暨南大學
JINAN UNIVERSITY

- ***University:*** JNU
- ***Department:*** Computer Science and Technology (CST)
- ***Course:*** Database System
- ***Project Title:*** **Database Project One**
- ***Author:*** 蒋云翔 2022102330（Yunxiang Jiang）
- ***Instructor:*** 吴汉瑞（Hanrui Wu）
- ***Date:*** December 4, 2024

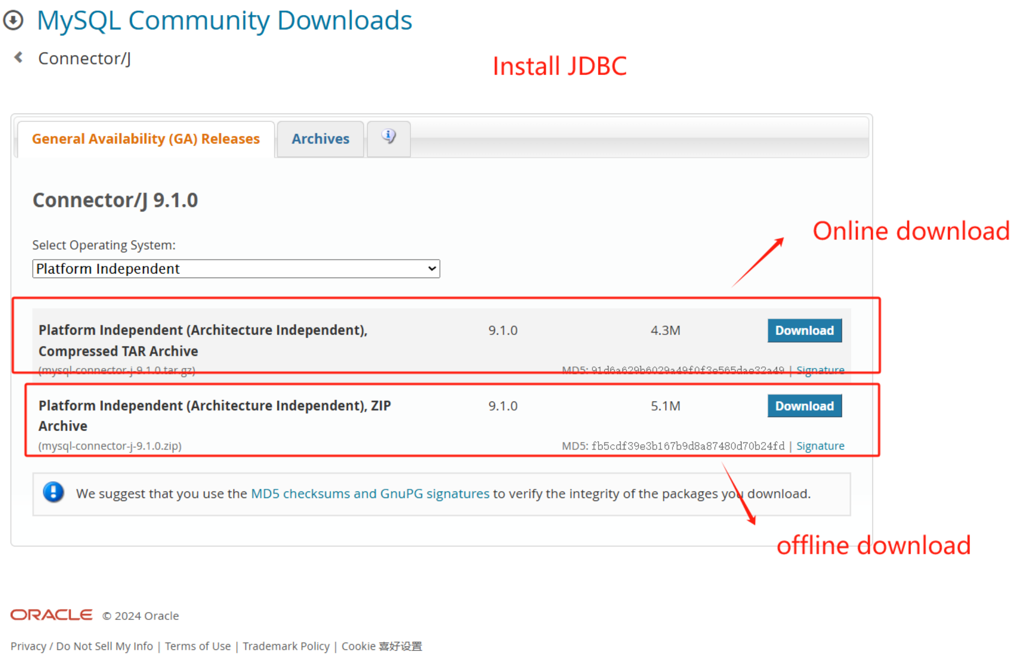
Catalogue

1. Objective

1. Write a java program to connect, access and update a real DB with JDBC. It should operate both on data and meta-data, work as a simple management tool for DBAs, accept SQL statements and show the results in proper text format.
2. Write a simple project report to describe the file structure of your program and a simple usage guide with snapshots to demonstrate the main functions.
3. Compress all your source code and the project report in pdf to a zip/rar file (named “CST_DBS_P1_YourName”) and send it to the course email: 1920603969@qq.combefore 22pm, Dec. 4, 2024.

2. JDBC Brief Intro

JDBC API serves as a Java-based architecture that enables communication with various types of structured data, predominantly in relational databases. It addresses three key programming functions within Java applications. Comprising four essential elements: the JDBC API, which allows Java applications to engage with relational data; the JDBC Driver Manager, that facilitates connections between Java applications and JDBC drivers; the JDBC Test Suite, which aids in confirming the compatibility of JDBC drivers with certain programs; and the JDBC-ODBC Bridge, enabling JDBC connectivity via ODBC drivers. The process of utilizing JDBC in programming encompasses several stages: initiating a connection to a database or other data sources, dispatching queries and updates, and subsequently retrieving and managing the database's reactions to these requests.



MySQL Community Downloads

Connector/J

Install JDBC

Connector/J 9.1.0

Select Operating System:
Platform Independent

Platform Independent (Architecture Independent), Compressed TAR Archive (mysql-connector-j-9.1.0.tar.gz)	9.1.0	4.3M	Download MD5: 91d6a629b6029a49f0f3e565dae32a49 | Signature
Platform Independent (Architecture Independent), ZIP Archive (mysql-connector-j-9.1.0.zip)	9.1.0	5.1M	Download MD5: fb5cdf39e3b167b9d8a87480d70b24fd | Signature

We suggest that you use the MD5 checksums and GnuPG signatures to verify the integrity of the packages you download.

