

OOP Report.docx

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Introduction

Procedural programming includes creating processes or methods that operate on data, whereas object-oriented programming entails creating objects that include both data and methods. Coding in an object-oriented way has several advantages. Some of them include the fact that OOP is quick and easy to use, that OOP gives programs a clear structure, that the OOP instructions make Java code simpler to maintain, modify, and debug, and that OOP allows for the creation of fully reusable application fields with less code and quicker development times.

I've noted the specific OOP diagrams in this document that correspond to the assignment scenario. ¹² Use case diagrams, class diagrams, and sequence diagrams are a few of these diagrams. I then designed an automated transaction processing system for a phone store named "Digital Tech Mobile Shop" after identifying the fundamentals of object-oriented programming. Finally, there is also now a user manual available.

Task 1

a) Use case diagram

In the UML, a use case diagram enumerates all the details of the system, system actors, and their relationships to the system. There are certain connections and symbols that are used to build a use case diagram. Either ellipses or circles are used to depict the use cases. There are not many specifics in a use case diagram. The relationship between use cases, actors, and systems is displayed in a complete and efficient diagram to the highest level. Represents a well-immersed UCD,

- The system's scenario.
- The system's scope.
- Objectives that the system aids in achieving.

Explanation of use case diagram

The cashier and manager are two actors in the use case illustration that follows. The Digital Tech Mobile shop's automated transaction process system consists of 20 use cases. Each actor has a relationship to the specific use case. The actor referred to as Cashier interacts with the application's login, manage phone data, search, view, and place order use cases, while the other actor referred to as the Manager takes care of those use cases as well as creates and manages new accounts. The manager can create 2 types of accounts, which are user accounts and sales accounts. Although it is conceivable, each actor need not interact with every use case.

The search use case in the accompanying graphic includes search by category, brand, name, and price use cases, while the manage details use case includes add, edit, and delete use cases. Save was added to the update use case. After the cashier places the order, the bill is processed and the bill printed.

```

    usecaseDiagram
        actor User
        actor Cashier
        actor Manager

        usecase UC1[Manage Phone details and categories]
        usecase UC2[Search]
        usecase UC3[View]
        usecase UC4[Login]
        usecase UC5[Place order]
        usecase UC6[Create new account]
        usecase UC7[Manage account]
        usecase UC8[Add]
        usecase UC9[Update]
        usecase UC10[Delete]
        usecase UC11[Save]
        usecase UC12[Category]
        usecase UC13[Brand]
        usecase UC14[Name]
        usecase UC15[Price]
        usecase UC16[Print Bill]
        usecase UC17[User account]
        usecase UC18[Sales account]

        User -- UC1
        User -- UC2
        User -- UC3
        User -- UC4
        User -- UC5
        User -- UC6
        User -- UC7

        Cashier -- UC2
        Cashier -- UC3
        Cashier -- UC5

        Manager -- UC4
        Manager -- UC5
        Manager -- UC6
        Manager -- UC7

        UC1 -.-> UC8 : <<include>>
        UC1 -.-> UC9 : <<include>>
        UC1 -.-> UC10 : <<include>>
        UC9 -.-> UC11 : <<extend>>

        UC2 -.-> UC12 : <<include>>
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        UC5 -.-> UC16 : <<extend>>

        UC6 -.-> UC17 : <<include>>
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        UC7 -.-> UC9 : <<include>>
        UC7 -.-> UC10 : <<include>>
  
```

b) Class diagram

In UML, a class diagram is considered a static diagram. A class diagram represents the system's perspective. Class diagrams are used to observe, describe, and record many system components, as well as to create the system's source codes. A class diagram illustrates a class's characteristics and actions as well as the system's boundaries. Since class diagrams are the only UML diagrams that can be coupled directly with object-oriented languages, they are often used in the development of object-oriented systems.

A collection of classes, attributes, relationships, operations, and dependencies are shown in a class diagram. Another name for it is a structural diagram. A class diagram that is well-designed represents,

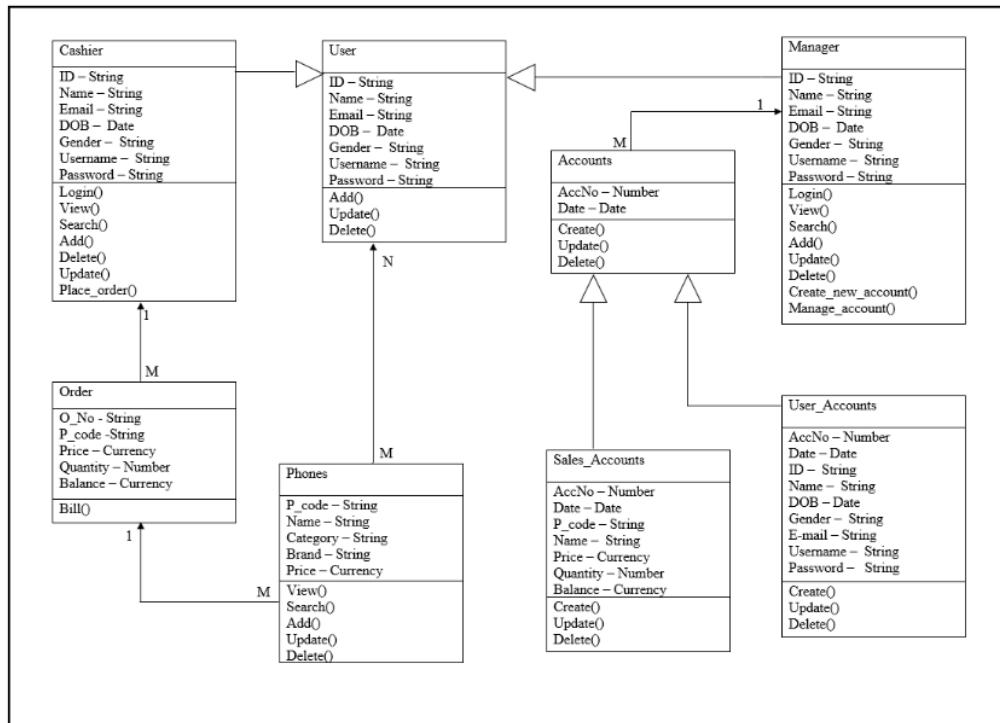
- Describe the project's functions.
- Backward and forward-compatible engineering.
- System analysis and design for the static perspective.
- This serves as the foundation for the creation of component and deployment diagrams.

