VIETNAM NATIONAL UNIVERSITY HCMC
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Principles of Database Management's Project

THE INTERNET CAFÉ MANAGEMENT

REPORT

May 2024

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INTRODUCTION

Abstract

The Internet Cafe Management system is a software application designed to streamline operations and enhance customer experience at internet cafes. This report details the system's functionalities, architecture, and the technologies employed in its development.

System Overview

The Internet Cafe Management system comprises five core entities:

- **Services:** Services offered by the cafe, such as rent time for internet access, ordering foods, and ordering drinks
- **Users:** Customers who avail of its services, and rate staff take care
- **Staff:** Cafe employees who manage users accounts, ordering, billing, and taking care and computer operations.
- **Computers:** The cafe's computer terminals that users rent to access services.
- **Orders:** A record of user requests for services, including time spent, food/drinks, and associated charges.

Goal

The primary goal of The Internet Cafe Management system is to automate and centralize various cafe operations, leading to:

- Improved efficiency in user account management, order processing, and billing.
- Enhanced transparency in service pricing and usage charges.
- Streamlined computer allocation and monitoring.
- Accumulation of valuable data to inform business decisions.

Techniques & Tools Used

The specific techniques and tools used to develop The Internet Cafe Management system will depend on the chosen software development methodology and project requirements. However, common technologies include:

- **Entity-relationship modeling (ERM):** A conceptual data modeling technique used to depict the relationships among entities within a system.
- **Relational database management system (RDBMS):** A type of database that stores data in structured tables with rows and columns, facilitating efficient data retrieval and manipulation.
- **Programming languages:** High-level programming language - Java

This report will delve deeper into these aspects and provide a comprehensive understanding of The Internet Cafe Management system.

PROJECT PLANNING

Project Timeline

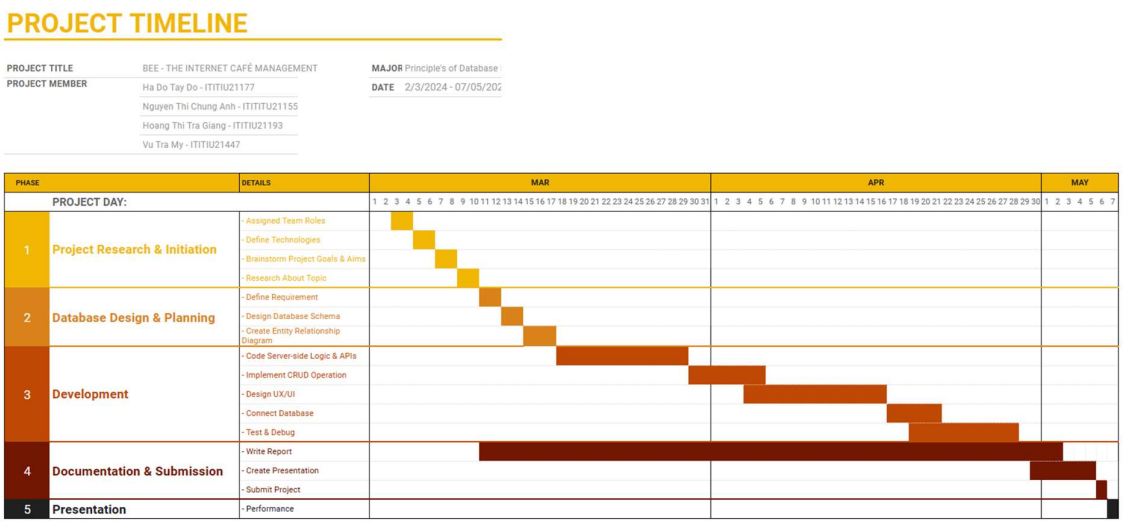


Figure 1: Project Timeline

Task Allocation

Task Allocation

Status	Content		Description	PIC	Deadline
☑	**Brainstorm**		- Goals - Aims - Requirements	All	10/03/2024
☑	**Database Design & ERD**		Design Schema based on requirement	Chung Anh, Tay Do	14/03/2024
☑			Provide input on data needed for UI elements	Tra Giang, Tra My	16/04/2024
☑			Create ERD based on Schema	Chung Anh, Tay Do	17/03/2024
☑	**Server-side Logic & APIs:**	Initial functionalities	Server-side logic and APIs handle basic data operations, user authentication, authorization, validation, error handling, security, and documentation.	Chung Anh, Tay Do	26/03/2024
☑		Subsequent functionalities	Additional features include advanced authentication, performance optimization, real-time communication with webhooks, data analytics, rate limiting, API versioning, and automated testing.	Tay Do, Tra Giang	29/03/2024
☑	**Implement CRUD Operations**		Implement functionalities for Create, Read, Update, and Delete for relevant data (orders, customers, products)	Chung Anh, Tra My	05/04/2024
☑	**UX/UI Design**		Design user interfaces (customer interface, admin interface) considering ease of use, navigation, and visual appeal.	Tra Giang, Tra My	16/04/2024
☑	**Connect Database**		Integrate the application with the chosen database.	Chung Anh, Tay Do	21/04/2024
☑	**Test & Debug**		Conduct thorough testing as a team, identifying and documenting bugs. Prioritize bug fixes.	All	28/04/2024
☑	**Write Report**		Divide report sections and collaboratively write the project report (overview, technical details, testing results).	All	02/05/2024
☑	**Create Presentation**		Divide content and create a presentation covering project goals, functionalities, and technical aspects.	Tra Giang, Tra My	05/05/2024
☑	**Submit Project**		Shared responsibility for final project submission (code, documentation, reports).	Tay Do	06/05/2024
☑	**Performance Evaluation**		Weekly team meetings to discuss progress, roadblocks, and workload distribution.	All	07/05/2024

Figure 2: Task Allocation

Resource Allocation

Tools:

- Project management tools: Google Drive
- Development tools: NetBeans, Git, SQL Server

- Design tools: Figma, Canva, Draw.io
- Communication tools: Discord, Messenger

Software and Hardware:

- Operating systems: Windows
- Development platforms: JDK 21 (Java Development Kit)
    - Programming languages: Java, SQL (Structure Query Language)
    - Frameworks & libraries: JDBC (Java Database Connectivity), JavaFX & Swing, Apache Maven

Risk Assessment and Mitigation Strategies

- Identify Risks:
    - Brainstorming potential risks with the project team.
    - Reviewing past projects or similar initiatives for common risks.
    - Consulting subject matter experts to identify industry-specific risks.
    - Categorize risks based on their likelihood and potential impact on the project.
- Assess Likelihood and Impact:
    - Evaluate the likelihood of each identified risk occurring and its potential impact on project objectives, schedule, and quality.
    - Prioritize risks based on their severity and the level of uncertainty associated with them.
- Develop Mitigation Strategies:
    - Risk avoidance: Eliminate the risk by changing project plans or procedures.
    - Risk reduction: Take actions to reduce the probability or impact of the risk.
    - Risk acceptance: Acknowledge the risk and develop contingency plans to minimize its impact if it occurs.
    - Assign responsibilities for implementing and monitoring risk mitigation strategies to specific team members.
- Monitor and Review:
    - Follow the project to avoid risks, and fix bug promptly
    - Regularly review the effectiveness of risk mitigation strategies and adjust them as needed.
    - Maintain open communication channels within the project team to promptly address emerging risks and implement appropriate responses.

PROJECT ANALYSIS

Requirements Analysis

Project requirements.

The Internet Cafe Management System is a comprehensive solution designed to serve dual purposes: as a practical application for learning principles of database management, and as a functional tool for streamlining the operations of an internet cafe. With a focus on connecting database structures with real-world applications, the system facilitates hands-on learning experiences for students while offering tangible benefits for cafe staff and users alike. Through its intuitive interface, users can easily rent time for internet access and place orders for food and drinks, while staff members efficiently manage user accounts, orders, and computer operations. The system prioritizes security and performance, implementing robust authentication measures and ensuring fast response times for all interactions. By adhering to compliance requirements and accommodating scalability needs, the Internet Cafe Management System emerges not only as a valuable educational resource but also as a reliable solution for optimizing cafe management processes.

User stories, use cases, or functional specifications.

