JAVA SE PROGRAMMING LANGUAGE

Lab Guides

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Contents

CODE:	JPL.L.L301
TYPE:	LONG
LOC:	200
DURATION:	120 MINUTES

Unit 16: Building Database Applications with JDBC

Objectives:

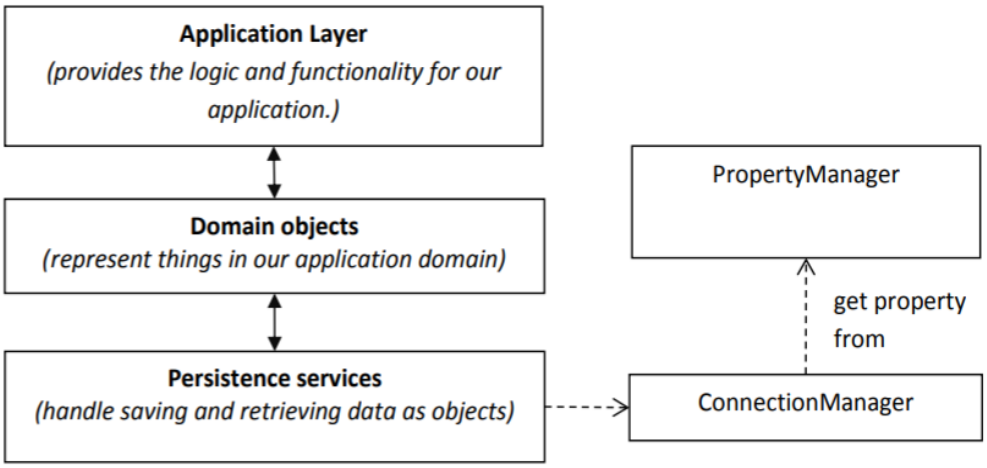
» Understand how to connect to database server and all components of JDBC APIs.

» How to work with Statement, ResultSet, PrepareStatement, CallableStatement, Stored procedures using INPUT/OUTPUT parametters

» How to call and execute stored procedures with java program.

Product Architecture:

This application will be developed using following architecture:



» The domain layer contains objects and logic related to our application.

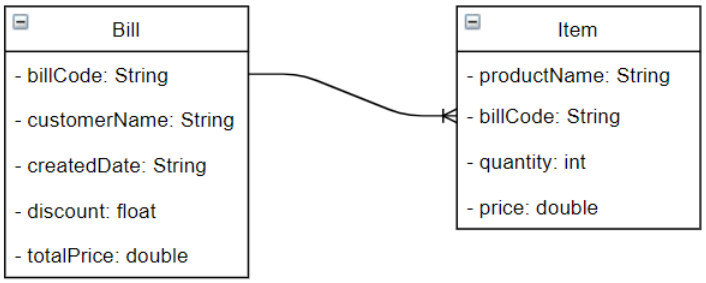
» The persistence layer contains data access objects (DAO) that provide services for accessing persistent data. DAO provide 4 basic services referred to as CRUD:

- ✓ Creaate: save new object data to the database.
- ✓ Retrieve: find object data in the database and recreate objects. There may be several methods for this service to enable different forms of object lookup.
- ✓ Update: update data for an object already saved to the database.
- ✓ Delete: delete object data from the database.

Write a program that simulates the functions of the sales system.

Lab Specifications:

For the hierarchy below, the trainee will create java classes that will implement this class diagram. Your classes should be able to show relationship between the entities.



Create a class called **Bill** with the following information:

» Five private instance variables: billCode (String), customerName (String), createdDate (String), discount(float), totalPrice(double).

» Default constructor, getter and setter method. Also overiding toString method().

And a class called **Item** with the following information:

» Four private instance variables: billCode (String), productName (String), quantity (int), price(double).

» Default constructor, getter and setter method. Also overiding toString method().

Business Rules:

» Bill code: start with B letter follows 4 digit numbers (i.e. B0000).

» One bill will has multiple items and a customer can has several bills.

Functional Requirements:

a. Create a new bill and save into the database using Stored Procedure (method named `boolean saveBill(Bill bill)).`

b. Add one or more item(s) for a bill into the database (method named `boolean addItems(final List<Item> items)`).

c. Display all bills from the database, sorted by created date (method named `List<Bill> getAll()`).

d. Display all bills which belongs to a specific customer, sorted by created date (method named `List<Bill> findBillsByCustomerName(final String customerName)`).

e. Display all items from a specific bill, sorted by item name using function (method named `Bill findBillsByBillCode(final String billCode)`).