Explanation of class diagram

The automated transaction process system for the Digital Tech Mobile store is shown in the class diagram that follows. There are 8 classes in this class diagram. The Super Class called User has two subclasses with the name's manager and cashier. User accounts and sales accounts are the two subclasses under the account class. The order class is related to the cashier class. The cashier is often involved in order cases. Due to its relationship with the user class and the fact that several things might be managed by a single user, the item class is unable to stand alone. Phone class affects order class. The Phone class is related to the User class.

A single phone can be managed by one or more users, and several users can handle a single phone. Both the cashier and the manager can use the login, search, view, add, update, and delete functions in the diagram, but the manager also has access to two extra actions: adding new accounts and updating and deleting existing ones.

A class diagram for the Digital Tech Mobile shop

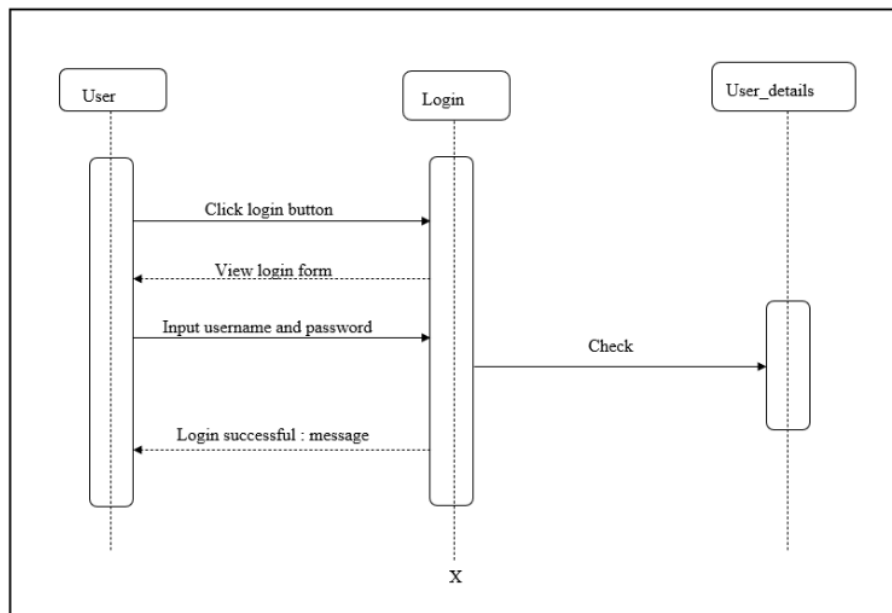


c) ² Sequence diagram

In the realm of software engineering, a sequence diagram, also known as a system sequence diagram, displays process interactions ordered in temporal sequence. Sequence diagrams are interaction diagrams in the UML, which depict how the system's activities are carried out. They depict how objects interact in a collaborative atmosphere. By using the vertical axis of the diagram to represent time and show when information is transmitted and when it is not, sequence diagrams, which are time-focused, graphically display the sequence of the interaction. This diagram is used for,

- To have a thorough understanding of how the pertinent or upcoming systems operate.
- To model and depict the logic of a complex system function, process, or method.
- Imagine how information and tasks move across the system's components.