- Being a host of the Internet café as well as the main user of this appilcation.
- For each customer coming to the Internet café, they will be able to register an account to conveniently rent computers, include: User ID, Account, Password and the amount of Time that they can use computer.
- To check whether the computer is available for rent or not and who is using which computer, there will be a data table to manage it.
- The system will also keep track of staff members, storing essential details like their Staff ID, Name, Date of Birth, Address and Phone Number. Each member of staff can be rated by the customer.
- The Internet café also provides other services besides renting computers, like food or drink, every service will also include many kinds of products attached to their price and Service ID.
- Customers can also order food or drink, and each order will include Order ID and the Date they have order services.
- In detail, customers can have many kinds of service in 1 order along with their quantity.
- Staff will serve the customers they order, each served by 1 staff member.
- Customers can pay for their order by many payment methods, and they will receive the bill with payment date and the Bill ID.

Approach Analysis

Reviewed Materials.

- Review relevant course materials: Start by revisiting lectures, textbooks, and any supplementary materials provided by the course instructor. Focus on database management principles, system architecture, and application development methodologies.
- Analyze sample projects: Look for examples of similar projects or case studies that involve building management systems or integrating databases with applications. Pay attention to design patterns, database schemas, and implementation strategies.
- Study coding examples: Explore code snippets or sample applications that demonstrate how to connect databases with applications using programming languages such as SQL, Python, or Java. Understand concepts like database querying, data manipulation, and error handling.

Research Analysis.

- Explore database management systems (DBMS): Research several types of DBMS platforms, such as relational databases (e.g., MySQL, PostgreSQL) or NoSQL databases (e.g., MongoDB, Redis). Consider factors like scalability, data modeling, and transaction management.
- Investigate application development frameworks: Investigate frameworks or libraries commonly used for building web-based applications, such as Django, Flask, or Node.js. Evaluate their features, documentation, and community support.
- Examine relevant technologies: Research tools and technologies that can facilitate the development of specific features required for the Internet Cafe Management System, such as user authentication (e.g., OAuth, JWT), session management, and data visualization libraries.
- Review best practices: Study industry best practices for designing and implementing database-driven applications. Consider aspects like data security, performance optimization, and code maintainability.

By thoroughly analyzing reviewed materials and conducting research, you will gain insights into the theoretical concepts and practical techniques needed to successfully implement the Internet Cafe Management System. This approach will provide a solid foundation for designing the system architecture, selecting appropriate technologies, and writing efficient code.

System Analysis

Database design

ERD Diagram:

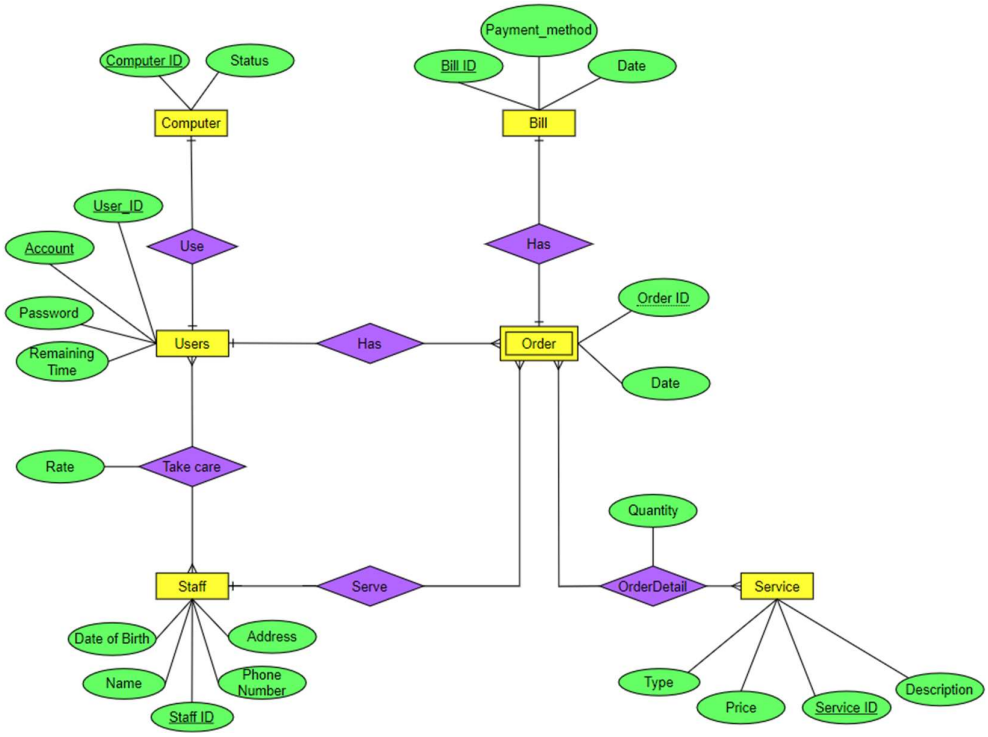


Figure 3: Project Timeline

Database Diagram:

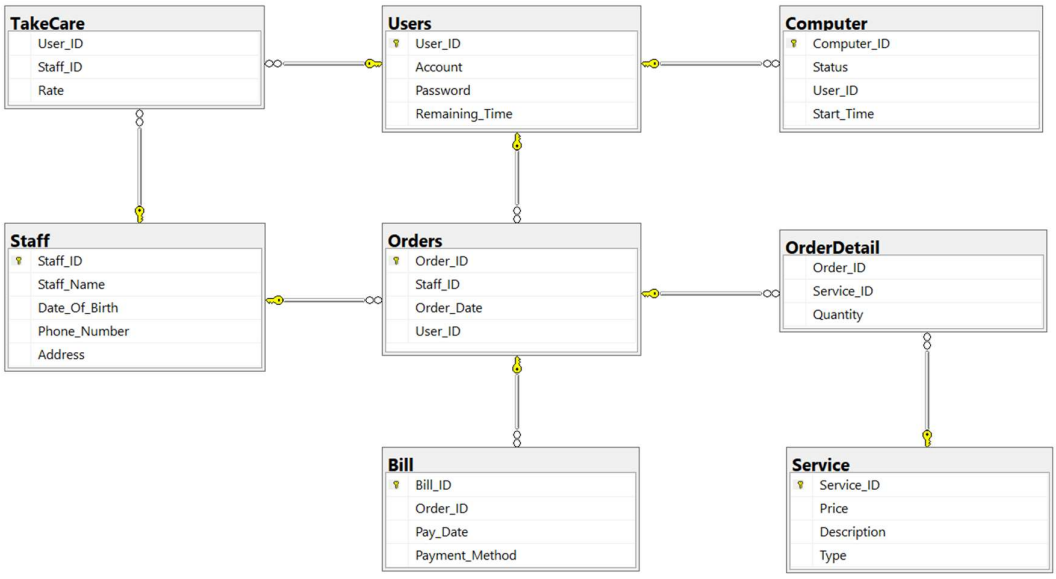


Figure 4

Database and Tables Creation.

	Column Name	Data Type	Allow Nulls
🔑	User_ID	varchar(10)	☐
	Account	varchar(20)	☐
	Password	varchar(50)	☐
	Remaining_Time	time(0)	☐

Figure 5: Users Table

	Column Name	Data Type	Allow Nulls
🔑	Staff_ID	varchar(10)	☐
	Staff_Name	varchar(50)	☐
	Date_Of_Birth	date	☐
	Phone_Number	varchar(10)	☐
	Address	varchar(100)	☐

Figure 6: Staff Table

	Column Name	Data Type	Allow Nulls
🔑	Computer_ID	varchar(10)	☐
	Status	varchar(10)	☐
	User_ID	varchar(10)	☑
	Start_Time	time(0)	☑

Figure 7: Computer Table

	Column Name	Data Type	Allow Nulls
🔑	Service_ID	varchar(10)	☐
	Price	decimal(4, 2)	☐
	Description	varchar(50)	☐
	Type	varchar(50)	☐

Figure 8: Service Table

	Column Name	Data Type	Allow Nulls
🔑	Order_ID	varchar(10)	☐
	Staff_ID	varchar(10)	☐
	Order_Date	date	☐
	User_ID	varchar(10)	☐

Figure 9: Orders Table

	Column Name	Data Type	Allow Nulls
	Order_ID	varchar(10)	☐
	Service_ID	varchar(10)	☐
	Quantity	int	☐

Figure 10: OrderDetail Table

	Column Name	Data Type	Allow Nulls
🔑	Bill_ID	varchar(10)	☐
	Order_ID	varchar(10)	☐
	Pay_Date	date	☐
	Payment_Method	varchar(20)	☐

Figure 11: Bill Table

	Column Name	Data Type	Allow Nulls
	User_ID	varchar(10)	☐
	Staff_ID	varchar(10)	☐
	Rate	numeric(2, 1)	☑

Figure 12: TakeCare Table

Database Data Insertion.