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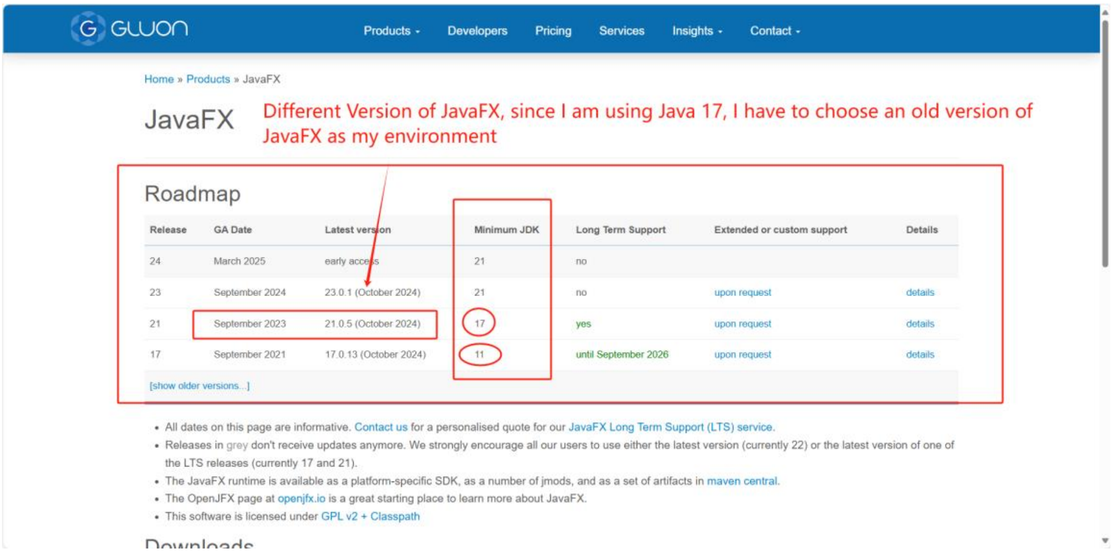
Figure 1: Install JDBC

3. JavaFX Brief Intro

JavaFX is a Java-based framework designed for creating and delivering dynamic user interfaces, particularly for desktop applications and recently expanded to mobile and embedded systems. It encompasses a comprehensive set of tools for building rich internet applications (RIAs) that can run across a variety of platforms. JavaFX addresses the need for modern UI development with three primary components: the JavaFX SDK, which provides a rich set of UI controls and tools for developers; the JavaFX Runtime, which enables the execution of JavaFX applications; and the JavaFX Scene Graph, which facilitates the rendering of complex UIs with animations and graphics. The process of developing with JavaFX involves several stages: designing the user interface using JavaFX's extensive library of UI components, coding the application logic, and then deploying the application across different platforms.



Home » Products » JavaFX

JavaFX

Different Version of JavaFX, since I am using Java 17, I have to choose an old version of JavaFX as my environment

Roadmap

Release	GA Date	Latest version	Minimum JDK	Long Term Support	Extended or custom support	Details
24	March 2025	early access	21	no		
23	September 2024	23.0.1 (October 2024)	21	no	upon request	details
21	September 2023	21.0.5 (October 2024)	17	yes	upon request	details
17	September 2021	17.0.13 (October 2024)	11	until September 2026	upon request	details

[show older versions...]

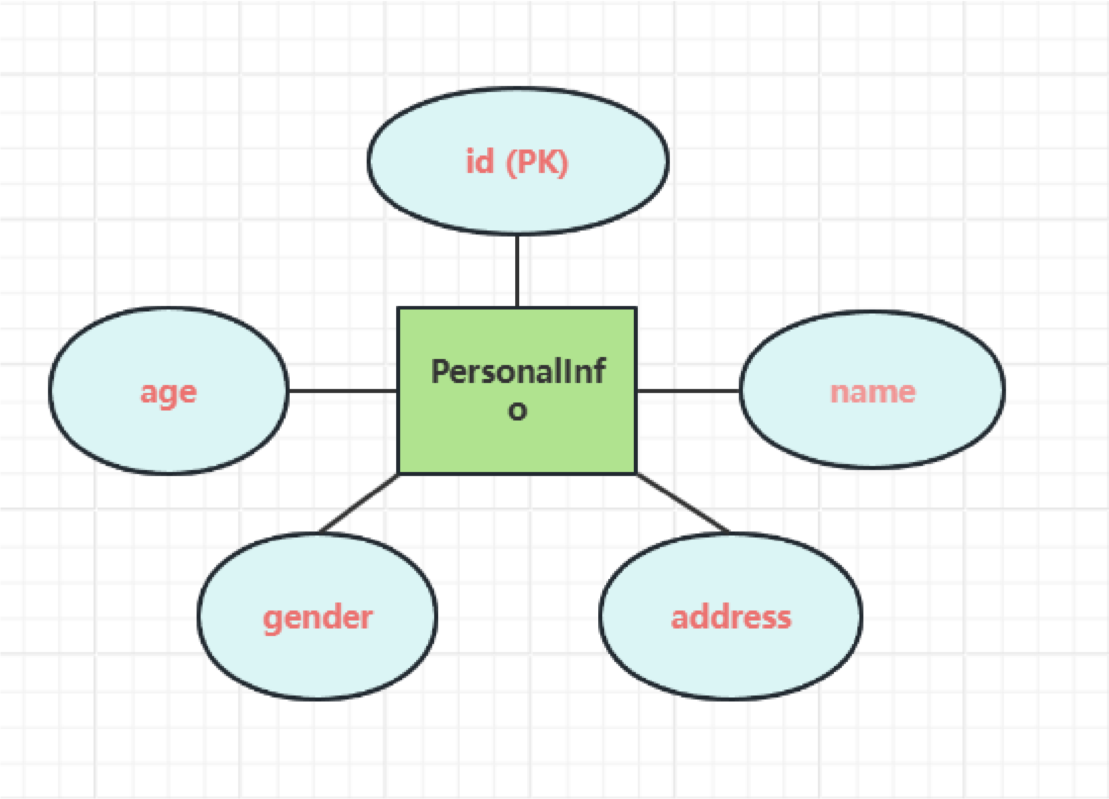
- All dates on this page are informative. Contact us for a personalised quote for our JavaFX Long Term Support (LTS) service.
- Releases in grey don't receive updates anymore. We strongly encourage all our users to use either the latest version (currently 22) or the latest version of one of the LTS releases (currently 17 and 21).
- The JavaFX runtime is available as a platform-specific SDK, as a number of jmods, and as a set of artifacts in maven central.
- The OpenJFX page at openjfx.io is a great starting place to learn more about JavaFX.
- This software is licensed under GPL v2 + Classpath