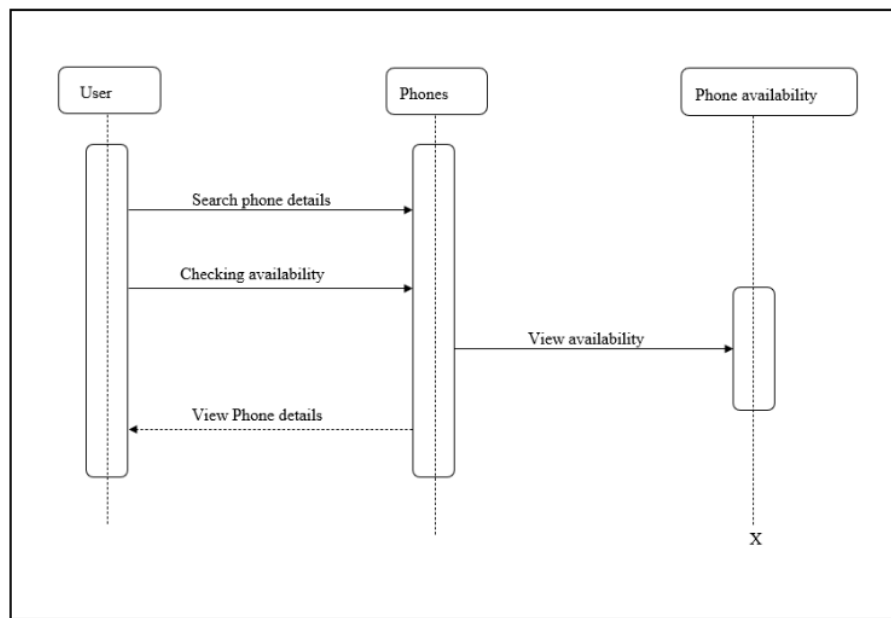
❖ User login



The method for logging into the system of Digital Tech Mobile Shop is depicted in the sequence diagram up above.

- Click the user class's login button.
- The login class displays a form.
- User class input username and password.
- Checks for correct entries in the login class.
- The user class receives the message from the login class.

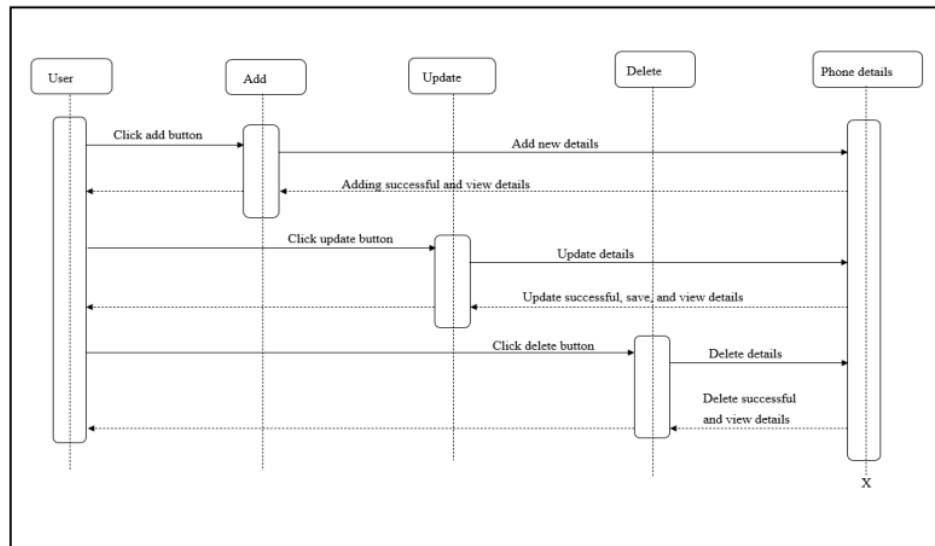
❖ Search phone details and view availability



The above sequence diagram shows the process used to view the availability of phones (phone details).

- User class search phone details of phone class.
- User class checking availability.
- Phone class view phone details to the user class.
- View the availability of phones.

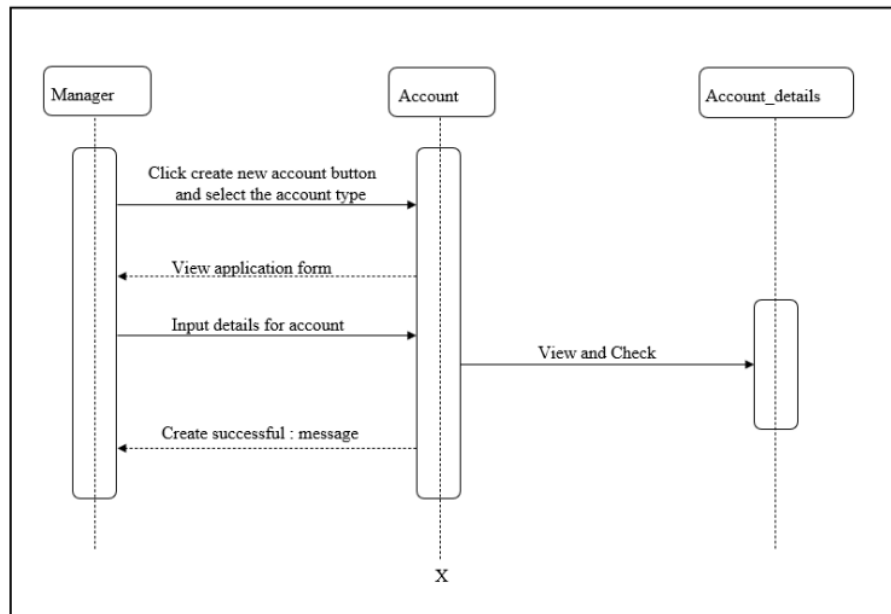
❖ Manage phone details



The above sequence diagram shows the process used to manage phone details through the system.

- Click the add button of the user class.
- Add class adds new details to the phone details class.
- Phone details give Adding a successful message to the user class.
- Click the update button of the user class.
- Update class update details on the phone details class.
- Phone details give updating successful messages to the user class.
- Click the delete button of the user class.
- Delete class delete details on the phone details class.
- Phone details give deleting successful message to the user class.