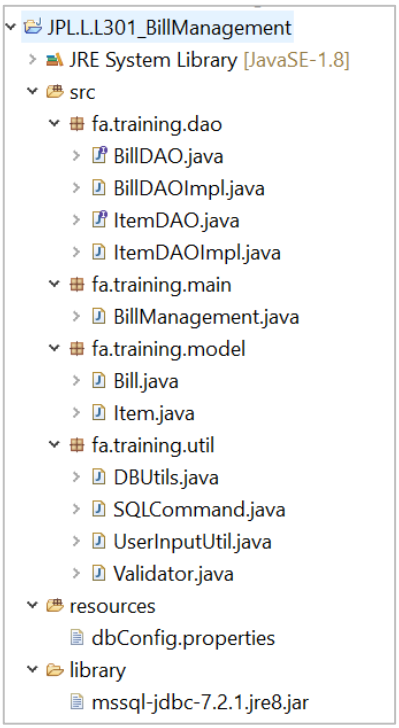
f. Delete one or more item(s) from a bill using Stored Procedure (method named `boolean deleteItems(final List<Item> items)`).

Screen Designs:

```
-----Menu-----
1. Create new bill
2. Add one or more item(s) into a specific bill
3. Delete one or more item(s) from a bill
4. Display all bills, sorted by created date
5. Display customer's bills, sorted by created date
6. Display items from a specific bill
7. Exit
Enter your choice:
```

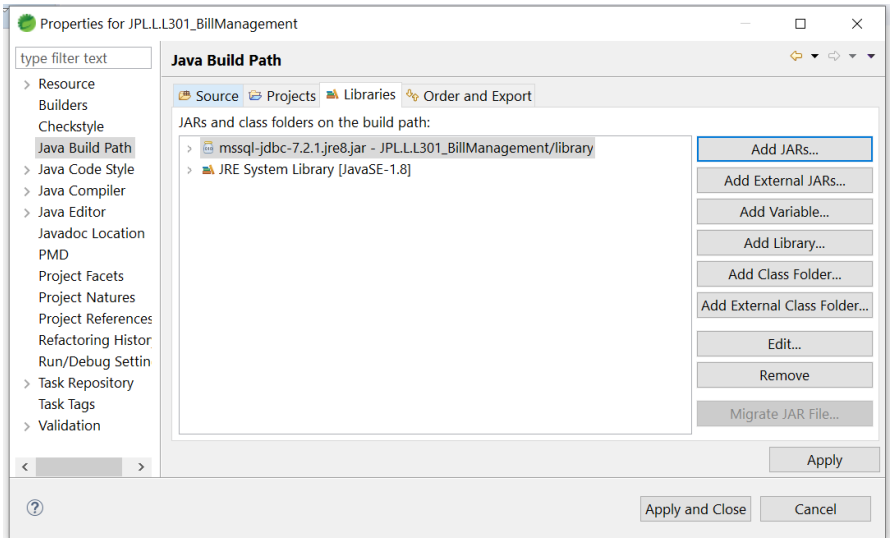
Guidelines:

» Step 1. Create a new project named **JPL.L.L301_BillManagement**



» Step 2. Add **mssql-jdbc-7.2.1.jre8.jar** to Java build path.

Right click on the project, choose **Properties** -> **Java Build Path** -> **Add JARs.**



» Step 3. Create *Source folder* named **resources** with the following property files:

dbConfig.properties file:

```
dbConfig.properties
1 driver=com.microsoft.sqlserver.jdbc.SQLServerDriver
2 url=jdbc:sqlserver://localhost:1433;databaseName=BillManagement
3 userName=sa
4 password=12345678
```

» Step 4. Create package *fa.training.model* that contains classes named **Bill** class and **Item** class as follows:

Bill class:

```
1.  public class Bill implements Serializable {
2.    private static final long serialVersionUID = 1L;
3.
4.    private String billCode;
5.    private String customerName;
6.    private String createdDate;
7.    private float discount;
8.    private double totalPrice;
9.
10.   public Bill() {
11.     super();
12.   }
13.
14.   public Bill(String billCode, String customerName, String createdDate,
15.       float discount, double totalPrice) {
16.     super();
17.     this.billCode = billCode;
18.     this.customerName = customerName;
19.     this.createdDate = createdDate;
20.     this.discount = discount;
21.     this.totalPrice = totalPrice;
22.   }
23.
24.   // getter and setter
25.   // overide toString() method
26. }
```

