

Inheritance

```
class Animal {
    void eat() {
        System.out.println("eat");
    }
}

class Dog extends Animal {
    void bark() {
        System.out.println("bark");
    }
}
```

Interface

```
interface Animal {
    void sound();
}

class Dog implements Animal {
    public void sound() {
        System.out.println("bark");
    }
}
```

Abstract

```
abstract class Animal {
    abstract void sound();
    void eat() {
        System.out.println("eat");
    }
}

class Dog extends Animal {
    void sound() {
        System.out.println("bark");
    }
}
```

Exception

```
public class UsedCarException extends
    Exception {
    private static final long serialVersionUID =
        1L;
    public UsedCarException(String message) {
        super(message);
    }
}
```

Working with Files

```
public class UsedCarApp {
    public static void writeToFile(ArrayList<UsedCar> cars, String fileName) {
        try {
            PrintWriter writer = new PrintWriter(new
                FileWriter(fileName));
            for (UsedCar car : cars) {
                writer.println(car.toString());
            }
            writer.close();
            System.out.println("\nSuccessfully saved
                valid cars to file.");
        } catch (IOException e) {
            System.out.println("Error writing to file: " +
                e.getMessage());
        }
    }

    public static void readFromFile(String
        fileName) {
        try {
            Scanner fileInput = new Scanner(new File(f-
                ileName));
            System.out.println("\nVIN and Price from
                file:");
            while (fileInput.hasNextLine()) {
                String line = fileInput.nextLine();
                String[] parts = line.split(",");
                if (parts.length == 4) {
                    String vin = parts[0];
                    String price = parts[3];
                    System.out.println("VIN: " + vin + " | Price: "
                        + price);
                }
            }
            fileInput.close();
        } catch (FileNotFoundException e) {
            System.out.println("Error reading file: " +
                e.getMessage());
        }
    }

    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        ArrayList<UsedCar> validCars = new
            ArrayList<>();
```

Working with Files (cont)

```
final int NUMBER_OF_CARS = 3;
for (int i = 0; i < NUMBER_OF_CARS; i++) {
    try {
        System.out.println("\nEnter information for
            car #" + (i + 1));
        System.out.print("Enter VIN (4 digits): ");
        String vin = input.nextLine();
        System.out.print("Enter make: ");
        String make = input.nextLine();
        System.out.print("Enter year: ");
        int year = Integer.parseInt(input.nextLine());
        System.out.print("Enter price: ");
        double price = Double.parseDouble(in-
            put.nextLine());
        UsedCar car = new UsedCar(vin, make,
            year, price);
        validCars.add(car);
        System.out.println("Car created successfu-
            lly.");
    } catch (UsedCarException e) {
        System.out.println("UsedCarException: " +
            e.getMessage());
    } catch (Exception e) {
        System.out.println("Exception: Invalid input.
            " + e.getMessage());
    }
}

String fileName = "UsedCars.txt";
writeToFile(validCars, fileName);
readFromFile(fileName);
input.close();
}
```

JDBC

```
module-info.java >
module FinalTermPractice {
    requires java.sql;
}
```



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Published 16th April, 2026.
 Last updated 16th April, 2026.
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JDBC

```
import java.sql.*;

public class EmployeeDBApp {
    private static final String DB_FILE = "EmployeeDB.accdb";
    private static final String DB_URL = "jdbc:ucanaccess://" + DB_FILE;

    public static Connection getConnection()
        throws SQLException, ClassNotFoundException {
        Class.forName("net.ucanaccess.jdbc.UcanaccessDriver");
        return DriverManager.getConnection(DB_URL);
    }

    public static void insertEmployee(Scanner input) {
        Connection conn = null;
        Statement statement = null;
        try {
            conn = getConnection();
            statement = conn.createStatement();
            System.out.print("Enter employee name: ");
            String name = input.nextLine();
            System.out.print("Enter employee salary: ");
            double salary = Double.parseDouble(input.nextLine());
            String insertQ = "INSERT INTO Employee (Name, Salary) VALUES ('" + name + "', " + salary + ")";
            statement.executeUpdate(insertQ);
            System.out.println("Employee inserted successfully.");
        } catch (ClassNotFoundException ex) {
            System.out.println("Driver error: " + ex.getMessage());
        } catch (SQLException ex) {
            System.out.println("Database error: " + ex.getMessage());
        } catch (Exception ex) {
            System.out.println("Input error: " + ex.getMessage());
        } finally {
            try {
                if (statement != null)
```