- Create a new account

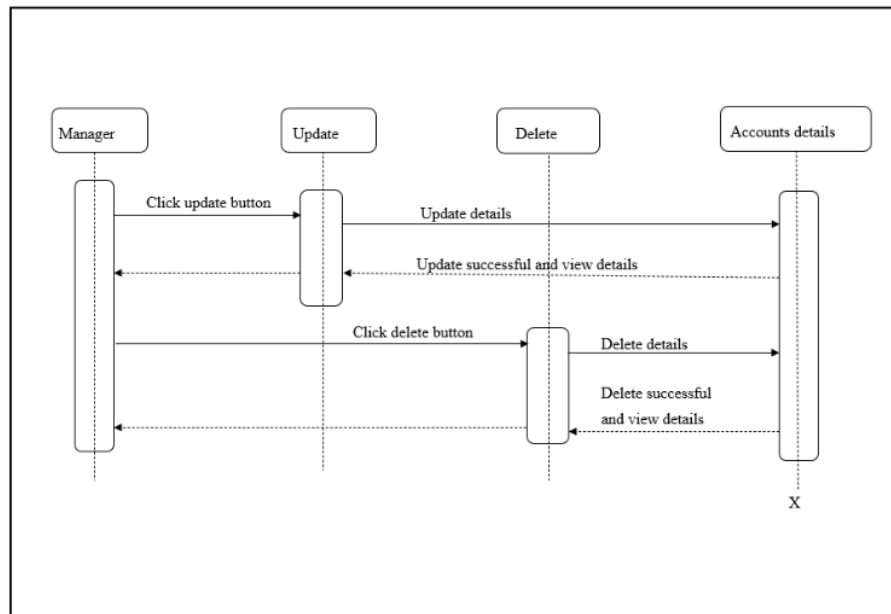


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The above sequence diagram shows the process used to create a new account through the system.

- Click create new account button and select the account type and click on the manager class.
- An application form is viewed by the manager from the account class.
- Manger class is input the account details for the account class.
- Manager class gets the message(create successfully) from the account class.
- Then manager can view and check account details.

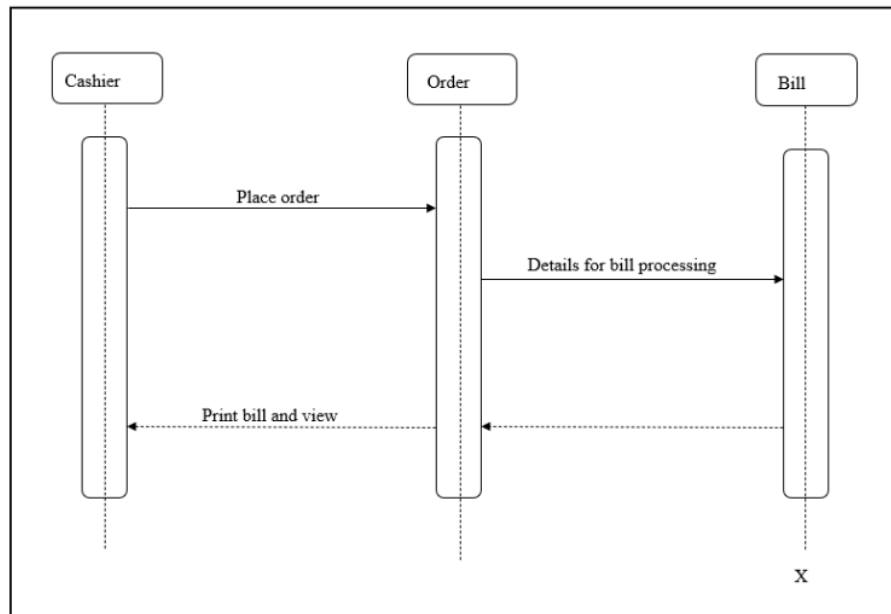
❖ Manage account



The above sequence diagram shows the process used to manage accounts through the system.

- Click the update button of the manager class.
- Update class update details on the account details class.
- Account details give updating successful messages to the user class.
- Click the delete button of the manager class.
- Add class deletes details on the account details class.
- Account details give deleting successful message to the user class.

❖ Place order and print bill (bill processing)



The above sequence diagram shows the process used to place orders and print bills (bill processing) in the system.

- Click the place order button on the cashier class.
- Order class will give the details for bill processing to the bill class.
- Bill class will print the bill and view it in the cashier class.