Item class:

```
1.  public class Item implements Serializable {
2.    private static final long serialVersionUID = 1L;
3.    private String productName;
4.    private String billCode;
5.    private int quantity;
6.    private double price;
7.
8.    public Item() {
9.      super();
10.   }
11.
12.   public Item(String productName, String billCode, int quantity, double price) {
13.     super();
14.     this.productName = productName;
15.     this.billCode = billCode;
16.     this.quantity = quantity;
17.     this.price = price;
18.   }
19.
20.   //getter and setter
21.   // overide toString() method
22. }
```

» Step 5. Create package *fa.training.util* that contains classes named **DBUtils**, **UserInputUtil** and **Validator** class as follows:

DBUtils class:

```
1.  public class DBUtils {
2.
3.    private static DBUtils instance;
4.    private Connection connection;
5.
6.    private DBUtils() {
7.      Properties properties = new Properties();
8.
9.      try {
10.       properties.load(
11.           DBUtils.class.getResourceAsStream("/dbConfig.properties"));
12.
13.       String driver = properties.getProperty("driver");
14.       String url = properties.getProperty("url");
15.       String userName = properties.getProperty("userName");
16.       String password = properties.getProperty("password");
17.
18.       Class.forName(driver);
19.
20.       connection = DriverManager.getConnection(url, userName, password);
21.
22.     } catch (ClassNotFoundException | SQLException | IOException e) {
23.       e.printStackTrace();
24.     }
25.   }
26.   /**
27.    * Get the connection from the instance
28.    *
29.    * @return {@link Connection}
30.    */
31.   public Connection getConnection() {
32.     return connection;
33.   }
34.
35.   /**
36.    * Create new instance which connects with the database.
37.    *
38.    * @return DBUtils
39.    * @throws SQLException if connection false.
40.    */
41.   public static DBUtils getInstance() throws SQLException {
42.     if (instance == null || instance.getConnection().isClosed()) {
43.       instance = new DBUtils();
44.     }
45.     return instance;
46.   }
47. }
```

Validator class:

```
1.  public class Validator {
2.    /**
3.     * Check bill code follow the pattern.
4.     *
5.     * @method isValidBillCode
6.     * @param billCode
7.     * @return true if bill code is valid, else false
8.     */
9.    public static boolean isValidBillCode(String billCode) {
10.     return Pattern.matches("^(B)[0-9]{4}$", billCode);
11.   }
12. }
```

UserInputUtil class:

```
13. package fa.training.util;
14.
15. import java.util.Scanner;
16. public class UserInputUtil {
17.
18.   /**
19.    * Get value type integer from console.
20.    *
21.    * @method inputTypeInt
22.    * @param value
23.    */
24.   public static int inputTypeInt(String value) {
25.     int intValue = 0;
26.     do {
27.       try {
28.         intValue = Integer.parseInt(value);
29.       } catch (Exception e) {
30.         System.out.println("Please input int value!");
31.       }
32.       break;
33.     } while (true);
34.     return intValue;
35.   }
36.
37.   /**
38.    * Get value type float from console.
39.    *
40.    * @method inputTypeFloat
41.    * @param value
42.    */
43.   public static float inputTypeFloat(String value) {
44.     float floatValue = 0;
45.     do {
46.       try {
47.         floatValue = Float.parseFloat(value);
48.       } catch (Exception e) {
49.         System.out.println("Please input float value!");
50.       }
51.       break;
52.     } while (true);
53.     return floatValue;
54.   }
55.
56.   /**
57.    *  Get value type double from console.
58.    *
59.    * @method inputTypeDouble
60.    * @param value
61.    */
62.   public static double inputTypeDouble(String value) {
63.     double doubleValue = 0;
64.     do {
65.       try {
66.         doubleValue = Double.parseDouble(value);
67.       } catch (Exception e) {
68.         System.out.println("Please input double value!");
69.       }
70.       break;
71.     } while (true);
72.     return doubleValue;
73.   }
74.
75.   /**
76.    *  Get a valid bill code from console.
77.    *
78.    * @method checkBillCode
```

```
79.    * @param scanner
80.    * @return
81.    */
82.   public static String checkBillCode(Scanner scanner) {
83.     String billCode;
84.
85.     System.out.println("Enter bill code:");
86.     billCode = scanner.nextLine();
87.
88.     while (!Validator.isValidBillCode(billCode)) {
89.       System.out.println("Invalid bill code: (example: B0000)");
90.       billCode = scanner.nextLine();
91.     }
92.
93.     return billCode;
94.   }
95. }
```