User_ID	Staff_ID	Rate
U011	S115	9.2
U012	S116	0.6
U013	S111	7.5
U014	S112	6.6
U015	S113	2.7
U016	S114	9.3
U017	S115	3.7
U018	S116	8.0
U004	S115	7.5
U003	S111	7.5
U005	S113	9.9
U002	S114	1.9
U004	S116	4.3
U006	S112	8.5
U007	S116	8.0

Table 11: Users Table

Staff_ID	Staff_Name	Date_Of_Birth	Phone_Number	Address
S111	Ha Do	2003-06-16	0123456789	TP Ho Chi Minh
S112	Chung Anh	2003-12-13	0987654321	Dong Nai
S113	Tra Giang	2003-01-14	0111222333	Quang Ngai
S114	Tra My	2003-05-17	0999888777	Nha Trang
S115	Thanh Huy	2003-11-14	0444555666	Dong Nai
S116	Minh Khoa	2003-08-21	0147258369	TP Ho Chi Minh

Table 2: Staff Table

Computer_ID	Status	User_ID	Start_Time
C01	ON	U001	08:00:35
C02	OFF	NULL	NULL
C03	ON	U005	10:32:46
C04	OFF	NULL	NULL
C05	ON	U003	09:45:31
C06	ON	U004	12:33:44
C07	OFF	NULL	NULL
C08	OFF	NULL	NULL
C09	ON	U007	12:34:50
C10	ON	U006	13:22:40
C11	OFF	NULL	NULL
C12	ON	U012	06:14:43
C13	OFF	NULL	NULL
C14	ON	U002	12:12:31
C15	ON	U018	05:19:00
C16	ON	U013	19:27:13
C17	ON	U016	04:48:40
C18	OFF	NULL	NULL
C19	ON	U014	18:40:43
C20	ON	U017	18:40:46
C21	OFF	NULL	NULL

Table 3: Computer Table

Service_ID	Price	Description	Type
D101	1.00	String	Drink
D102	1.00	Coca	Drink
D103	1.50	Peach Tea	Drink
D104	1.50	Pineapple Juice	Drink
D105	1.00	Coffe	Drink
F101	1.00	Noodles With Egg	Food
F102	1.50	Fried Rice With Chicken	Food
F103	1.00	One Skewer	Food
F104	10.00	Beef Steak	Food
F105	1.50	Pho	Food
T101	0.50	1 Hour	Play Time
T102	1.00	2 Hours	Play Time
T103	2.50	5 Hours	Play Time
T104	4.00	8 Hours Night With a ...	Play Time

Table 4: Service Table

Order_ID	Service_ID	Quantity
O001	F101	2
O001	D102	1
O002	F104	1
O003	F105	1
O003	D105	1
O002	T103	1
O004	T101	3
O004	D104	1
O005	F101	2
O005	D102	1
O005	T103	1
O006	T104	1
O007	F103	3
O007	F101	1
O007	D105	2
O007	T103	1
O008	D101	3
O008	F103	2

Order_ID	Service_ID	Quantity
O008	T102	2
O009	D104	2
O009	F105	2
O010	D102	2
O010	F104	3
O011	D105	1
O011	T103	2
O012	T101	1
O013	D103	1
O014	T104	2
O015	F103	3
O016	T102	2
O017	D105	2
O017	F101	1
O017	T104	1
O008	D102	3
O009	F101	2
O010	T104	2

Table 5: Order Table

Order_ID	Staff_ID	Order_Date	User_ID
O001	S112	2024-04-05	U003
O002	S113	2024-03-23	U008
O003	S113	2024-04-10	U007
O004	S111	2024-04-30	U001
O005	S115	2024-04-10	U005
O006	S114	2024-05-01	U002
O007	S111	2024-04-30	U004
O008	S113	2024-04-06	U005
O009	S115	2024-03-21	U002
O010	S116	2024-03-08	U017
O011	S112	2024-03-03	U013
O012	S111	2024-04-16	U008
O013	S114	2024-04-17	U012
O014	S115	2024-04-10	U011
O015	S113	2024-03-24	U010
O016	S112	2024-04-11	U006
O017	S116	2024-03-18	U014
O018	S114	2024-12-06	U001

Table 6 Table

Bill_ID	Order_ID	Pay_Date	Payment_Method
B001	O004	2024-04-30	Card
B002	O007	2024-04-30	Internet Banking
B003	O002	2014-03-24	Cash
B004	O006	2024-05-01	Internet Banking
B005	O001	2024-04-06	Card
B006	O005	2024-04-10	Cash
B007	O003	2024-05-01	Internet Banking
B008	O008	2024-04-06	Card
B009	O017	2024-03-18	Cash
B010	O011	2024-03-03	Internet Banking
B011	O014	2024-04-10	Cash
B012	O010	2024-03-08	Card
B013	O013	2024-03-24	Internet Banking
B014	O012	2024-04-16	Card
B015	O015	2024-04-10	Cash
B016	O016	2024-04-11	Internet Banking
B017	O009	2024-03-21	Card

Table 7 Table

User_ID	Staff_ID	Rate
U001	S111	8.5
U001	S112	5.0
U001	S114	6.5
U004	S112	4.0
U008	S112	2.0
U001	S111	3.6
U002	S112	0.2
U003	S113	7.4
U004	S114	8.9
U005	S115	0.8
U006	S116	4.2
U007	S111	0.1
U008	S112	1.5
U009	S113	7.5
U010	S114	0.2

Table 8: TakeCare Table

Database Queries.

```
CREATE TABLE [dbo].[Users](
    [User_ID] [varchar](10) NOT NULL,
    [Account] [varchar](20) NOT NULL,
    [Password] [varchar](50) NOT NULL,
    [Remaining_Time] [time](0) NOT NULL,
 CONSTRAINT [PK_Users] PRIMARY KEY CLUSTERED
(
    [User_ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF,
IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON,
OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
) ON [PRIMARY]
```

Figure 13: Users Query

```
CREATE TABLE [dbo].[Staff](
    [Staff_ID] [varchar](10) NOT NULL,
    [Staff_Name] [varchar](50) NOT NULL,
    [Date_Of_Birth] [date] NOT NULL,
    [Phone_Number] [varchar](10) NOT NULL,
    [Address] [varchar](100) NOT NULL,
 CONSTRAINT [PK_Staff] PRIMARY KEY CLUSTERED
(
    [Staff_ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF,
IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON,
OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
) ON [PRIMARY]
```

Figure 14: Staff Query

```
CREATE TABLE [dbo].[Computer](
    [Computer_ID] [varchar](10) NOT NULL,
    [Status] [varchar](10) NOT NULL,
    [User_ID] [varchar](10) NULL,
    [Start_Time] [time](0) NULL,
 CONSTRAINT [PK_Computer] PRIMARY KEY CLUSTERED
(
    [Computer_ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF,
IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON,
OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
) ON [PRIMARY]
```

Figure 15: Computer Query

```
CREATE TABLE [dbo].[Service](
    [Service_ID] [varchar](10) NOT NULL,
    [Price] [decimal](4, 2) NOT NULL,
    [Description] [varchar](50) NOT NULL,
    [Type] [varchar](50) NOT NULL,
 CONSTRAINT [PK_Service] PRIMARY KEY CLUSTERED
(
    [Service_ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF,
IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON,
ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
) ON [PRIMARY]
```

Figure 16: Service Query

```
CREATE TABLE [dbo].[Orders](
    [Order_ID] [varchar](10) NOT NULL,
    [Staff_ID] [varchar](10) NOT NULL,
    [Order_Date] [date] NOT NULL,
    [User_ID] [varchar](10) NOT NULL,
 CONSTRAINT [PK_Order] PRIMARY KEY CLUSTERED
(
    [Order_ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF,
IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON,
OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
) ON [PRIMARY]
```