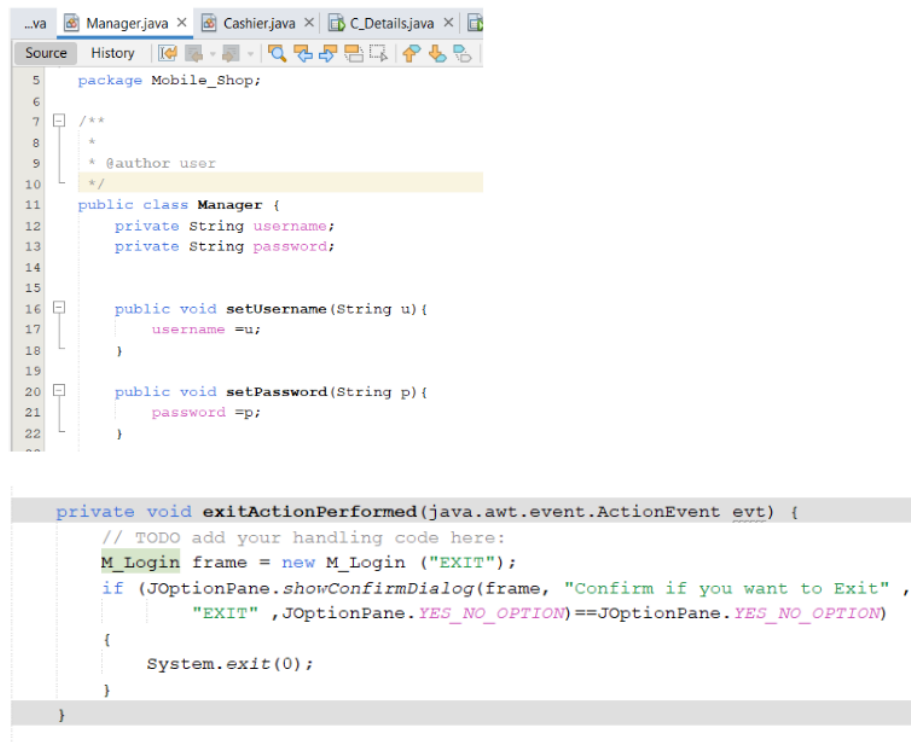
Task 2

1) Object

A Java object is a component of a Java class. Variables keep track of an object's state, while methods (functions) show what the object does. Templates usually referred to as classes, are used to build runtime objects. Java objects and those we may find in the outside world are very similar. Objects have three major qualities that may be seen. There are three attributes of an object,

- State - The states of a Java object are kept in fields that correspond to the various aspects of the object.
- Behavior - The process through which an item regulates its internal state and exhibits its behavior is known as behavior.
- Identity - It is used to specifically identify an object, such as a random ID number or a memory location.

Object - Manager



```
...va Manager.java X Cashier.java X C_Details.java X
Source History
5 package Mobile_Shop;
6
7 /**
8  *
9  * @author user
10 */
11 public class Manager {
12     private String username;
13     private String password;
14
15
16     public void setUsername(String u) {
17         username =u;
18     }
19
20     public void setPassword(String p) {
21         password =p;
22     }
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2) Class

6

In object-oriented programming, a class is a prototype or blueprint that specifies the variables and functions shared by all Java objects of a particular kind. It is a collection of entities with similar qualities. In OOPS, an object is a sample belonging to a class. Real-world things found in everyday life are frequently modeled using software objects. The following variable types might appear in a class.

- Local variables

Local variables are those that are defined within functions, constructors, or blocks. In Java, a local variable can be defined locally in constructors, code blocks, and methods. The variable would be created, initialized, and destroyed inside the function when the method is finished. A local variable has to have an initial value.

- Instance variables

Variables known as instance variables are those that are present in a class but are not linked to any methods. Java allows instance variables to be specified inside a class but outside of a block, method, or constructor. These variables are created with their default values when the class is constructed. When a class object is formed, these variables are also generated, and when an object of that class is deleted, they are also destroyed.

- Class variables

A class's static variables are those that are defined in the class's absence of any methods and are referred to as class variables. At the beginning of the program and when it is finished, a class variable may be established.

```

    * @author user
    */
    public class Cashier {
        private String username;
        private String password;

        public void setUsername(String u) {
            username =u;
        }

        public void setPassword(String p) {
            password =p;
        }

        public String getUsername() {
            return username;
        }

        public boolean login() {
            if(username.equalsIgnoreCase("cashier") && password.equalsIgnoreCase("c@123")) {
                return true;
            }else{
                return false;
            }
        }
    }
}

```

3) Abstraction

By retaining part of the user's information, data abstraction allows you to display just the information that is absolutely necessary. classes and methods that use the abstract keyword have an inaccessible modification.

- ❖ Abstraction class - a constrained class that is not capable of producing objects.
- ❖ Abstraction method - It has no body and is only applicable in abstract classes. The class's subclass supplies the body.
- Data Abstraction

Complex data types are usually constructed and their implementation is buried under this data abstraction. Without getting into to mechanics of the technology, this just exposes the procedures for manipulating those data structures.

- Control Abstraction

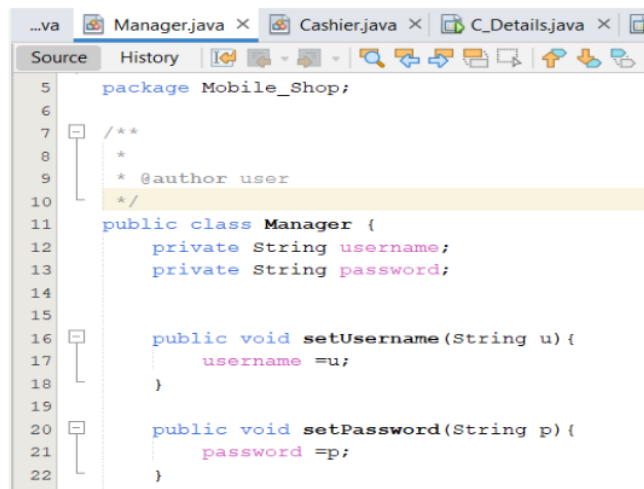
The entire user's control statements are compiled into a single object and provided through control abstraction. The cornerstone of structured programming, control abstraction enables us to create everything from simple functions to intricate systems.

4) Inheritance

Because of inheritance, new classes could be added on top of existing ones. Users can utilize the parent class's methods and attributes when they inherit from such an existing class. To your current class, you may also add new fields and methods. attributes that apply to one class but not to another, like the father-son connection. The method of inheriting all of an object's parent object's functionality is known as an inheritance in Java.

5) Encapsulation

One of the four basic OOP ideas is encapsulation. Encapsulation is the Java term for combining code (methods) and data (variables) into a single entity. The term "encapsulation" describes a class's variables as being hidden from other subclasses and only available through the current class's methods. Java's object-oriented encapsulation technique combines the class's data members and data methods inside a user-defined class. It's crucial to make this class secret. This is the alternative method of obtaining and processing.