SQLCommand class:

```
1.  public class SQLCommand {
2.    public static String BILL_QUERY_FIND_ALL =
3.                  "SELECT *, dbo.udf_ComputeBillTotal(bill_code) AS total_price FROM Bill";
4.    public static String BILL_QUERY_ADD = "{CALL usp_AddBill(?, ?, ?, ?, ?)}";
5.    public static String BILL_QUERY_DELETE = "{CALL usp_DeleteBill(?, ?)}";
6.    public static String BILL_QUERY_FIND_BY_CODE =
7.                          "SELECT *, dbo.udf_ComputeBillTotal(bill_code) AS total_price
8.                          FROM Bill WHERE bill_code=?";
9.    public static String BILL_QUERY_FIND_BY_CUSTOMER_NAME =
10.                 "SELECT *, dbo.udf_ComputeBillTotal(bill_code) AS total_price
11.                 FROM Bill WHERE customer_name=?";
12.   public static String ITEM_QUERY_FIND_ALL =
13.                         "SELECT * FROM dbo.udf_FindItemsByBillCode(?)";
14.   public static String ITEM_QUERY_ADD =
15.         "INSERT INTO Item(product_name, bill_code, quantity, price) VALUES (?, ?, ?, ?)";
16.   public static String ITEM_QUERY_DELETE =
17.                         "DELETE FROM Item WHERE bill_code=? AND product_name=?";
18.   public static String ITEM_QUERY_FIND_CODE_AND_PRODUCT_NAME =
19.                         "SELECT * FROM Item WHERE bill_code=? AND product_name=?";
20. }
```

» Step 6. Create package *fa.training.dao* that contains **BillIDAO, ItemDAO** interfaces and classes named **BillDAOImpl**, **ItemDAOImpl** class as follows:

BillDAO interface:

```
1.  package fa.training.dao;
2.
3.  import java.sql.SQLException;
4.  import java.util.List;
5.
6.  import fa.training.model.Bill;
7.
8.  public interface BillDAO {
9.
10.     /**
11.      * Execute a query to get all bills from database.
12.      *
13.      * @method getAll
14.      * @return list of bills
15.      * @throws SQLException
16.      */
17.     List<Bill> getAll() throws SQLException;
18.
19.     /**
20.      * Call a stored procedure to save a bill to database.
21.      *
22.      * @method saveBill
23.      * @param bill
```

```
24.      * @return true if inserts success to database, else false
25.      * @throws SQLException
26.      */
27.     boolean saveBill(Bill bill) throws SQLException;
28.
29.     /**
30.      * Execute a query to retrieve a bill by its code.
31.      *
32.      * @method findBillsByBillCode
33.      * @param billCode
34.      * @return bill if found, else null
35.      * @throws SQLException
36.      */
37.     Bill findBillsByBillCode(String billCode) throws SQLException;
38.
39.     /**
40.      * Execute a query to retrieve bills by its customer name.
41.      *
42.      * @method findBillsByCustomerName
43.      * @param customerName
44.      * @return list of bills
45.      * @throws SQLException
46.      */
47.     List<Bill> findBillsByCustomerName(String customerName) throws SQLException;
48.
49. }
```