Figure 17: Orders Query

```
CREATE TABLE [dbo].[OrderDetail](
    [Order_ID] [varchar](10) NOT NULL,
    [Service_ID] [varchar](10) NOT NULL,
    [Quantity] [int] NOT NULL
) ON [PRIMARY]
```

Figure 18: OrderDetail Query

```
CREATE TABLE [dbo].[Bill](
    [Bill_ID] [varchar](10) NOT NULL,
    [Order_ID] [varchar](10) NOT NULL,
    [Pay_Date] [date] NOT NULL,
    [Payment_Method] [varchar](20) NOT NULL,
 CONSTRAINT [PK_Bill] PRIMARY KEY CLUSTERED
(
    [Bill_ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF,
IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON,
OPTIMIZE_FOR_SEQUENTIAL_KEY = OFF) ON [PRIMARY]
) ON [PRIMARY]
```

Figure 19: Bill Query

```
CREATE TABLE [dbo].[TakeCare](
    [User_ID] [varchar](10) NOT NULL,
    [Staff_ID] [varchar](10) NOT NULL,
    [Rate] [numeric](2, 1) NULL
) ON [PRIMARY]
```

Figure 20: TakeCare Query

Application Java structure

Project Structure

- Main package: “com.mycompany.internet_cafe”: Internet_cafe. Java, RoundedBorder.java, ScollBar.java
- Package: “Database”: Connect.java
- Database Folder: InternetCafe.bak
- Report Folder: Report. pdf, Presentation. pdf

Class structure

- Internet_cafe class: This class is primarily used to execute the GUI, build up the main frame of the application and receive the events of components whenever user interacts.
- RoundedBorder class: Use to set the border of panels in the frame more unsharp. This class is called in class Internet_cafe.
- Scrollbar class: Class use to modify the size, color, theme of the table’s scroll bar, called in Interner_cafe
- Connect class: The database is built by SQL server is connected to the java code in Netbeans through this class. This class also implemented some functions to read data which user’s input or the data from database and display it into the table of the frame.

Connection implementation

```
public Connect(){
    try{
        String connectionUrl = "jdbc:sqlserver://LAPTOP-DCGSC18J\\SQLEXPRESS:1433;databaseName=InternetCafe;user=sa;password=123456;"
        + "encrypt=true;trustServerCertificate=true;";

        connect = DriverManager.getConnection(url:connectionUrl);
        s = connect.createStatement(resultSetType: ResultSet.TYPE_SCROLL_INSENSITIVE, resultSetConcurrency: ResultSet.CONCUR_READ_ONLY);
    }catch(SQLException e){
        e.printStackTrace();
    }
}
```

Figure 21

- Adding JDBC API (Application Programing Interface) to the dependency of the project file and use it to connect the database from SQL Server to Netbeans.

```
<dependency>
    <groupId>com.microsoft.sqlserver</groupId>
    <artifactId>mssql-jdbc</artifactId>
    <version>12.6.1.jre11</version>
</dependency>
```

Figure 22

- DriverManager.getConnection(url): attempts to establish a connection to the database by using the given url which includes server name, port, database name, user’s name and password of the local host device.
- Statement, PrepareStatement and ResultSet id also use to point out and store the data and after completing the connection

G.U.I Design-Frames implementation.

- Home Frame:
  - Search Bar to check information

- Table to display information that user would like to search

Service_ID	Price	Description	Type
D101	1.00	String	Drink
D102	1.00	Coca	Drink
D103	1.50	Peach Tea	Drink
D104	1.50	Pineapple Juice	Drink
D105	1.00	Coffe	Drink
F101	1.00	Noodles With Egg	Food
F102	1.50	Fried Rice With Chicken	Food
F103	1.00	One Skewer	Food
F104	10.00	Beef Steak	Food
F105	1.50	Pho	Food
T101	0.50	1 Hour	Play Time
T102	1.00	2 Hours	Play Time
T103	2.50	5 Hours	Play Time
T104	4.00	8 Hours Night With a Coca	Play Time

Figure 23

- Users Frame:
  - ID TextField, Account TextField, Password TextField, Remaning Time TextField
  - Add Button, Update Button, Delete Button
  - Table to display information of Users Table

User_ID	Account	Password	Remaining_Time
U001	bluebird91	Sky123	03:00:00
U002	stellar_galaxy	SpaceR0cks	00:00:00
U003	wanderlust77	Adventure	02:50:30
U004	bookworm88	ReadingIsFun	10:40:47
U005	musiclover22	MelodyMagic#	05:17:44
U006	techgeek99	C0deN3rd	03:32:33
U007	beachbum55	SandyToes	02:34:56
U008	foodiegirl123	YummyYum	00:45:12
U009	john_doe	pass12345	12:00:00
U010	jane_smith	qwerty	08:45:00
U011	mike_jones	abc123	16:20:00
U012	emily_wang	password	03:15:00
U013	chris_brown	letmein	20:00:00
U014	sara_adams	hello123	06:00:00
U015	david_miller	p@ssw0rd	14:45:00
U016	lisa_jackson	iloveyou	09:30:00
U017	kevin_white	football	18:10:00
U018	amy_carter	welcome1	05:55:00

Figure 24

- Staff Frame:
  - ID TextField, Name TextField, Date of Birth TextField, Phone Number TextField, Address TextField
  - Add Button, Update Button, Delete Button

- Table to display information of Staff Table

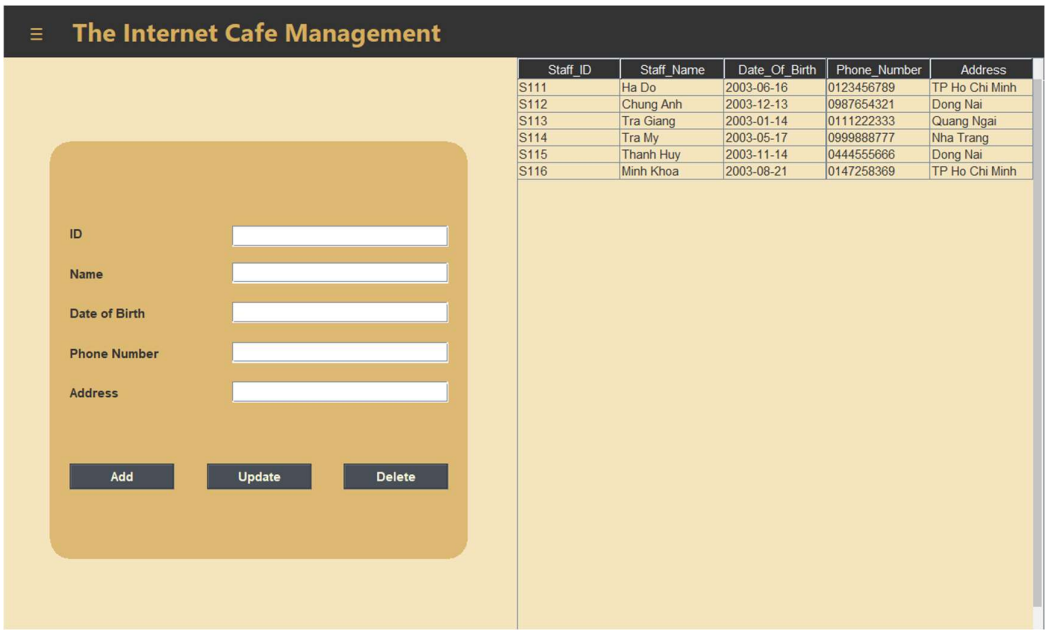


Figure 25

- Computer Frame:
  - ID TextField, User ID TextField, Start Time TextField, ON and OFF RadioButton
  - Add Button, Update Button, Delete Button
  - Table to display information of Computer Table