```
...va  Manager.java x  Cashier.java x  C_Details.java x
Source  History  [Icons]
5      package Mobile_Shop;
6
7      /**
8       *
9       * @author user
10     */
11     public class Manager {
12         private String username;
13         private String password;
14
15
16         public void setUsername(String u) {
17             username =u;
18         }
19
20         public void setPassword(String p) {
21             password =p;
22         }
23     }
```


6) Polymorphism

The capacity of an item ⁴ to assume several forms is known as polymorphism. In Java, polymorphism refers to a class's capacity to provide several method implementations based on the kind of object sent in as a parameter. Polymorphic refers to any Java class ¹ that can pass and over one IS-A test. Every Java object was polymorphic because they all pass the IS-A test for both their own class and the class Object. . It's crucial to understand that a reference variable is the sole method for obtaining an object. Only one type of reference variable may be employed. Once a reference variable's type has been specified, it cannot be altered. Java is ⁷ an object-oriented programming language with a property called polymorphism that implies there are several methods to carry out a single operation.

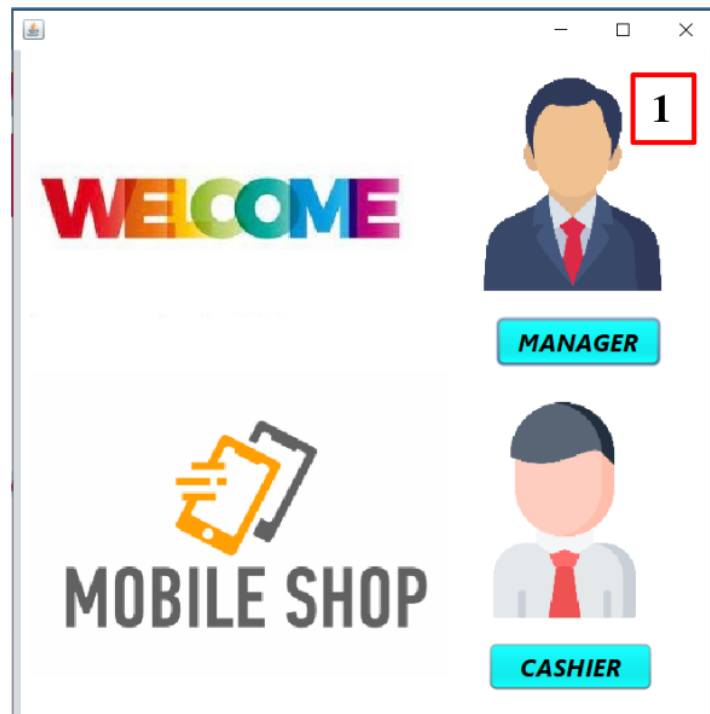
Task 3

User manual

Manager

1. Login function

We have a choice between two alternatives in the Welcome interface. The manager and Cashier are them. You must select the Manager option if you are a manager. You will then be sent to the manager login page. The Manager must enter the user name and password on the login screen before they can access the system.



Input username and password

username

password

NO	Function
1	When you click on the 'Manager' button you will be switched to the login interface
2	Input username as 'manager'
3	Input password as 'm@123'
4	When you click the reset button, you can re-enter your username and password
5	When you click the login button, you can go to the manager's main menu
6	When you click the exit button, you can exit from the system

2. Manager's main menu



NO	Function
7	When you click the 'User Account' button, you can go to the User Account Creation page
8	When you click the 'Sales Account' button, you can go to the Sales Account Creation page
9	When you click the 'search and view' button, you can search mobile details and view it
10	When you click the 'Add' button, you can add mobile details
11	When you click the 'Update' button, you can update your mobile details
12	When you click the 'Delete' button, you can delete mobile details
13	When you click the 'Manage Account' button, you can manage accounts (update and delete)
14	When you click the 'Logout' button, you can log out the system

3. Create a new user account

User Account Form

Account No **15**

Name

User ID

DOB

Email

Gender ☐ Male ☐ Female

Username

Password

Date

16 **17** **18**

View Account Details

Name	Name	User ID	DOB	Email	Gender	Usern...	Pass...	Date

NO	Function
15	Input user details and fill out the form
16	When you click the 'Back' button, you can go the main menu
17	When you click the 'Reset' button, you can reset the details
18	When you click the 'Create' button, you can create a new user account

4. Create a new sales account

The screenshot displays a web application interface. On the left, a teal-colored panel titled "Sales Account Form" contains six input fields: "Account No", "Phone_Code", "Name", "Price", "Quantity", and "Balance". Below these fields are three yellow buttons: "Back", "Reset", and "Create". On the right, a light green panel titled "Sales Accounts Details" contains a table with four columns: "Phone Code", "Price", "Quantity", and "Balance". The table body is currently empty. Red boxes with numbers are overlaid on the interface: box 19 is around the "Account No" field, box 20 is around the "Back" button, box 21 is around the "Reset" button, and box 22 is around the "Create" button.