ItemDAO interface:

```
1.  package fa.training.dao;
2.
3.  import java.sql.SQLException;
4.  import java.util.List;
5.
6.  import fa.training.model.Item;
7.
8.  public interface ItemDAO {
9.
10.     /**
11.      * This method is for saving items to the database, using batch.
12.      *
13.      * @method addItems
14.      * @param items
15.      * @return true if saves success, else false
16.      * @throws SQLException
17.      */
18.     boolean addItems(List<Item> items) throws SQLException;
19.
20.     /**
21.      * This method is for deleting items from the database, using batch.
22.      *
23.      * @method deleteItems
24.      * @param items
25.      * @return true if deletes success, else false
26.      * @throws SQLException
27.      */
28.     boolean deleteItems(List<Item> items) throws SQLException;
29.
30.     /**
31.      * Execute a query to get all items of a specific bill, using batch.
32.      *
33.      * @method getAllByBillCode
34.      * @param billCode
35.      * @return list of items
36.      * @throws SQLException
37.      */
38.     List<Item> getAllByBillCode(String billCode) throws SQLException;
39.
```

```
    /**
     * Execute a query to check an item was exist or not.
     *
     * @method checkItemExist
     * @param item
     * @return true if exist, else false
     * @throws SQLException
     */
    boolean checkItemExist(Item item) throws SQLException;
}
```

BillDaoImpl class:

```
package fa.training.dao;

//Imports

/**
 * author Duy Bach.
 *
 * @time 4:04:17 PM
 * @date Jun 16, 2019
 */
public class BillDAOImpl implements BillDAO {

    private Connection connection = null;
    private PreparedStatement preparedStatement = null;
    private CallableStatement caStatement = null;
    private ResultSet results = null;

    @Override
    public List<Bill> getAll() throws SQLException {
        List<Bill> bills = new ArrayList<>();
        Bill bill = null;
        try {
            connection = DBUtils.getInstance().getConnection();
            preparedStatement =
               connection.prepareStatement(SQLCommand.BILL_QUERY_FIND_ALL);
            results = preparedStatement.executeQuery();
            while (results.next()) {
                bill = new Bill();

                bill.setBillCode(results.getString("bill_code").trim());
                bill.setCustomerName(results.getString("customer_name"));
                bill.setCreatedDate(results.getString("created_date"));
                bill.setDiscount(results.getInt("discount"));
                bill.setTotalPrice(results.getDouble("total_price"));
                bills.add(bill);
            }
        } finally {
            try {
                if (connection != null) {
                    connection.close();
                }
                if (preparedStatement != null) {
                    preparedStatement.close();
                }
            } catch (SQLException e) {
                e.printStackTrace();
            }
        }
        return bills;
    }


@Override
    public boolean saveBill(Bill bill)
                                        throws SQLException {
        boolean check = false;
```

```
57.         try {
58.             connection = DBUtils.getInstance().getConnection();
59.             caStatement = connection.prepareCall(SQLCommand.BILL_QUERY_ADD);
60.
61.             caStatement.setString(1, bill.getBillCode());
62.             caStatement.setString(2, bill.getCustomerName());
63.             caStatement.setString(3, bill.getCreatedDate());
64.             caStatement.setFloat(4, bill.getDiscount());
65.             caStatement.registerOutParameter(5, Types.INTEGER);
66.             caStatement.execute();
67.             if (caStatement.getInt(5) == 1) {
68.                 check = true;
69.             }
70.
71.         } finally {
72.             try {
73.                 if (connection != null) {
74.                     connection.close();
75.                 }