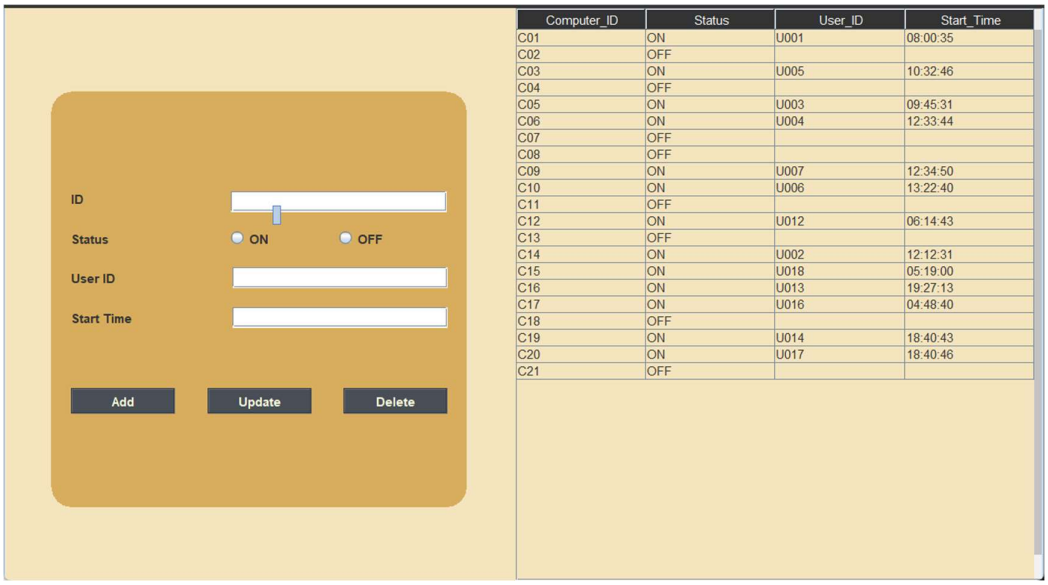


Figure 26

- Service Frame:
  - ID TextField, Price TextField, DescriptionTextField, Type TextField
  - Add Button, Update Button, Delete Button

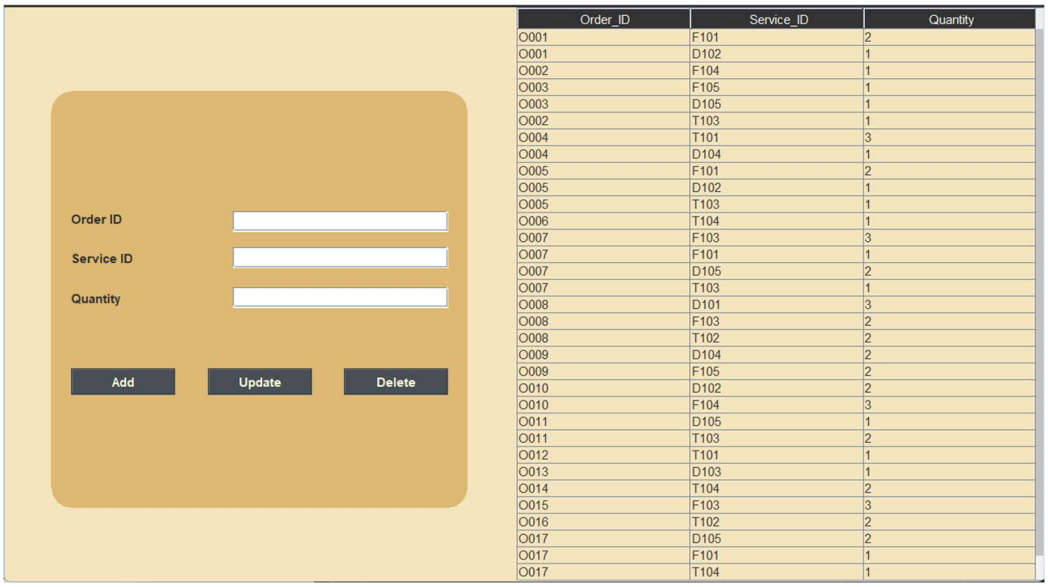
- Table to display information of Service Table

Figure 27

- Orders Frame:
  - ID TextField, Staff ID TextField, Order Date TextField, User ID TextField
  - Add Button, Update Button, Delete Button
  - Table to display information of Orders Table

Figure 28

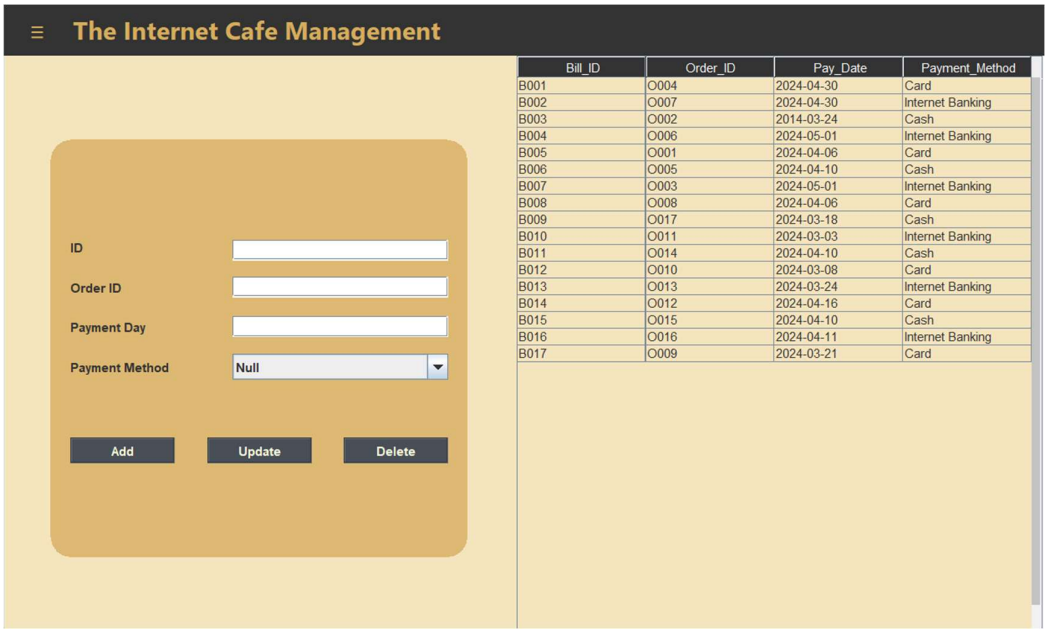
- Order Detail Frame:
  - ID TextField, Service ID TextField, Quantity TextField
  - Add Button, Update Button, Delete Button
  - Table to display information of Order Detail Table



Order_ID	Service_ID	Quantity
O001	F101	2
O001	D102	1
O002	F104	1
O003	F105	1
O003	D105	1
O002	T103	1
O004	T101	3
O004	D104	1
O005	F101	2
O005	D102	1
O005	T103	1
O006	T104	1
O007	F103	3
O007	F101	1
O007	D105	2
O007	T103	1
O008	D101	3
O008	F103	2
O008	T102	2
O009	D104	2
O009	F105	2
O010	D102	2
O010	F104	3
O011	D105	1
O011	T103	2
O012	T101	1
O013	D103	1
O014	T104	2
O015	F103	3
O016	T102	2
O017	D105	2
O017	F101	1
O017	T104	1

Figure 29

- Bill Frame:
  - ID TextField, Order ID TextField, Payment Day TextField, Payment Method ComboBox
  - Add Button, Update Button, Delete Button
  - Table to display information of Bill Table