Downloads

Figure 2: Install JavaFX (choose a suitable version)

4. Project Introduction

The **Personal Information Management System** is a simple yet efficient database application developed to manage personal information such as names, ages, genders, and addresses. Built using Java, JDBC, and JavaFX, this system provides a user-friendly interface for adding, viewing, updating, and deleting personal data records in a MySQL database.



4.1 Key Features

1. **User-Friendly Interface:** The system uses JavaFX to create an intuitive and easy-to-navigate graphical user interface (GUI), allowing users to interact with the database through simple form inputs and buttons.
2. **Database Connectivity:** Leveraging JDBC (Java Database Connectivity), the application establishes a reliable connection to a MySQL database, facilitating seamless data transactions and operations.
3. **CRUD Operations:** The system supports full CRUD (Create, Read, Update, Delete) functionalities:
   - **Create:** Users can add new personal information records.
   - **Read:** Users can view existing records in a table format.
   - **Update:** Users can select and modify existing records.
   - **Delete:** Users can remove records from the database.
4. **Error Handling and Data Integrity:** The system ensures robust error handling to manage database exceptions and maintain data integrity during transactions.

4.2 Technical Overview

- **Java:** The core programming language used to develop the application.
- **JavaFX:** Utilized for creating a responsive and visually appealing user interface.
- **JDBC:** Provides the bridge between the Java application and the MySQL database, enabling SQL operations.
- **MySQL:** The relational database management system used to store and manage the personal information records.

5 Project Development Environment

JDK: Oracle JDK, Version 17.0.10
Database: MySQL, Version 8.0.40
JDBC Driver: Version 8.0.25
IDE: IntelliJ IDEA Community Edition 2023.3.5
OS: Windows 11

6. File structure

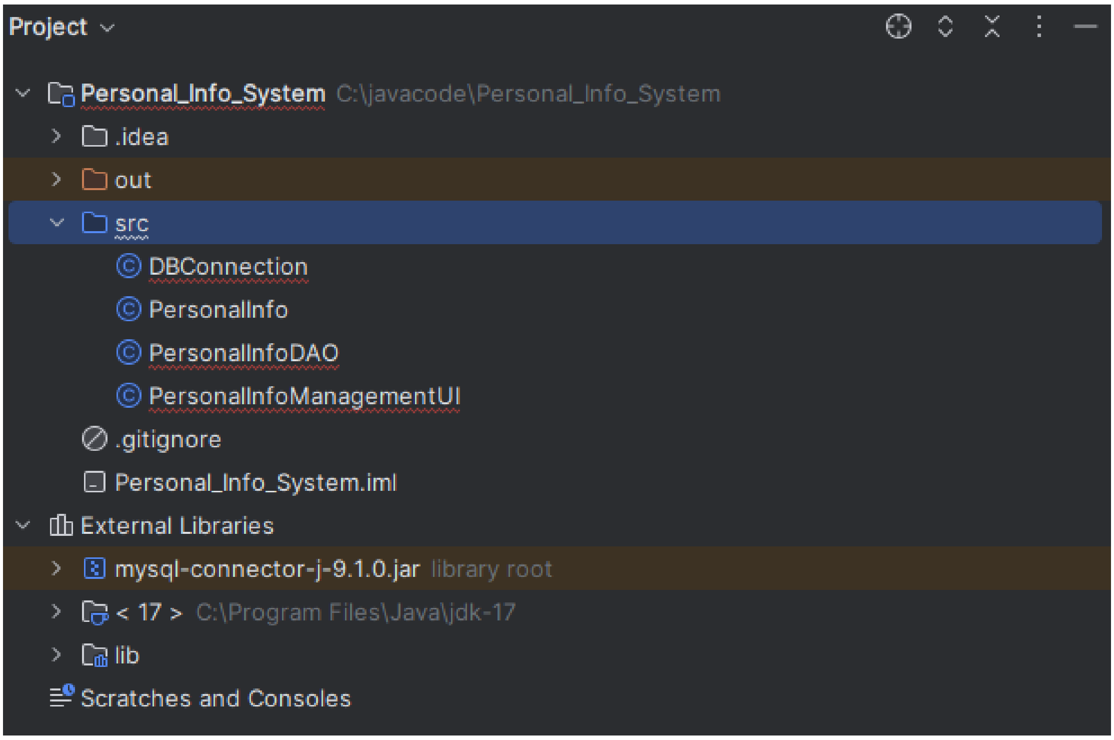
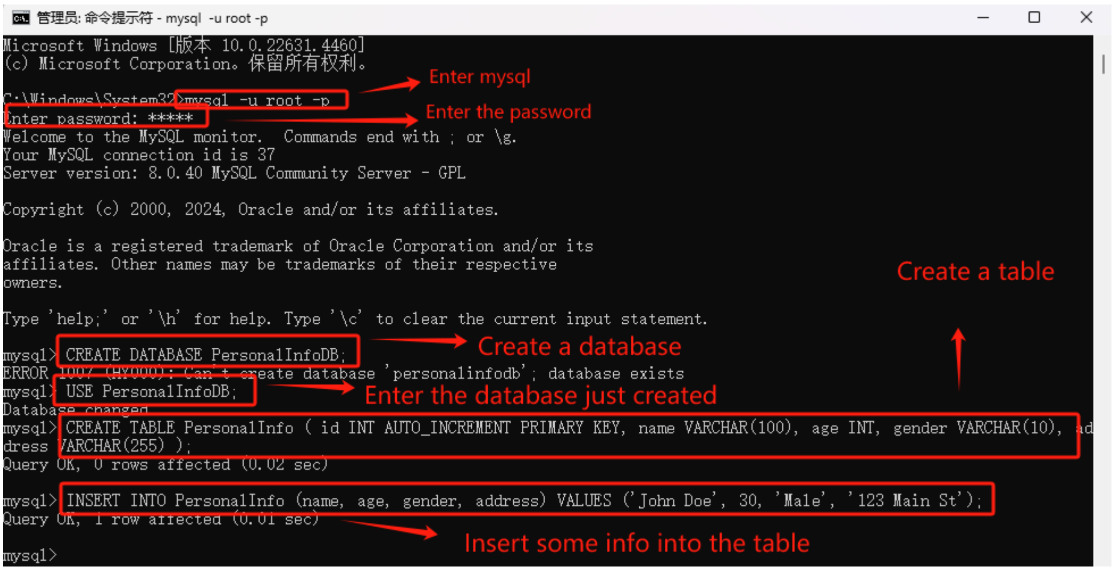


