

BSCS6-A&B (Collective Project)

Shipping Optimization System

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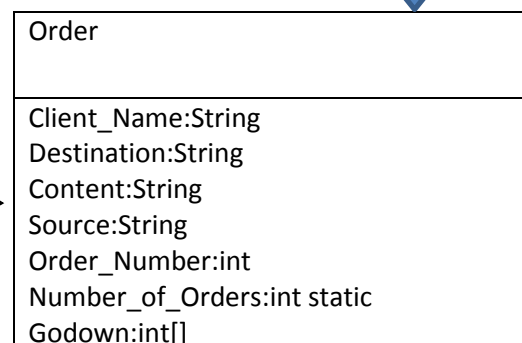
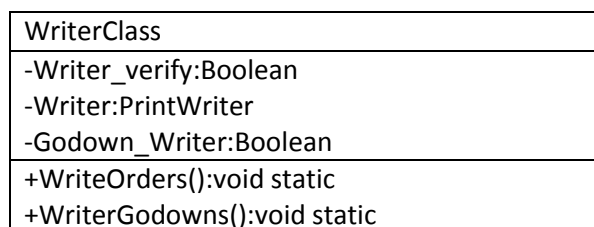
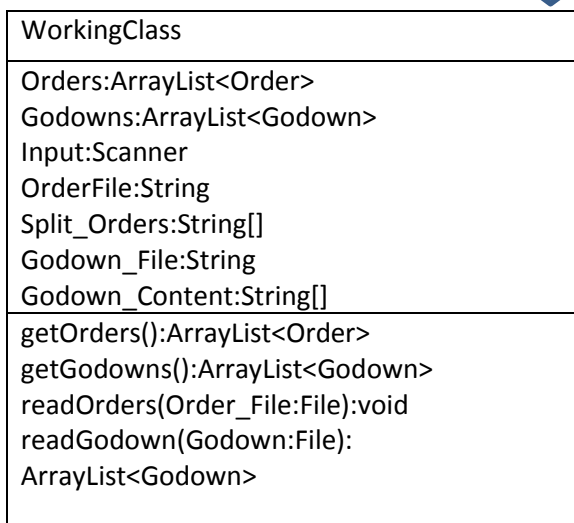
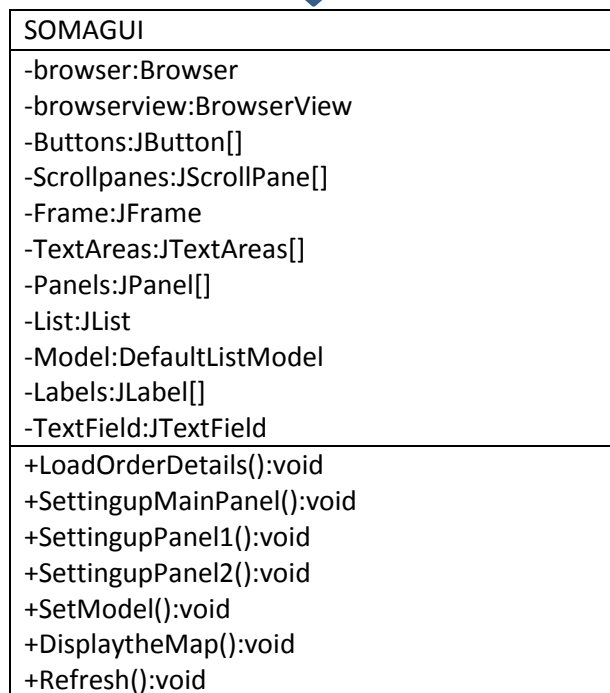
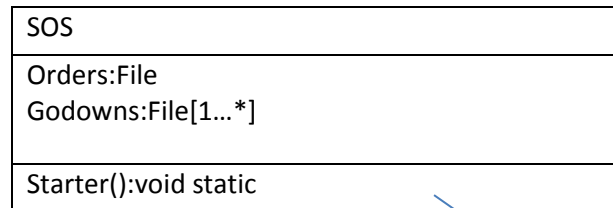
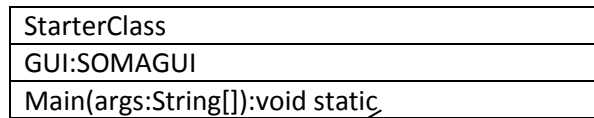
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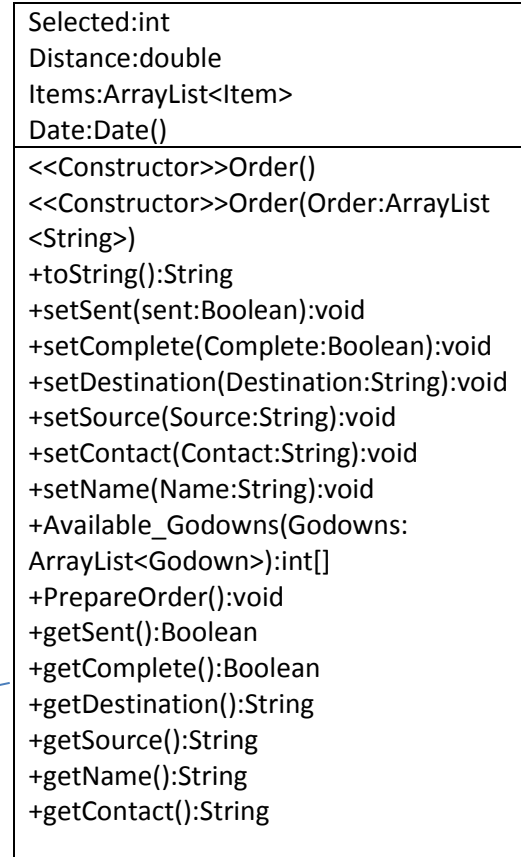
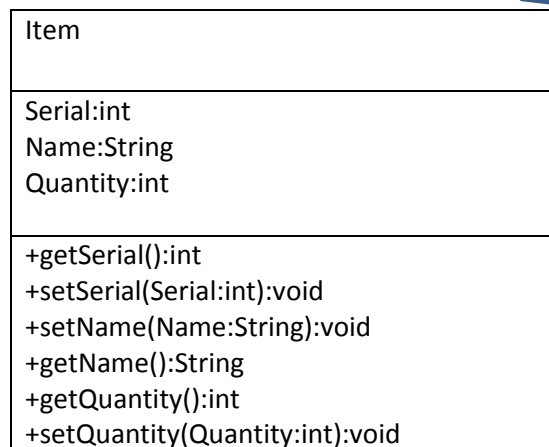
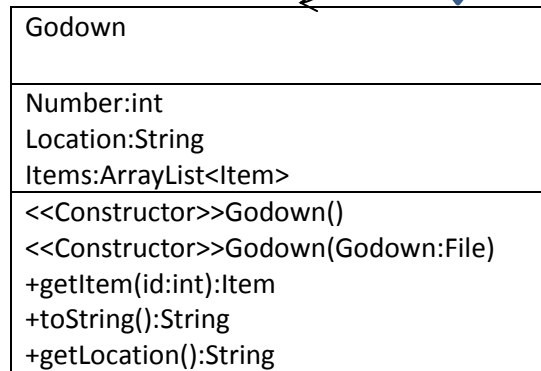
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→ Shows Association