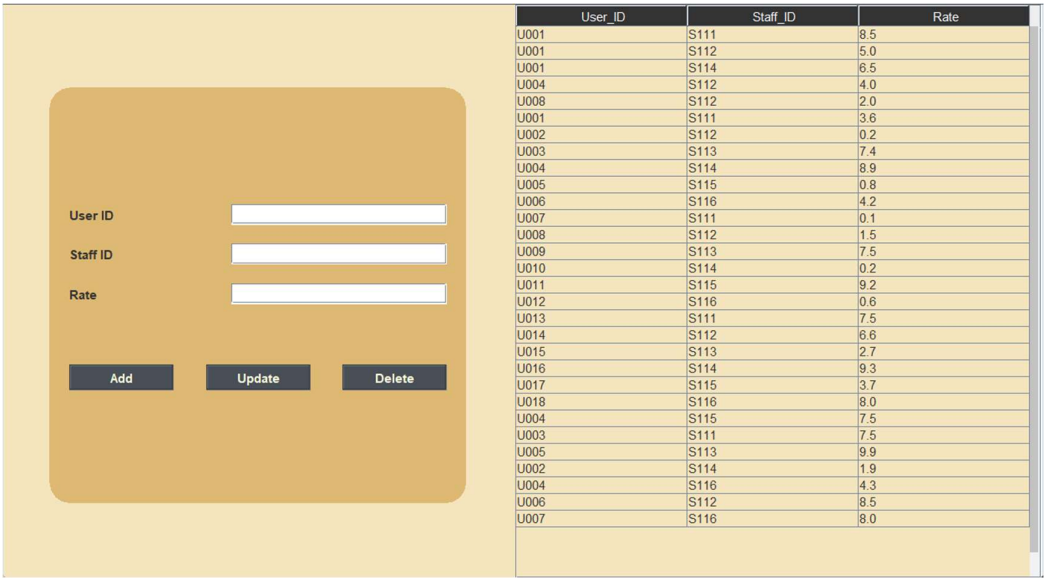


Bill_ID	Order_ID	Pay_Date	Payment_Method
B001	O004	2024-04-30	Card
B002	O007	2024-04-30	Internet Banking
B003	O002	2014-03-24	Cash
B004	O006	2024-05-01	Internet Banking
B005	O001	2024-04-06	Card
B006	O005	2024-04-10	Cash
B007	O003	2024-05-01	Internet Banking
B008	O008	2024-04-06	Card
B009	O017	2024-03-18	Cash
B010	O011	2024-03-03	Internet Banking
B011	O014	2024-04-10	Cash
B012	O010	2024-03-08	Card
B013	O013	2024-03-24	Internet Banking
B014	O012	2024-04-16	Card
B015	O015	2024-04-10	Cash
B016	O016	2024-04-11	Internet Banking
B017	O009	2024-03-21	Card

Figure 30

- Take Care Frame:
  - User ID TextField, Staff ID TextField, Rate TextField
  - Add Button, Update Button, Delete Button

- Table to display information of Take Care Table



User_ID	Staff_ID	Rate
U001	S111	8.5
U001	S112	5.0
U001	S114	6.5
U004	S112	4.0
U008	S112	2.0
U001	S111	3.6
U002	S112	0.2
U003	S113	7.4
U004	S114	8.9
U005	S115	0.8
U006	S116	4.2
U007	S111	0.1
U008	S112	1.5
U009	S113	7.5
U010	S114	0.2
U011	S115	9.2
U012	S116	0.6
U013	S111	7.5
U014	S112	6.6
U015	S113	2.7
U016	S114	9.3
U017	S115	3.7
U018	S116	8.0
U004	S115	7.5
U003	S111	7.5
U005	S113	9.9
U002	S114	1.9
U004	S116	4.3
U006	S112	8.5
U007	S116	8.0

Figure 31

Buttons implementation.

1. Menu Button

```
private void menuButtonMouseClicked(java.awt.event.MouseEvent evt) {
    if (!menuClick) {
        submenu.setSize(150, 550);
        menuClick = true;
    } else {
        submenu.setSize(0, 0);
        menuClick = false;
    }
}// GEN-LAST:event_menuButtonMouseClicked
```

Figure 32

2. Table Selection Button (Home, Users, Staff, Computer, Service, Orders, OrderDetail, Bill, TakeCare)
   An Example of Table Selection Button: Users

```
private void usersButtonMouseClicked(java.awt.event.MouseEvent evt) {
    menuSize(false);
    jTabbedPane.setSelectedIndex(1);
    connect.displayData("SELECT * FROM Users", UserTable);
    setTable(UserTable);
    setScroll(jScrollPane2);
}
```

Figure 33

3. Add Button of Each Table Interface
   An Example of Add Button: Users

```
private void uAddActionPerformed(java.awt.event.ActionEvent evt) {
    String[] data = { uidText.getText(), uaccText.getText(), upassText.getText(), utimeText.getText() };
    boolean state = true;
    for(String i: data){
        if(i.isEmpty()){
            state = false;
            break;
        }
    }
    if(state){
        connect.showAddData("Users", data);
        connect.displayData("SELECT * FROM Users", UserTable);
        if(connect.modify != false){
            showAddMessage(true);

            uidText.setText(null);
            uaccText.setText(null);
            upassText.setText(null);
            utimeText.setText(null);
        }else
            exceptionMess();
    }
    else
        showAddMessage(false);
}
```

Figure 34

4. Update Button of Each Table Interface
   An Example of Update Button: Users

```
private void uUpdateActionPerformed(java.awt.event.ActionEvent evt) {
    String[] data = { uidText.getText(), uaccText.getText(), upassText.getText(), utimeText.getText() };
    boolean state = true;
    for(String i: data){
        if(i.isEmpty()){
            state = false;
            break;
        }
    }
    if(state){
        connect.showUpdateData("Users", data, UserTable);
        connect.displayData("SELECT * FROM Users", UserTable);
        if(connect.modify != false){
            showUpdateMessage(true);

            uidText.setText(null);
            uaccText.setText(null);
            upassText.setText(null);
            utimeText.setText(null);
        }else
            exceptionMess();
    }
    else
        showUpdateMessage(false);
}
```

Figure 35

5. Delete Button of Each Table Interface

An Example of Delete Button: Users

```
private void uDeleteActionPerformed(java.awt.event.ActionEvent evt) {
    String data = uidText.getText();
    if(!data.isEmpty()){
        showDeleteMessage(true);
        if(option == 1){
            connect.showDeleteData("Users", data);
            connect.displayData("SELECT * FROM Users", UserTable);

            uidText.setText(null);
            uaccText.setText(null);
            upassText.setText(null);
            utimeText.setText(null);
        }
        chooseDeleteMess(option);
    }
    else
        showDeleteMessage(false);
}
```