Figure 3: Project’s file structure

7. Usage Guide

7.1 Using MySQL command windows



```
Microsoft Windows [版本 10.0.22631.4460]
(c) Microsoft Corporation。保留所有权利。

C:\Windows\System32>mysql -u root -p
Enter password: *****
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 37
Server version: 8.0.40 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE PersonalInfoDB;
ERROR 1007 (HY000): Can't create database 'personalinfodb'; database exists
mysql> USE PersonalInfoDB;
Database changed
mysql> CREATE TABLE PersonalInfo ( id INT AUTO_INCREMENT PRIMARY KEY, name VARCHAR(100), age INT, gender VARCHAR(10), ad
dress VARCHAR(255) );
Query OK, 0 rows affected (0.02 sec)

mysql> INSERT INTO PersonalInfo (name, age, gender, address) VALUES ('John Doe', 30, 'Male', '123 Main St');
Query OK, 1 row affected (0.01 sec)

mysql>
```

Enter mysql

Enter the password

Create a table

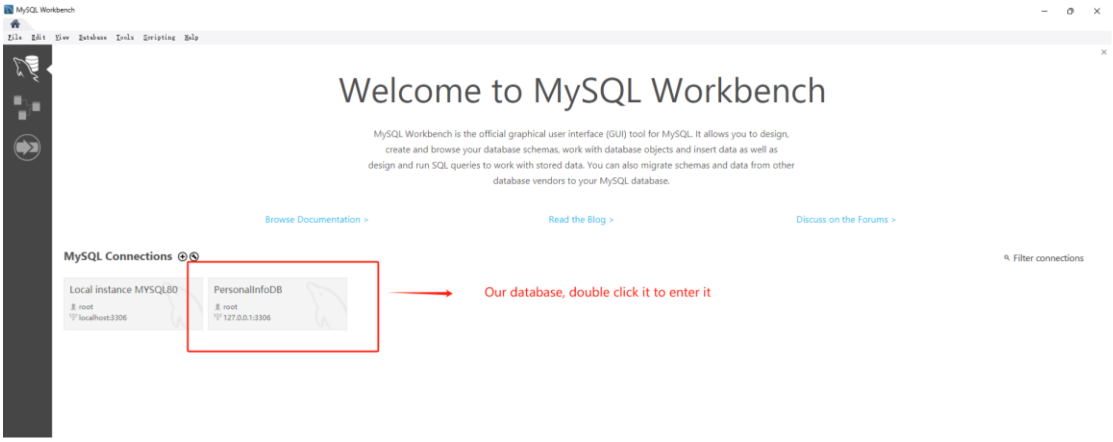
Create a database

Enter the database just created

Insert some info into the table

Figure 4: Using MySQL command windows

7.2 Using MySQL Workbench

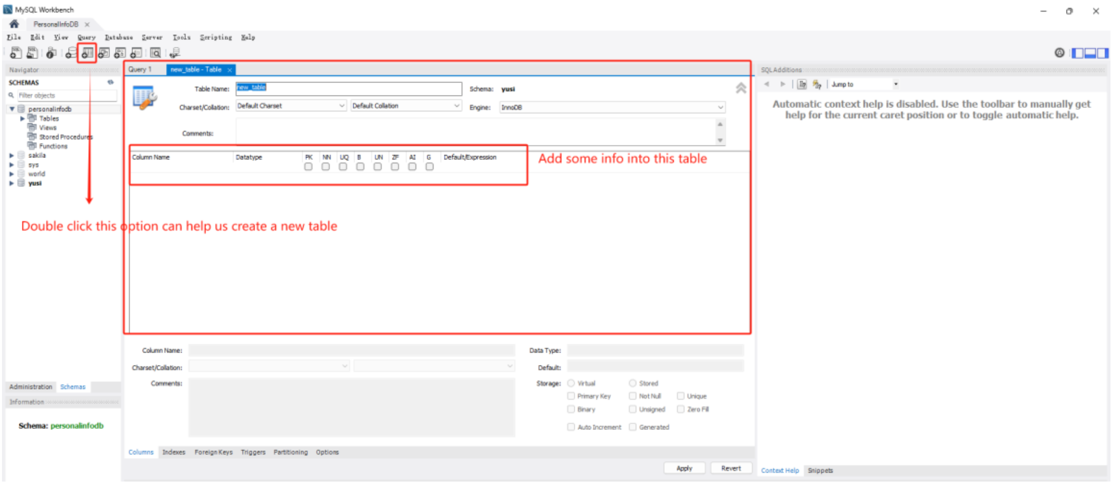


Welcome to MySQL Workbench

MySQL Workbench is the official graphical user interface (GUI) tool for MySQL. It allows you to design, create and browse your database schemas, work with database objects and insert data as well as design and run SQL queries to work with stored data. You can also migrate schemas and data from other database vendors to your MySQL database.