76.                 if (caStatement != null) {
77.                     caStatement.close();
78.                 }
79.             } catch (SQLException e) {
80.                 e.printStackTrace();
81.             }
82.         }
83.         return check;
84.     }
85.
86.     @Override
87.     public Bill findBillsByBillCode(final String billCode)
88.                                             throws SQLException {
89.         Bill bill = null;
90.         try {
91.             connection = DBUtils.getInstance().getConnection();
92.             preparedStatement =
93.                connection.prepareStatement(SQLCommand.BILL_QUERY_FIND_BY_CODE);
94.             preparedStatement.setString(1, billCode);
95.             results = preparedStatement.executeQuery();
96.             if (results.next()) {
97.                 bill = new Bill();
98.
99.                 bill.setBillCode(results.getString("bill_code").trim());
100.                        bill.setCustomerName(results.getString("customer_name"));
101.                        bill.setCreatedDate(results.getString("created_date"));
102.                        bill.setDiscount(results.getInt("discount"));
103.                        // bill.setTotalPrice(results.getDouble("total_price"));
104.                    }
105.                }  finally {
106.                    try {
107.                        if (connection != null) {
108.                            connection.close();
109.                        }
110.                        if (preparedStatement != null) {
111.                            preparedStatement.close();
112.                        }
113.                    } catch (SQLException e) {
114.                        e.printStackTrace();
115.                    }
116.                }
117.                return bill;
118.            }
119.
120.            /**
121.             * Execute a query to retrieve bills by its customer name.
122.             *
123.             * @method findBillsByCustomerName
124.             * @param customerName
125.             * @return list of bills
```

```
126.             * @throws SQLException
127.             */
128.            public List<Bill> findBillsByCustomerName(final String customerName)
129.                                                    throws SQLException {
130.                List<Bill> bills = new ArrayList<>();
131.                Bill bill = null;
132.                try {
133.                    connection = DBUtils.getInstance().getConnection();
134.                    preparedStatement =
135.                              connection.prepareStatement(
136.                              SQLCommand.BILL_QUERY_FIND_BY_CUSTOMER_NAME);
137.                    preparedStatement.setString(1, customerName);
138.                    results = preparedStatement.executeQuery();
139.                    while (results.next()) {
140.                        bill = new Bill();
141.
142.                        bill.setBillCode(results.getString("bill_code").trim());
143.                        bill.setCustomerName(results.getString("customer_name"));
144.                        bill.setCreatedDate(results.getString("created_date"));
145.                        bill.setDiscount(results.getInt("discount"));
146.                        bill.setTotalPrice(results.getDouble("total_price"));
147.
148.                        bills.add(bill);
149.                    }
150.                }  finally {
151.                    try {
152.                        if (connection != null) {
153.                            connection.close();
154.                        }
155.                        if (preparedStatement != null) {
156.                            preparedStatement.close();
157.                        }
158.                    } catch (SQLException e) {
159.                        e.printStackTrace();
160.                    }
161.                }
162.                return bills;
163.            }
164.
165.        }
```