NO	Function
19	Input sales details and fill out the form
20	When you click the 'Back' button, you can go to the main menu
21	When you click the 'Reset' button, you can reset the details
22	When you click the 'Create' button, you can create a new sales account

5. Updating accounts

The screenshot displays a web application window titled "Updating Account Details". It contains two main forms side-by-side. On the left is the "User Account Updating" form, and on the right is the "Sales Account Form".

Callout 23: Points to a "Delete" button located at the top left of the interface.

Callout 24: Points to a "Back" button located below the "Delete" button.

Callout 25: Points to the "Name" input field in the "User Account Updating" form.

Callout 26: Points to a "Reset" button at the bottom of the "User Account Updating" form.

Callout 27: Points to an "Update" button at the bottom of the "User Account Updating" form.

Callout 28: Points to the "Phone_Code" input field in the "Sales Account Form".

Callout 29: Points to a "Reset" button at the bottom of the "Sales Account Form".

Callout 30: Points to an "Update" button at the bottom of the "Sales Account Form".

The "User Account Updating" form includes fields for: Account No, Name, User ID, DOB, Email, Gender (Male/Female), Username, Password, and Date. The "Sales Account Form" includes fields for: Account No, Phone_Code, Name, Price, Quantity, and Balance.

NO	Function
23	When you click the 'Delete' button, you can go to the delete phone details interface
24	When you click the 'Back' button, you can go to the main menu
25	Input user details and fill out the form
26	When you click the 'Reset' button, you can reset the input user details
27	When you click the 'Update' button, you can update user account details
28	Input sales details and fill out the form
29	When you click the 'Reset' button, you can reset the input sales details
30	When you click the 'Update' button, you can update sales account details

6. Deleting accounts

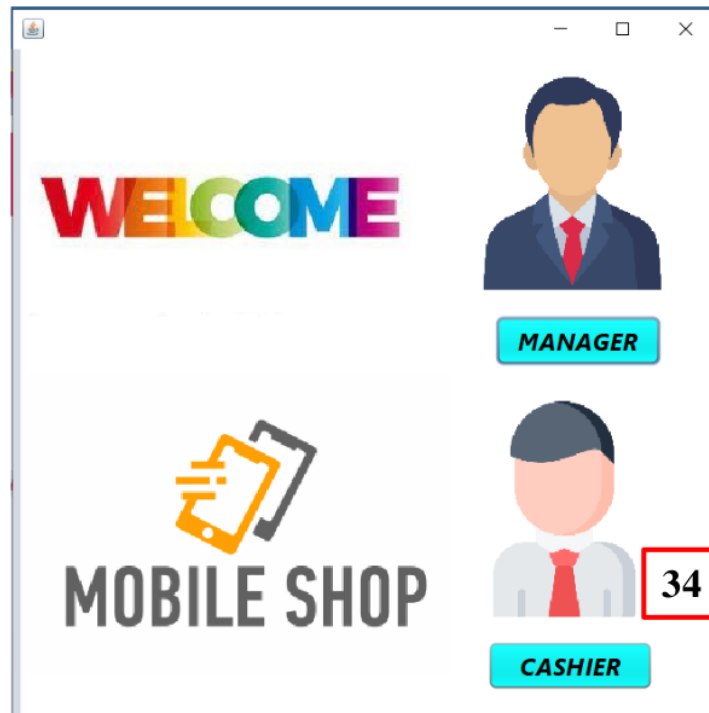
The screenshot shows a window titled "Delete Account". Inside the window, there is a text label "Enter Account No :" followed by a text input field. A red box with the number "31" points to the input field. Below the input field, there are two buttons: a yellow button labeled "BACK" and a red button labeled "DELETE". A red box with the number "32" points to the "BACK" button, and another red box with the number "33" points to the "DELETE" button.

NO	Function
31	Enter the account number code
32	When you click the 'Back' button, you can go to the main menu
33	When you click the 'Delete' button, you can delete account

Cashier

1. Login

You must select the Cashier option if you are a cashier. You will then be sent to the cashier login page. The Cashier must enter the user name and password on the login screen before they can access the system.



Input username and password

username **35**

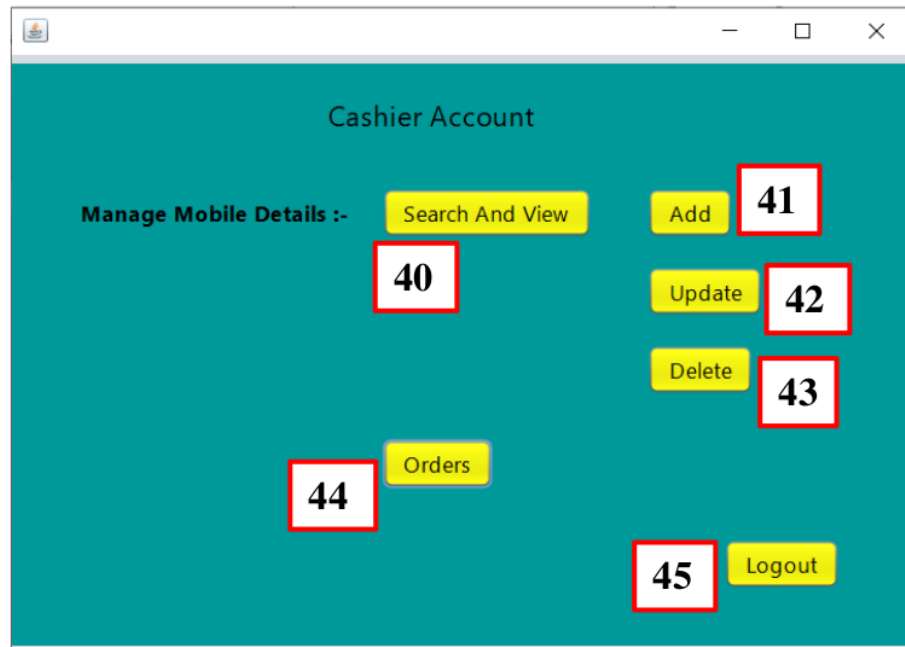
password **36**

Reset **Login** **Exit**

37 **38** **39**

NO	Function
34	When you click on the 'Cashier' button you will be switched to the login interface
35	Input username as 'cashier'
36	Input password as 'c@123'
37	When you click the reset button, you can re-enter your username and password
38	When you click the login button, you can go to the cashier's main menu
39	When you click the exit button, you can exit from the system

2. Cashier's main menu



NO	Function
40	When you click the 'search and view' button, you can search mobile details and view it
41	When you click the 'Add' button, you can add mobile details
42	When you click the 'Update' button, you can update the mobile details
43	When you click the 'Delete' button, you can delete mobile details
44	When you click the 'Order' button, you can place an order, and bill processing
45	When you click the 'Logout' button, you can log out of the system

3. Placing orders and printing bill