Our database, double click it to enter it

Figure 5: Using MySQL Workbench step1



Add some info into this table

Double click this option can help us create a new table

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Table Name: new_table

Schema: yusi

Charset/Collation: Default Charset, Default Collation

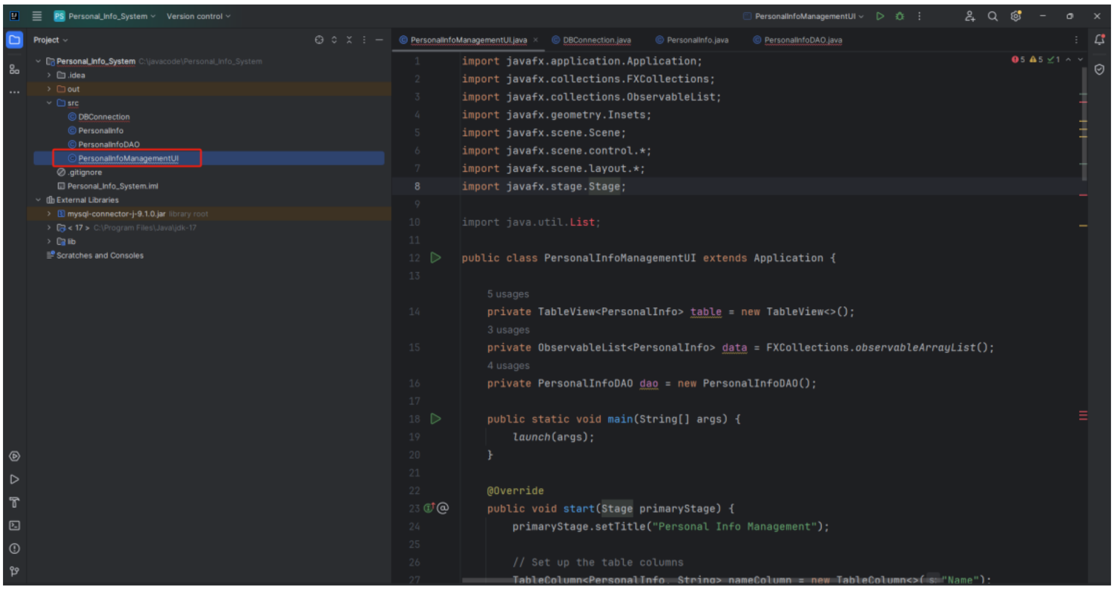
Engine: InnoDB

Schema: personalinfodb

Figure 6: Using MySQL Workbench step2

7.3 Using our Java program

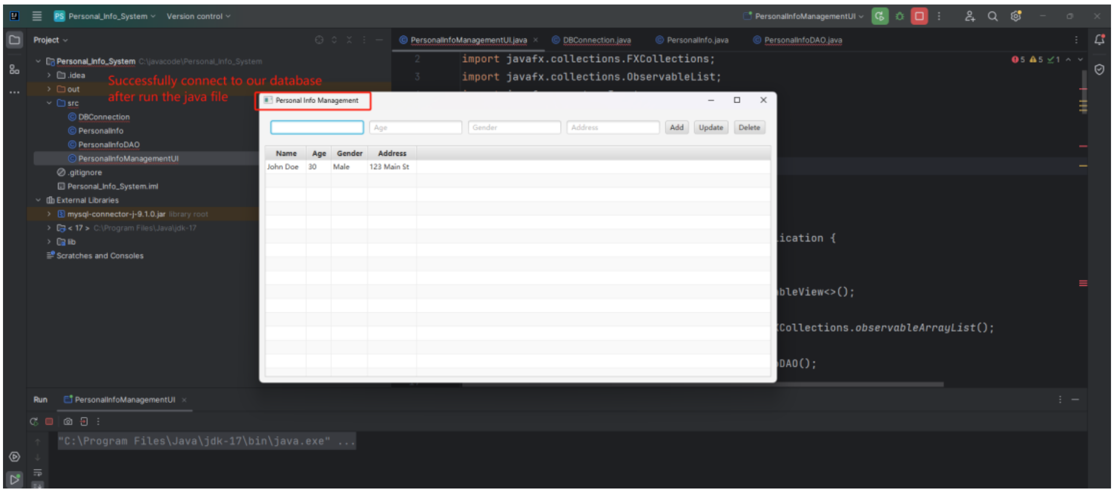
PersonalInfoManagementUI.java is the sequential execution entry of the entire program, but other partial files can also be used as separate program entries. When PersonalInfoManagementUI.java is started, the window will open in a magnified form. This is a common human-computer interaction delaying technique and reduces the user's sensitivity to the loading speed of other components.



```java
import javafx.application.Application;
import javafx.collections.FXCollections;
import javafx.collections.ObservableList;
import javafx.geometry.Insets;
import javafx.scene.Scene;
import javafx.scene.control.*;
import javafx.scene.layout.*;
import javafx.stage.Stage;

