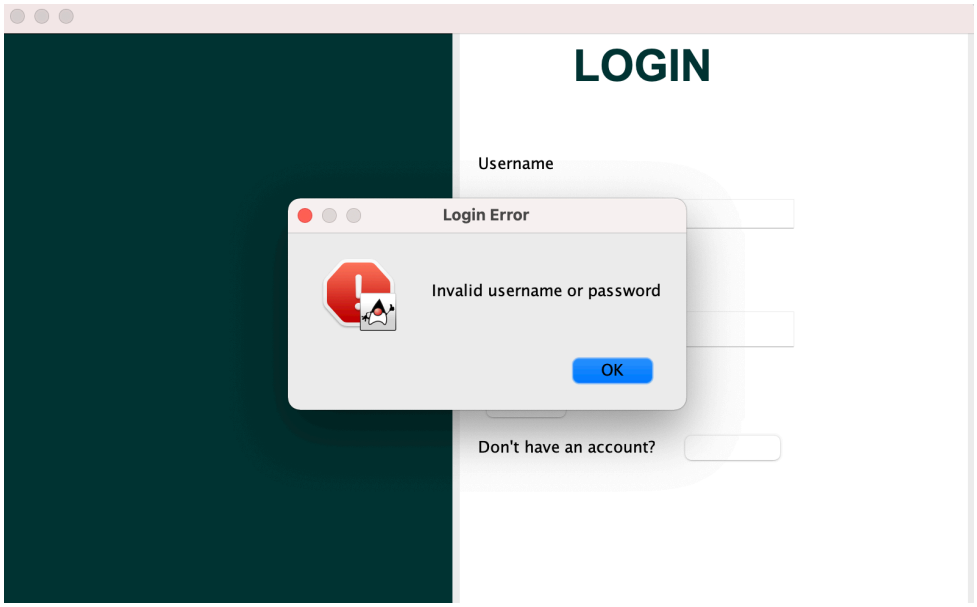
Expected Output: User has successfully logged in.

Actual Output: Invalid username or password.

Pass/Fail: Fail

```
-------------------------------------------------------------------------------------------------------------
User ID    First Name      Last Name       Username        Birthday        Account Type    Employee Number
-------------------------------------------------------------------------------------------------------------
1          User            Tester          validUser       2002-12-01      User            N/A
-------------------------------------------------------------------------------------------------------------
```





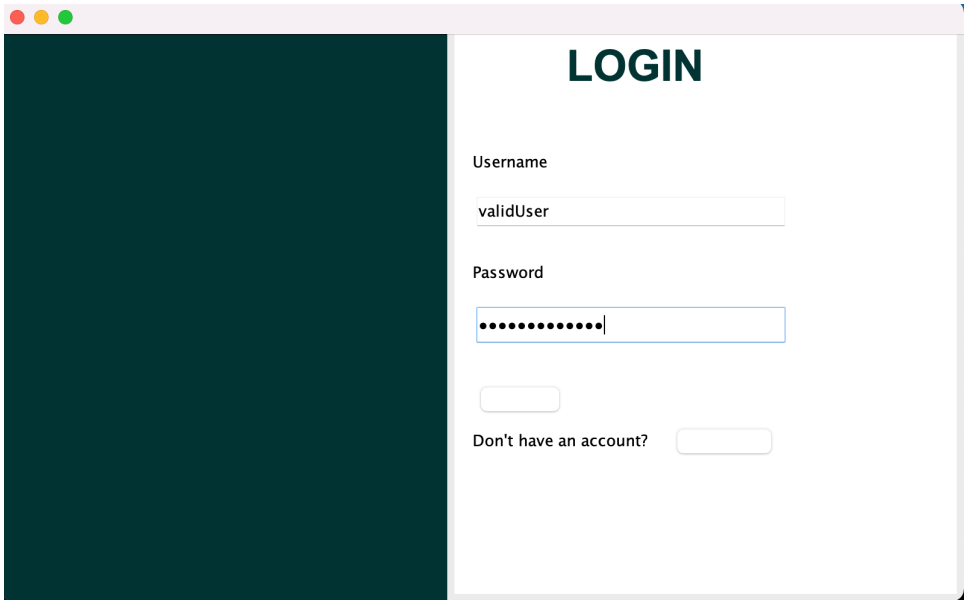
Test case 2:

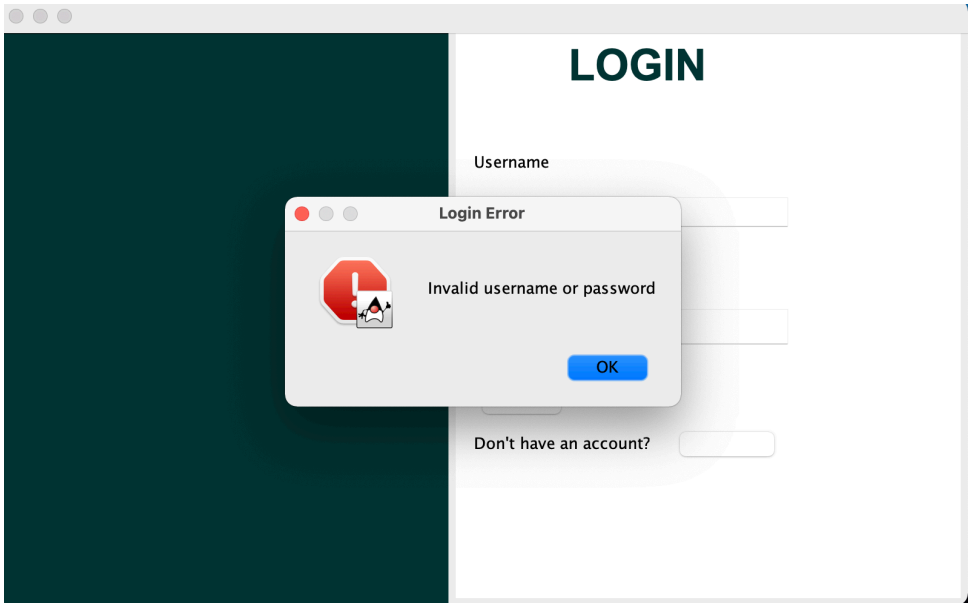
Input: Username: validUsername, Password: wrongPassword

Expected Output: Error shown saying password is incorrect.

Actual Output: Error is shown.

Pass/Fail: Pass





Second validation test:

(3.1) Requirement name: The requirement is allowing users to create a reservation with a valid start date and a valid end date.

(3.2) ECs:

1. Valid EC: Dates are within range of room availability
2. Invalid EC: Start date is after the end date / Dates are outside room availability range

(3.3) Test Cases and Test Results:

Test case 1:

Input: Start date: 2024/12/10 | End date: 2024/12/13

Expected Output: Reservation was successfully created.

Actual Output: Error regarding hotel.

Pass/Fail: Fail

```
Current screen: Signed in as User Home Screen
--------------Welcome Third Tester!--------------
1. Select Hotel
2. Edit My Account
3. Make Reservation
4. View My Reservations
5. Quit
Please enter a number: 3
Current screen: Make Reservation Screen
Enter the start date of your reservation in the following format: YYYY/MM/DD
2024/12/10
Now, enter the end date of your reservation in the following format: YYYY/MM/DD
2024/12/13
Enter the number of beds for your room:
1
Database not connected: Cannot invoke "com.hotelapplication.backend.Hotel.getAllRooms()" because the return value of "com.hotelapplic
ation.backend.DatabaseManager.getCurrentHotel()" is null
Disconnected from database.
emojabedi@MacBook-Pro-445 HotelApplication %
```

*Note: this does work without the database and the standalone application but right now it gives an error.

Test case 2:

Input: Start date: 2024/12/13 | End date: 2024/12/10

Expected Output: Reservation not created, error is shown to prompt user to re-enter.

Actual Output: Error is shown on the screen.

Pass/Fail: Pass

```
Current screen: Signed in as User Home Screen
---------------Welcome Tester Four!---------------
1. Select Hotel
2. Edit My Account
3. Make Reservation
4. View My Reservations
5. Quit
Please enter a number: 3
Current screen: Make Reservation Screen
Enter the start date of your reservation in the following format: YYYY/MM/DD
2024/12/13
Now, enter the end date of your reservation in the following format: YYYY/MM/DD
2024/12/10
Your end date cannot be before or on the same day as your start date.
Try again from the beginning.
Enter the start date of your reservation in the following format: YYYY/MM/DD
```

4. Refactoring

Do you recall performing any refactoring to your code/design? If so then give a brief description of the instances along with the reasons.

Yes, we had to refactor to accommodate using the database to store data instead of using lists of objects. The base classes originally created objects and added them to an ArrayList stored in the Database Class. Now they will connect directly to the database via the Database connector.