JDBC (cont)

```
statement.close();
            if (conn != null)
                conn.close();
        } catch (SQLException ex) {
            System.out.println(ex.getMessage());
        }
    }

    public static void updateEmployeeSalary(Scanner input) {
        Connection conn = null;
        Statement statement = null;
        try {
            conn = getConnection();
            statement = conn.createStatement();
            System.out.print("Enter employee name to update: ");
            String name = input.nextLine();
            System.out.print("Enter new salary: ");
            double salary = Double.parseDouble(input.nextLine());
            String updateQ = "UPDATE Employee SET Salary = " + salary + " WHERE Name = '" + name + "'";
            int rows = statement.executeUpdate(updateQ);
            if (rows > 0) {
                System.out.println("Salary updated successfully.");
            } else {
                System.out.println("Employee not found.");
            }
        } catch (ClassNotFoundException ex) {
            System.out.println("Driver error: " + ex.getMessage());
        } catch (SQLException ex) {
            System.out.println("Database error: " + ex.getMessage());
        } catch (Exception ex) {
            System.out.println("Input error: " + ex.getMessage());
        } finally {
```

JDBC (cont)

```
try {
    if (statement != null)
        statement.close();
    if (conn != null)
        conn.close();
} catch (SQLException ex) {
    System.out.println(ex.getMessage());
}

public static void deleteEmployee(Scanner input) {
    Connection conn = null;
    Statement statement = null;
    try {
        conn = getConnection();
        statement = conn.createStatement();
        System.out.print("Enter employee name to delete: ");
        String name = input.nextLine();
        String deleteQ = "DELETE FROM Employee WHERE Name = '" + name + "'";
        int rows = statement.executeUpdate(deleteQ);
        if (rows > 0) {
            System.out.println("Employee deleted successfully.");
        } else {
            System.out.println("Employee not found.");
        }
    } catch (ClassNotFoundException ex) {
        System.out.println("Driver error: " + ex.getMessage());
    } catch (SQLException ex) {
        System.out.println("Database error: " + ex.getMessage());
    } catch (Exception ex) {
        System.out.println("Input error: " + ex.getMessage());
    } finally {
        try {
            if (statement != null)
                statement.close();
```



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Published 16th April, 2026.
 Last updated 16th April, 2026.
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JDBC (cont)

```
if (conn != null)
    conn.close();
} catch (SQLException ex) {
    System.out.println(ex.getMessage());
}
}

public static void displayAllEmployees() {
    Connection conn = null;
    Statement statement = null;
    ResultSet rs = null;
    ArrayList<Employee> employees = new
    ArrayList<Employee>();
    try {
        conn = getConnection();
        statement = conn.createStatement();
        String query = "SELECT * FROM Employ-
        ee";
        rs = statement.executeQuery(query);
        while (rs.next()) {
            int id = rs.getInt("ID");
            String name = rs.getString("Name");
            double salary = rs.getDouble("Salary");
            Employee emp = new Employee(id, name,
            salary);
            employees.add(emp);
        }
        if (employees.size() == 0) {
            System.out.println("No employee records
            found.");
        } else {
            System.out.println("\n--- All Employees ---");
            for (Employee emp : employees) {
                System.out.println("ID: " + emp.getId()
                + ", Name: " + emp.getName()
                + ", Salary: " + emp.getSalary());
            }
        }
    } catch (ClassNotFoundException ex) {
        System.out.println("Driver error: " + ex.get-
        Message());
    } catch (SQLException ex) {
        System.out.println("Database error: " +
        ex.getMessage());
    } finally {
```

JDBC (cont)

```
try {
    if (rs != null)
        rs.close();
    if (statement != null)
        statement.close();
    if (conn != null)
        conn.close();
} catch (SQLException ex) {
    System.out.println(ex.getMessage());
}
}

public static void showMenu() {
    System.out.println("\n===== Employee
    Database Menu =====");
    System.out.println("1. Insert Employee");
    System.out.println("2. Update Employee
    Salary");
    System.out.println("3. Delete Employee");
    System.out.println("4. Display All Employ-
    ees");
    System.out.println("5. Exit");
    System.out.print("Enter your choice: ");
}

public static void main(String[] args) {
    Scanner input = new Scanner(System.in);
    int choice = 0;
    do {
        showMenu();
        try {
            choice = Integer.parseInt(input.nextLine());
            switch (choice) {
                case 1:
                    insertEmployee(input);
                    break;
                case 2:
                    updateEmployeeSalary(input);
                    break;
                case 3:
                    deleteEmployee(input);
                    break;
                case 4:
                    displayAllEmployees();
```

JDBC (cont)

```
break;
        case 5:
            System.out.println("Program terminated.");
            break;
        default:
            System.out.println("Invalid choice. Please
            enter a number from 1 to 5.");
    }
} catch (Exception ex) {
    System.out.println("Invalid input. Please
    enter a valid number.");
}
} while (choice != 5);
input.close();
}
```