import java.util.List;

public class PersonalInfoManagementUI extends Application {

    5 usages
    private TableView<PersonalInfo> table = new TableView<>();
    3 usages
    private ObservableList<PersonalInfo> data = FXCollections.observableArrayList();
    4 usages
    private PersonalInfoDAO dao = new PersonalInfoDAO();

    public static void main(String[] args) {
        launch(args);
    }

    @Override
    public void start(Stage primaryStage) {
        primaryStage.setTitle("Personal Info Management");

        // Set up the table columns
        TableColumn<PersonalInfo, String> nameColumn = new TableColumn<>( s: "Name");
```

Figure 7: Using our Java program

When the PersonalInfoManagementUI.java is loaded, it will connect directly to our local MySQL database, which can be directly added, deleted, changed and checked (we have pre-placed the username and password in other files to connect to the database).



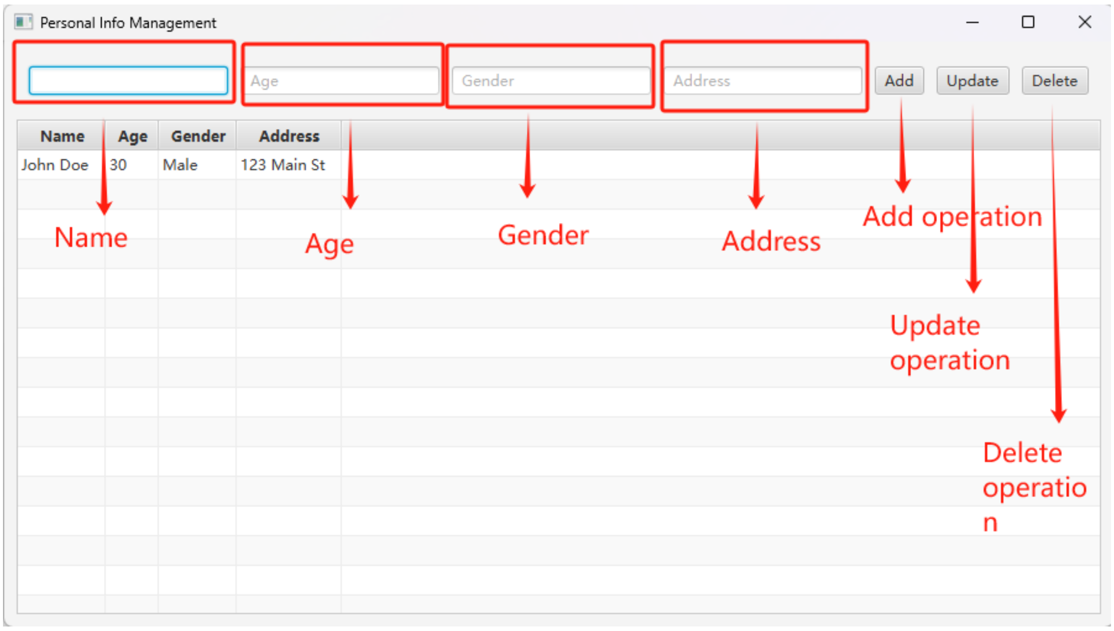
Successfully connect to our database after run the java file

Name	Age	Gender	Address
John Doe	30	Male	123 Main St

```
"C:\Program Files\Java\jdk-17\bin\java.exe" ...
```