ItemDAOImpl class:

```
1.  package fa.training.dao;
2.
3.  // Imports
4.
5.  /**
6.   * author Duy Bach.
7.   *
8.   * @time 4:04:50 PM
9.   * @date Jun 16, 2019
10.  */
11. public class ItemDAOImpl implements ItemDAO {
12.     private Connection connection = null;
13.     private PreparedStatement preparedStatement = null;
14.     private ResultSet results = null;
15.
16.     @Override
17.     public boolean addItems(final List<Item> items) throws SQLException {
18.
19.         boolean check = false;
20.         int results[] = null;
21.         try {
22.             connection = DBUtils.getInstance().getConnection();
23.             connection.setAutoCommit(false);
24.             preparedStatement =
25.                       connection.prepareStatement(SQLCommand.ITEM_QUERY_ADD);
26.
```

```
27.             items.stream().forEach((item) -> {
28.                 try {
29.                     preparedStatement.setString(1, item.getProductName());
30.                     preparedStatement.setString(2, item.getBillCode().trim());
31.                     preparedStatement.setInt(3, item.getQuantity());
32.                     preparedStatement.setDouble(4, item.getPrice());
33.
34.                     preparedStatement.addBatch();
35.                 } catch (SQLException e) {
36.                     e.printStackTrace();
37.                 }
38.             });
39.             results = preparedStatement.executeBatch();
40.             connection.commit();
41.         } finally {
42.             try {
43.                 if (connection != null) {
44.                     connection.close();
45.                 }
46.                 if (preparedStatement != null) {
47.                     preparedStatement.close();
48.                 }
49.             } catch (SQLException e) {
50.                 e.printStackTrace();
51.             }
52.         }
53.
54.         if (results.length > 0) {
55.             check = true;
56.         }
57.         return check;
58.     }
59.
60.     @Override
61.     public boolean deleteItems(final List<Item> items) throws SQLException {
62.         boolean check = false;
63.         int results[] = null;
64.         try {
65.             connection = DBUtils.getInstance().getConnection();
66.             connection.setAutoCommit(false);
67.             preparedStatement =
68.                       connection.prepareStatement(SQLCommand.ITEM_QUERY_DELETE);
69.
70.             items.stream().forEach((item) -> {
71.                 try {
72.
73.                     preparedStatement.setString(1, item.getBillCode());
74.                     preparedStatement.setString(2, item.getProductName());
75.
76.                     preparedStatement.addBatch();
77.                 } catch (SQLException e) {
78.                     e.printStackTrace();
79.                 }
80.             });
81.             results = preparedStatement.executeBatch();
82.             connection.commit();
83.         } finally {
84.             try {
85.                 if (connection != null) {
86.                     connection.close();
87.                 }
88.                 if (preparedStatement != null) {
89.                     preparedStatement.close();
90.                 }
91.             } catch (SQLException e) {
92.                 e.printStackTrace();
93.             }
94.         }
95.
```

```
96.         if (results.length > 0) {
97.             check = true;
98.         }
99.         return check;
100.        }
101.
102.        @Override
103.        public List<Item> getAllByBillCode(String billCode)
104.                    throws SQLException {
105.            List<Item> items = new ArrayList<>();
106.            Item item = null;
107.            try {
108.                connection = DBUtils.getInstance().getConnection();
109.                preparedStatement =
110.                   connection.prepareStatement(SQLCommand.ITEM_QUERY_FIND_ALL);
111.                preparedStatement.setString(1, billCode);
112.                results = preparedStatement.executeQuery();
113.                while (results.next()) {
114.                    item = new Item();
115.
116.                    item.setBillCode(results.getString("bill_code"));
117.                    item.setProductName(results.getString("product_name"));
118.                    item.setQuantity(results.getInt("quantity"));
119.                    item.setPrice(results.getDouble("price"));
120.
121.                    items.add(item);
122.                }
123.            } finally {
124.                try {
125.                    if (connection != null) {
126.                        connection.close();
127.                    }
128.                    if (preparedStatement != null) {
129.                        preparedStatement.close();
130.                    }
131.                } catch (SQLException e) {
132.                    e.printStackTrace();
133.                }
134.            }
135.            return items;
136.        }
137.
138.        @Override
139.        public boolean checkItemExist(Item item) throws SQLException {
140.            boolean check = false;
141.            try {
142.                connection = DBUtils.getInstance().getConnection();
143.                preparedStatement =
144.                          connection.prepareStatement(
145.                          SQLCommand.ITEM_QUERY_FIND_CODE_AND_PRODUCT_NAME);
146.                preparedStatement.setString(1, item.getBillCode());
147.                preparedStatement.setString(2, item.getProductName());
148.                results = preparedStatement.executeQuery();
149.                if (results.next()) {
150.                    check = true;
151.                }
152.            } finally {
153.                try {
154.                    if (connection != null) {
155.                        connection.close();
156.                    }
157.                    if (preparedStatement != null) {
158.                        preparedStatement.close();
159.                    }
160.                } catch (SQLException e) {
161.                    e.printStackTrace();
162.                }
163.            }
```

```
164.                return check;
165.            }
166.
167.        }
```