Placing Orders and Print Bill

Order No

Phone Code 46

Price

Quantity

Balance

Reset Ok 48

47

NO	Function
46	Input order details and fill out the bill from
47	When you click the 'Reset' button, you can reset the details
48	When you click the 'Ok' button, the bill will be printed

Common interfaces

1. Search phone details and view

Search Phone Details

Enter Phone Code

Back **Search**

50 **51**

NO	Function
49	Enter the phone code
50	When you click the ‘back’ button, you can go to the main menu
51	When you click the ‘Search’ button, you can view phone details

2. Adding phone details

The screenshot shows a Java Swing window titled "Adding Phone Details". The window has a teal background. On the left side, there is a sidebar with five buttons: "Update" (labeled 52), "Delete" (labeled 53), "Back" (labeled 54), "Reset" (labeled 56), and "Add" (labeled 57). The main area of the window is divided into two sections. The top section, titled "Adding Phone Details", contains a form with five input fields: "Phone Code" (labeled 55), "Name", "Category", "Brand", and "Price". The bottom section is a table with columns: "Phone Code", "Name", "Category", "Brand", and "Price". The table is currently empty.

NO	Function
52	When you click the 'Update' button, you can go to the updating phone details interface
53	When you click the 'Delete' button, you can go to the deleting phone details interface
54	When you click the 'Back' button, you can go to the main menu
55	Input phone details and fill out the form
56	When you click the 'Reset' button, you can reset the input details
57	When you click the 'Add' button, you can add new phone details

3. Updating phone details

The screenshot shows a web application window titled "Updating Phone Details". On the left side, there is a teal sidebar containing several yellow buttons: "Add", "Delete", "Back", "Reset", and "Update". On the right side, there is a light green form area with input fields for "Phone Code", "Name", "Category", "Brand", and "Price". Below these fields are "Reset" and "Update" buttons. To the right of the form is a large grey rectangular area, likely a table for displaying phone details. A table header is visible at the top of this area with columns: "Phone Code", "Name", "Category", "Brand", and "Price".

Numbered callouts in red boxes point to specific elements:

- 58**: Points to the "Add" button in the sidebar.
- 59**: Points to the "Delete" button in the sidebar.
- 60**: Points to the "Back" button in the sidebar.
- 61**: Points to the "Phone Code" input field in the form.
- 62**: Points to the "Reset" button at the bottom of the form.
- 63**: Points to the "Update" button at the bottom of the form.

NO	Function
58	When you click the 'Add' button, you can go to the adding phone details interface
59	When you click the 'Delete' button, you can go to the delete phone details interface
60	When you click the 'Back' button, you can go to the main menu
61	Input phone details and fill out the form
62	When you click the 'Reset' button, you can reset the input details
63	When you click the 'Add' button, you can add new phone details

4. Deleting phone details

NO	Function
64	Enter the phone code
65	When you click the 'Back' button, you can go to the main menu
66	When you click the 'Delete' button, you can delete phone details

Task 4

>>>>>>> Software submission <<<<<<<<<

Conclusion

I mainly researched object-oriented diagrams as I created an automatic transaction processing system in this document in response to the scenario. Object-oriented diagrams like use case, class, and sequence diagrams are created to make it simple to construct the system in accordance with the scenario. I was also able to clarify by using the idea of object orientation, which is the key component. In light of this, a computerized system for processing transactions has been developed for this mobile store.

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