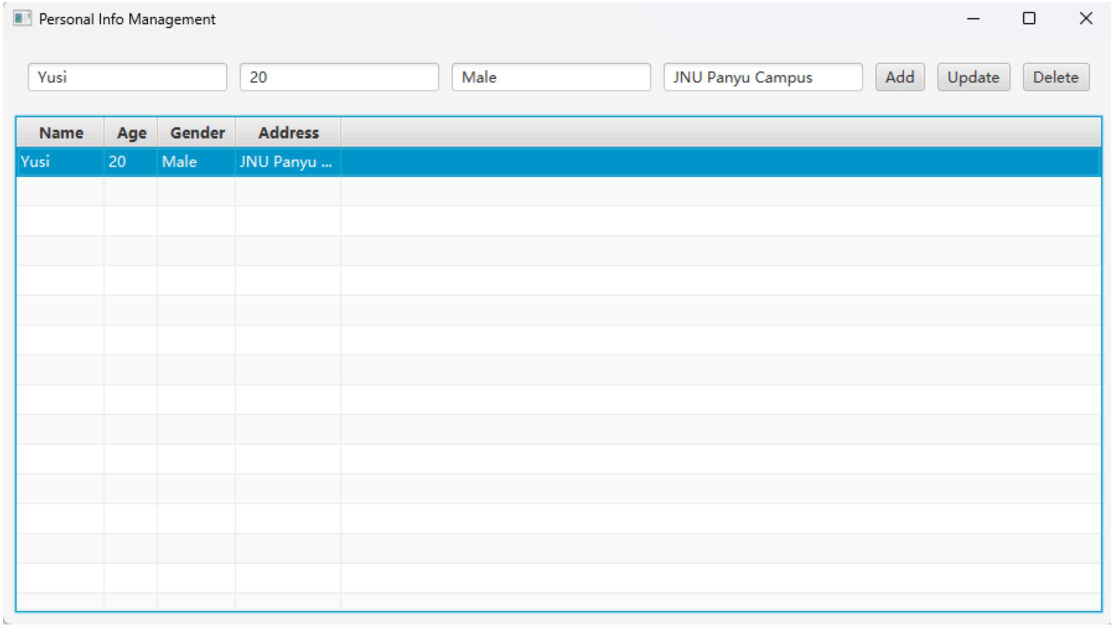
Figure 8: Run the specific java file

In this interface, you can add, delete, modify and check a series of operations, the user interface is very simple and clear, in line with the design trend of The Times



Name	Age	Gender	Address
John Doe	30	Male	123 Main St

Figure 9: User interface



Yusi

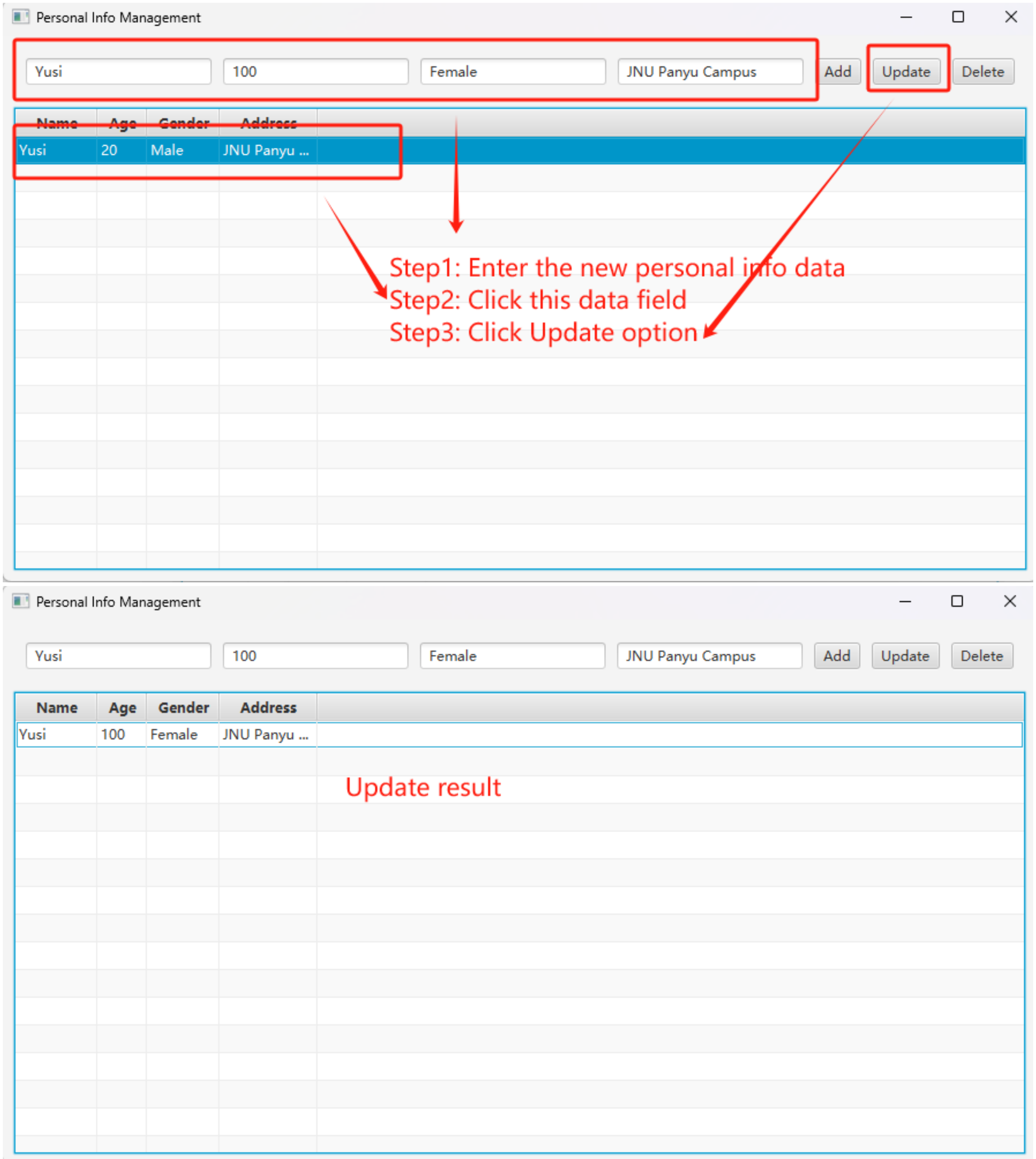
20

Male

JNU Panyu Campus

Name	Age	Gender	Address
Yusi	20	Male	JNU Panyu ...