Figure 36

*A*pplication Demo-Screenshots

1. List out average of rate of Staff

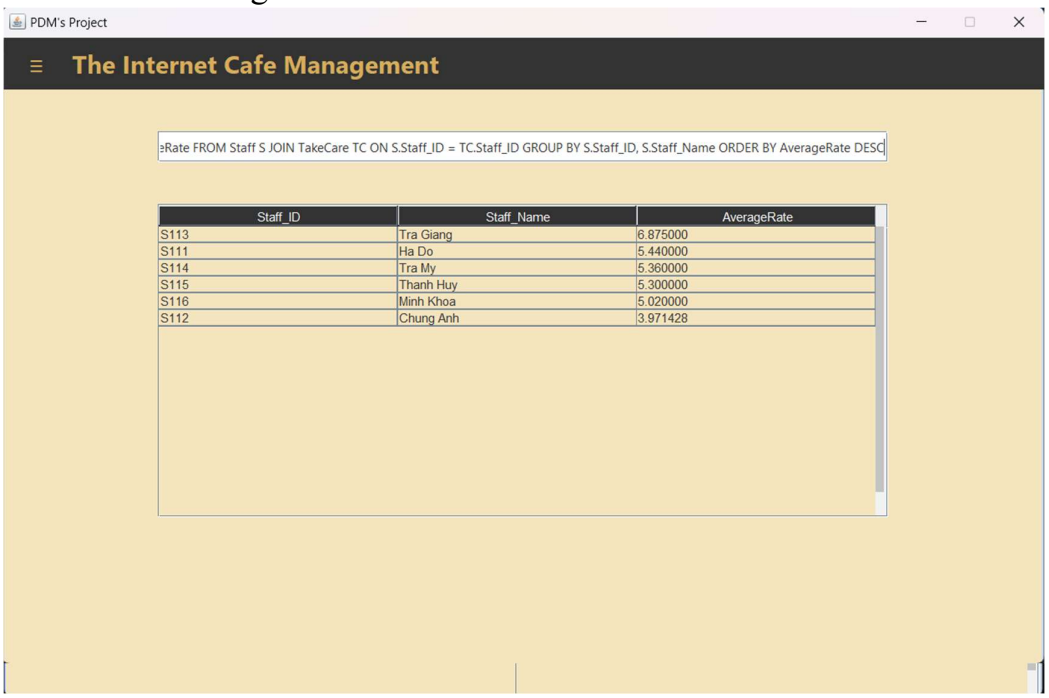


Figure 37

2. Add a new User

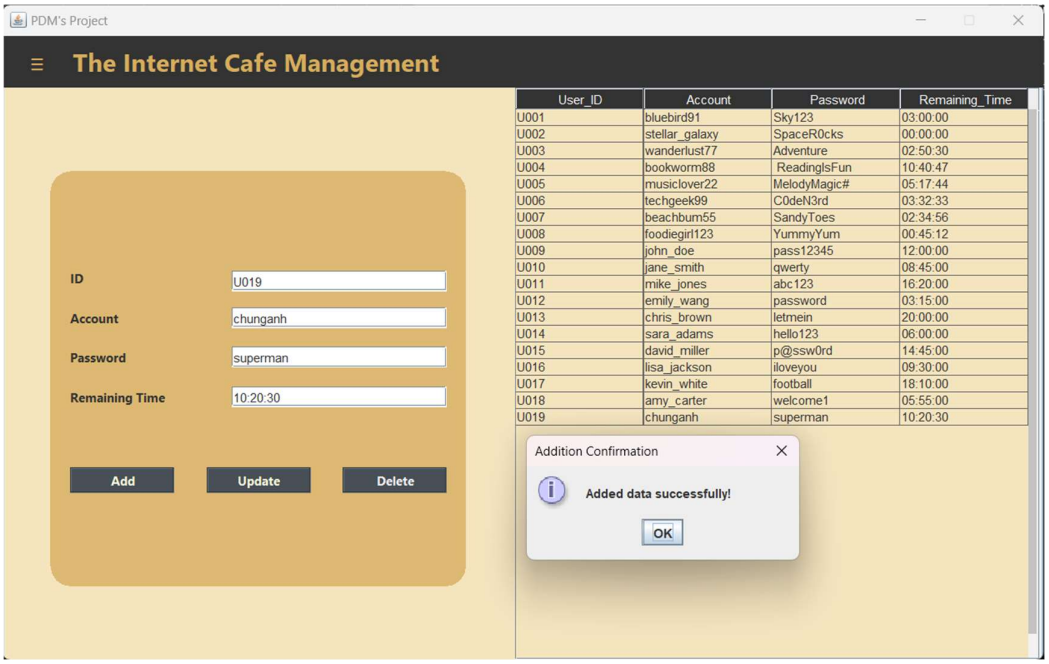


Figure 38

3. Update User

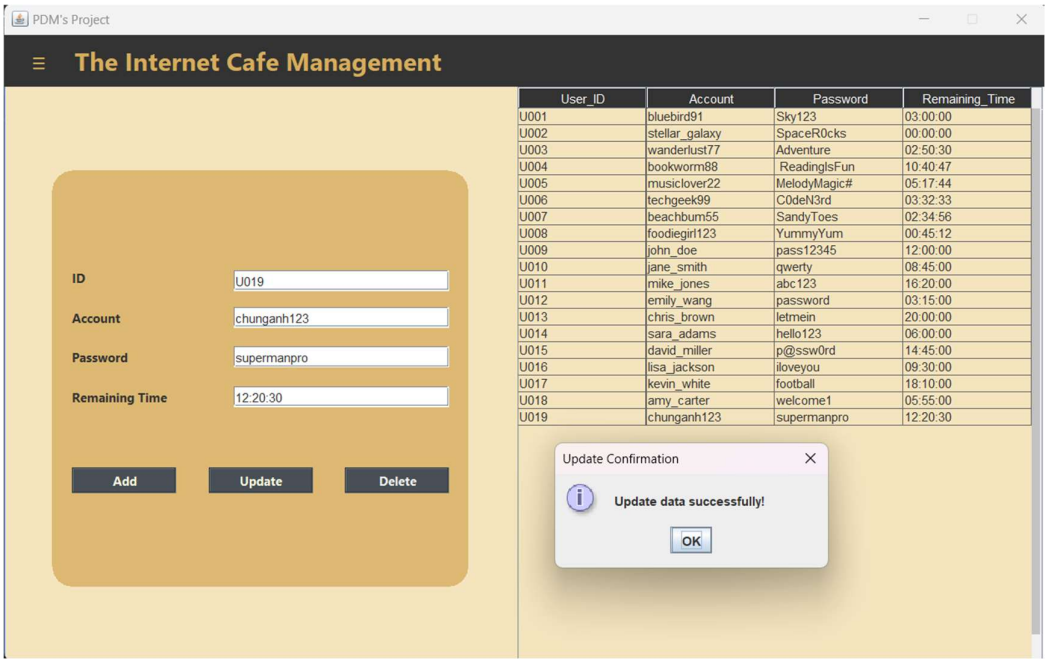


Figure 39

4. Delete a User

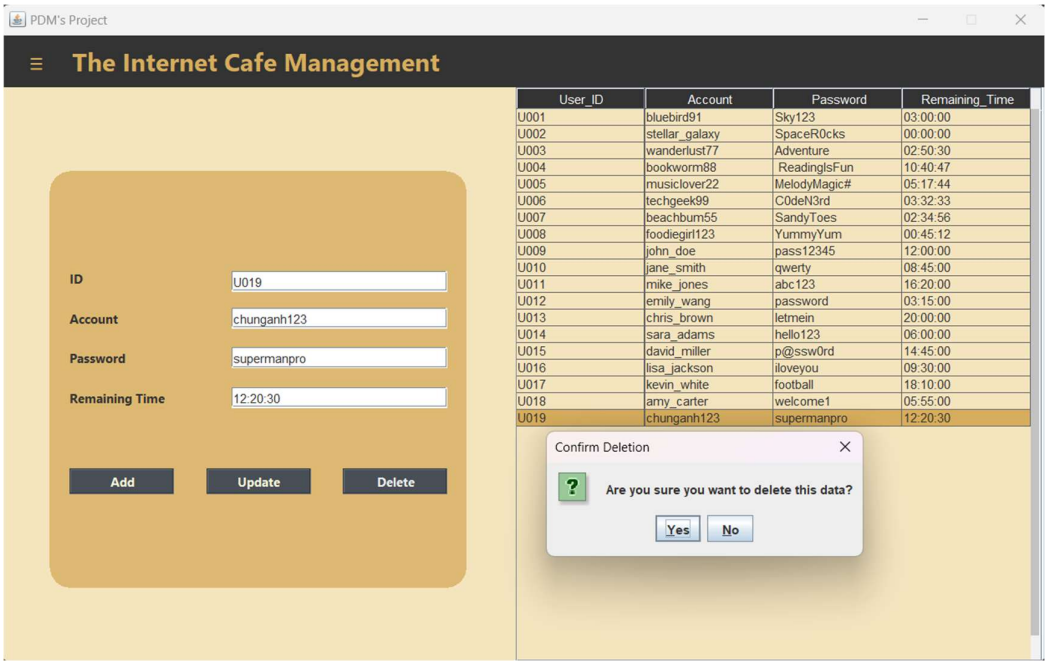


Figure 40

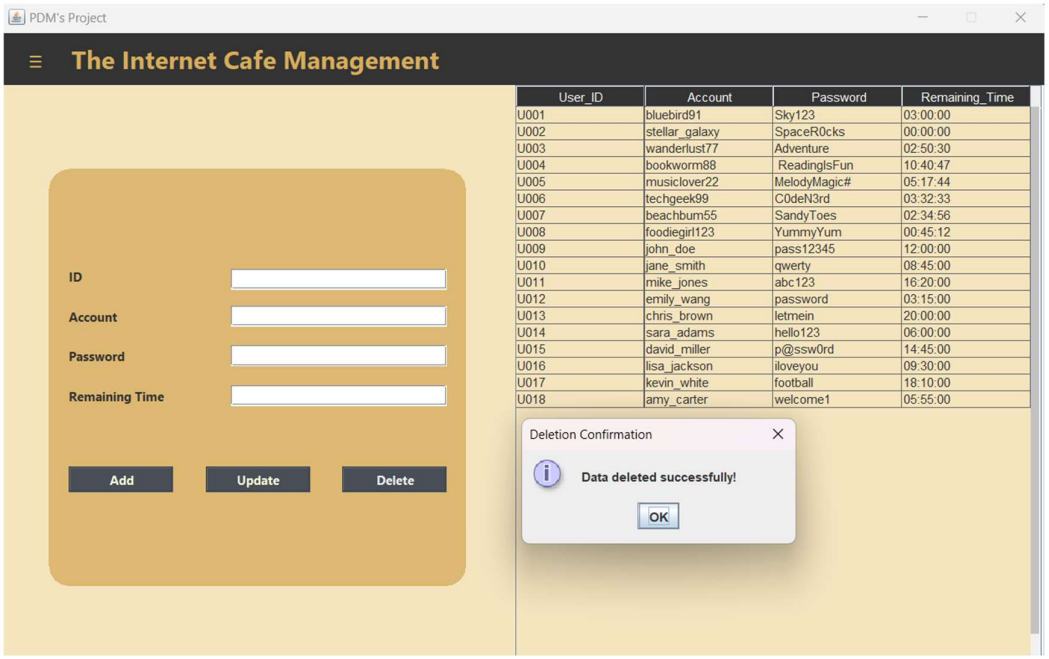


Figure 41

5. Incorrect add datatype

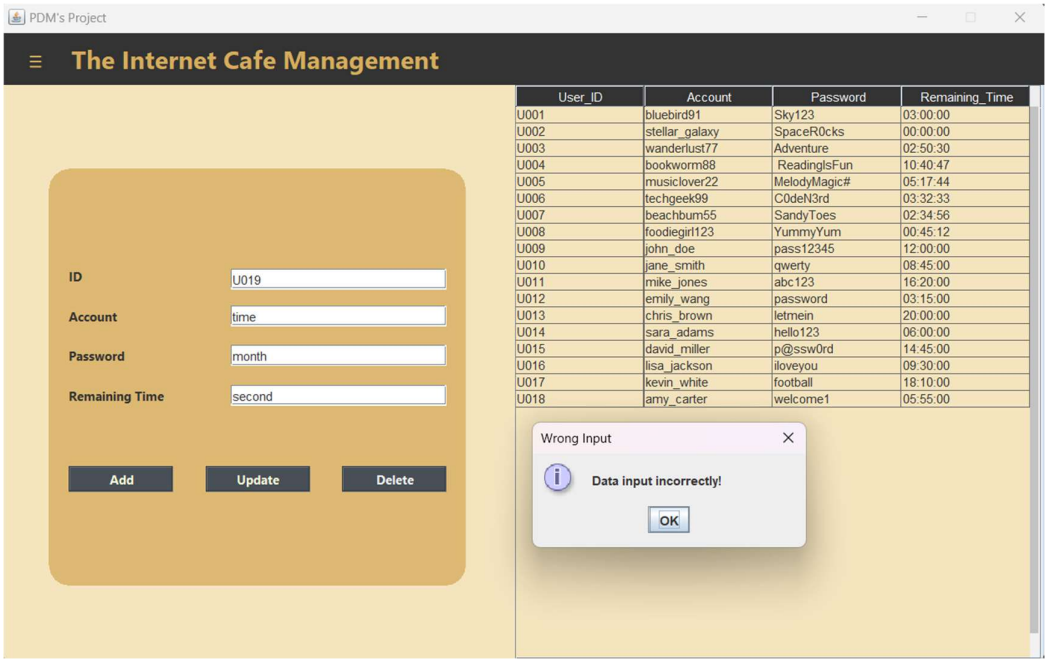


Figure 42

6. Update Failed

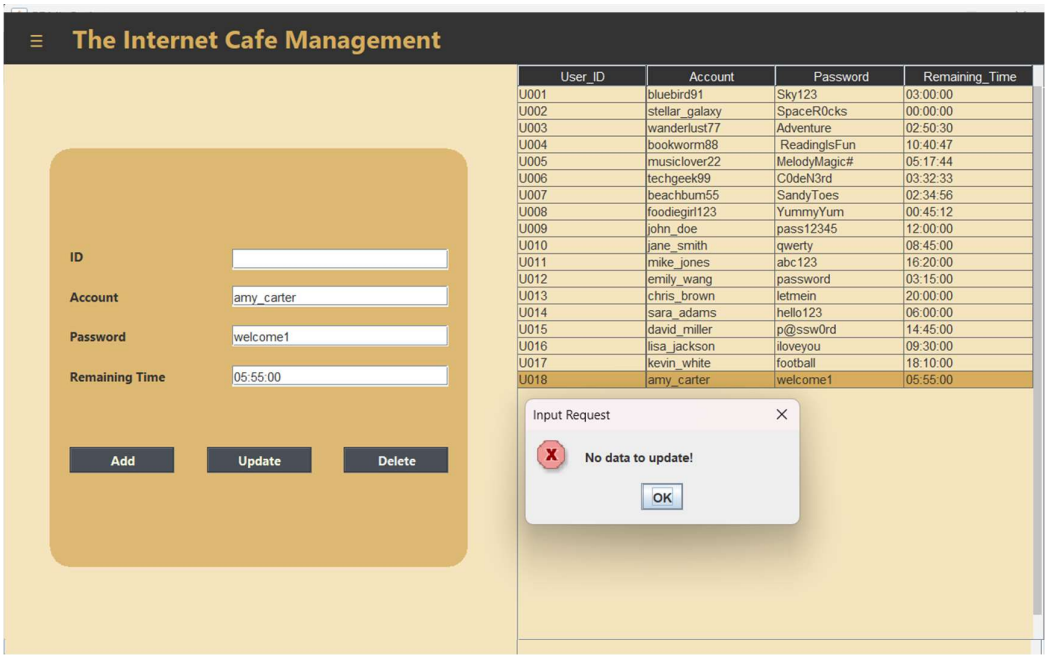


Figure 43

CONCLUSION

In conclusion, the Internet Cafe Management project has yielded significant outcomes, marking a pivotal milestone in enhancing operational efficiency and customer satisfaction within the cafe.

Through the diligent efforts of our team, we have successfully developed and implemented a robust Java application tailored to the specific needs of managing an internet cafe. The application provides a comprehensive suite of features, including user management, time tracking, billing, and reporting functionalities. By leveraging modern technologies and best practices in software development, we have delivered a solution that streamlines cafe operations, improves customer service, and ensures a seamless experience for both patrons and staff.

Throughout the project lifecycle, several key achievements have been realized:

- Feature-Rich Application: We have designed and implemented a feature-rich application that meets the diverse needs of internet cafe management, encompassing user authentication, session monitoring, billing calculations, and reporting capabilities.
- Scalability and Flexibility: The architecture of the application allows for scalability and flexibility, accommodating future enhancements and modifications to adapt to evolving business requirements.
- User-Friendly Interface: The intuitive user interface of the application enhances usability and accessibility for both cafe administrators and customers, fostering a positive interaction experience.