» Step 7. Create package *fa.training.main* that contains **BillManagement** class as follows:

BillManagement class:

```
1.  public class BillManagement {
2.
3.    static BillDAO billDAO = new BillDAOImpl();
4.    static ItemDAO itemDAO = new ItemDAOImpl();
5.
6.    public static void main(String[] args) {
7.      Scanner scanner = new Scanner(System.in);
8.      List<Bill> bills = new ArrayList<>();
9.      List<Item> items = new ArrayList<>();
10.     String billCode;
11.     String loop = "";
12.     Item item = null;
13.     String choice = "";
14.     do {
15.       getMenu();
16.       System.out.println("Enter your choice:");
17.       choice = scanner.nextLine();
18.
19.       switch (choice) {
20.       case "1":
21.         Bill bill = new Bill();
22.         do {
23.           bill.setBillCode(UserInputUtil.checkBillCode(scanner));
24.         } while (billDAO.findBillsByBillCode(bill.getBillCode()) != null);
25.
26.         System.out.println("Enter customer name:");
27.         bill.setCustomerName(scanner.nextLine());
28.
29.         System.out.println("Enter discount:");
30.         bill.setDiscount(UserInputUtil.inputTypeFloat(scanner.nextLine()));
31.
32.         bill.setCreatedDate(getCurrentDate());
33.
34.         boolean check = billDAO.saveBill(bill);
35.         if (check) {
36.           System.out.println("Saved success!");
37.         }
38.         break;
39.       case "2":
40.         if (!items.isEmpty()) {
41.           items.clear();
42.         }
43.
44.         billCode = UserInputUtil.checkBillCode(scanner);
45.
46.         if (billDAO.findBillsByBillCode(billCode) == null) {
47.           System.out.println("No bill code = " + billCode + " found!");
48.         } else {
49.           do {
50.             item = new Item();
51.
52.             item.setBillCode(billCode);
53.
54.             do {
55.               System.out.println("Enter product name:");
56.               item.setProductName(scanner.nextLine());
57.             } while (checkProductExist(items, item.getProductName()));
58.
59.             System.out.println("Enter quantity:");
60.             item.setQuantity(UserInputUtil.inputTypeInt(scanner.nextLine()));
```

```
61.             System.out.println("Enter product price:");
62.             item.setPrice(UserInputUtil.inputTypeDouble(scanner.nextLine()));
63.
64.             items.add(item);
65.
66.             System.out.println("Do you want to continue adding (Y|N)?");
67.             loop = scanner.nextLine();
68.           } while (loop.charAt(0) == 'Y' || loop.charAt(0) == 'y');
69.
70.           itemDAO.addItems(items);
71.         }
72.         break;
73.       case "3":
74.         if (!items.isEmpty()) {
75.           items.clear();
76.         }
77.         loop = "";
78.         billCode = UserInputUtil.checkBillCode(scanner);
79.
80.         if (billDAO.findBillsByBillCode(billCode) == null) {
81.           System.out.println("No bill code = " + billCode + " found!");
82.         } else {
83.           do {
84.             item = new Item();
85.
86.             item.setBillCode(billCode);
87.
88.             do {
89.               System.out.println("Enter product name:");
90.               item.setProductName(scanner.nextLine());
91.             } while (checkProductExist(items, item.getProductName()));
92.
93.             items.add(item);
94.
95.             System.out.println("Do you want to continue deleting (Y|N)?");
96.             loop = scanner.nextLine();
97.           } while (loop.charAt(0) == 'Y' || loop.charAt(0) == 'y');
98.
99.           itemDAO.deleteItems(items);
100.               }
101.               break;
102.             case "4":
103.               bills = billDAO.getAll();
104.               if (bills.isEmpty()) {
105.                 System.out.println("No bill found!");
106.               } else {
107.                 System.out.println("---List of bills---");
108.
109.                 bills.stream().sorted(Comparator.comparing(Bill::getCreatedDate))
110.                     .forEach(System.out::println);
111.               }
112.               break;
113.             case "5":
114.               System.out.println("Enter customer name:");
115.               String customerName = scanner.nextLine();
116.               bills = billDAO.findBillsByCustomerName(customerName);
117.               if (bills.isEmpty()) {
118.                 System.out.println("No bill found!");
119.               } else {
120.                 System.out.println("---List of bills---");
121.
122.                 bills.stream().sorted(Comparator.comparing(Bill::getCreatedDate))
123.                     .forEach(System.out::println);
124.               }
125.               break;
126.             case "6":
127.               billCode = UserInputUtil.checkBillCode(scanner);
128.
129.               items = itemDAO.getAllByBillCode(billCode);
```

```
130.
131.                if (items.isEmpty()) {
132.                  System.out.println("No data found!");
133.                } else {
134.                  System.out.println("---List all items from bill---");
135.                  items.stream().forEach(System.out::println);
136.                }
137.                break;
138.              case "7":
139.                System.exit(0);
140.                break;
141.              default:
142.                System.out.println("Invalid input!");
143.                break;
144.              }
145.            } while (true);
146.
147.          }
148.
149.          public static void getMenu() {
150.            System.out.println("-----Menu-----");
151.            System.out.println("1. Create new bill");
152.            System.out.println("2. Add one or more item(s) into a specific bill");
153.            System.out.println("3. Delete one or more item(s) from a bill");
154.            System.out.println("4. Display all bills, sorted by created date");
155.            System.out.println("5. Display customer's bills,
156.                                                  sorted by created date");
157.            System.out.println("6. Display items from a specific bill");
158.            System.out.println("7. Exit");
159.          }
160.
161.          /**
162.           * This method is checked if the product name exist in the list or not
163.           *
164.           * @method checkProductExist
165.           * @param items, productName
166.           * @return true if product name is exist, otherwise false
167.           */
168.          private static boolean checkProductExist(final List<Item> items,
169.              final String productName) {
170.            boolean check = items.stream()
171.                .anyMatch((Item item) ->
172.                                    productName.equals(item.getProductName()));
173.            return check;
174.          }
175.
176.          public static String getCurrentDate() {
177.            SimpleDateFormat format = new SimpleDateFormat("yyyy-MM-dd");
178.            return format.format(new Date());
179.          }
180.        }
```

----oOo-----

THE END