Figure 10: Add operation



Yusi | 100 | Female | JNU Panyu Campus

Name	Age	Gender	Address
Yusi	20	Male	JNU Panyu ...

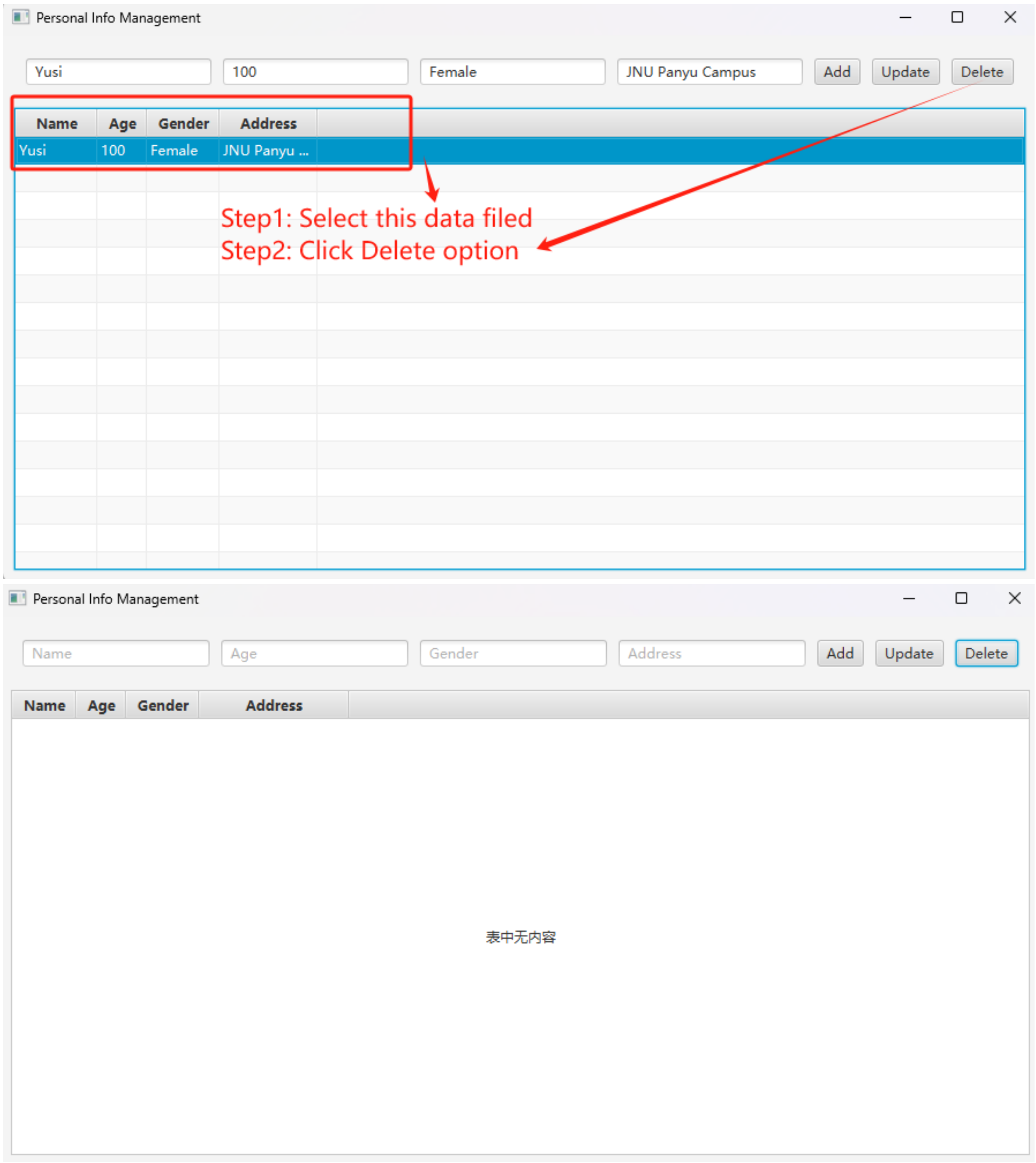
Step1: Enter the new personal info data
Step2: Click this data field
Step3: Click Update option

Yusi | 100 | Female | JNU Panyu Campus

Name	Age	Gender	Address
Yusi	100	Female	JNU Panyu ...

Update result

Figure 11: Update operation and its result



Yusi | 100 | Female | JNU Panyu Campus

Name	Age	Gender	Address
Yusi	100	Female	JNU Panyu ...

Step1: Select this data filed
Step2: Click Delete option

Name	Age	Gender	Address

表中无内容

Figure 12: Delete operation and its result

8. Personal thoughts of this project

Completing the Personal Information Management System project was both rewarding and educational. I deepened my understanding of Java, JDBC, and JavaFX while gaining practical experience in database operations. Designing a user-friendly interface and implementing CRUD functionalities highlighted the importance of intuitive UI/UX design and robust error handling. The project underscored the integration of various technologies to create a seamless application, enhancing my problem-solving skills and inspiring me to tackle more complex projects in the future. Overall, it was a fulfilling journey that solidified my skills and expanded my horizons in software development.