- Reliability and Performance: Rigorous testing and optimization measures have been employed to ensure the reliability and performance of the application, guaranteeing smooth and efficient cafe operations even during peak usage periods.

In conclusion, the Internet Cafe Management System exemplifies our commitment to innovation and excellence in software development. By harnessing the power of Java technology, we have delivered a solution that not only meets the needs of internet cafe owners but also sets a new standard for efficiency and productivity in the industry. We extend our gratitude to all stakeholders involved in this endeavor and look forward to continued success in future projects.

REFERENCES

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ACKNOWLEDGMENT

Completing the Internet Cafe management project has equipped us with valuable technical and practical skills. There are many key takeaways that we have gained.

Our group gained a solid understanding of how Java interacts with databases. This includes skills like connecting to a database, executing queries, and manipulating data. This knowledge forms a solid foundation for building more complex applications with data persistence.

The project involved various stages of development, from planning and design to implementation and testing. This experience has provided insights into the software development lifecycle (SDLC). We have learned about methodologies for breaking down tasks, managing versions, and ensuring quality control.

While the focus may have been on backend functionality, our team have also dabbled in designing a user interface. This could have involved learning about best practices for user interaction, data presentation, and overall user experience.

Lastly, it is about improving Project Management Skills. Building a project often involves juggling various tasks and resources. This experience will have helped us develop project management skills such as time management, task delegation, and communication. We learned how to work effectively within a team and collaborate toward a shared goal.