UML DIAGRAM





Abstract

E-shopping is a rapidly growing business across the world. Internet is widely used as means of buying for short as well as long distance travels. E-shopping increases rapidly during festive seasons which results in the need for a system which not only deals with the most effective payment process but also maintains the record of every transaction and enhances the efficiency of the shopping system by counting the frequency of every item being sold. This report outlines the design and development of our Shipping Optimization System. The program has been written in JAVA to run under Windows Operating System and other systems. The shipping optimization system maintains the record and information regarding the quantity and type of items, their placement in which godown and frequency of any sold item. In addition this system also saves time by enhancing the speed and efficiency of buying process. By using this system people from all parts of the country can buy things by the most efficient way as it calculates the nearest godown by using google maps for current as well as advance bookings and check the availability of items. In addition, the project provides and checks all sorts of restrictions and limitations in order to input only relevant data from customer thus making validation effective. It provides us with search inquiry option in order to search details regarding booking and buying of each item incase customer wants to reassure it. The primary focus of the project is to computerize the process of buying and selling of all kinds of items like clothes or any common house hold items as well as data management in order to escalate record keeping processes. Furthermore, it prevents manual errors, calculation mistakes, price generation errors etc. The project thus provides a successful implementation of Shipping Optimization System.

Progress Report:

After the selection of our respective project i.e. Shipping Optimization System we as a team of two collectively gathered different ideas suiting the project. The methods we employed for this purpose including browsing through the internet, viewing and carrying out process of reservation and buying for different shopping systems cumulative discussions and sharing and amendment of ideas presented by one another. These ideas included number of terminals, distance calculation, data keeping, godown placement and distance calculation. All these things were added step by step in the code which was started by making a base header file which made up the base of our program. Further functions and implementations were made by making header files and classes derived from our base class by inheritance. At every step our code passed through a rigorous manual testing process for systematic as well as logical errors which were removed side by side and different exceptions were added. New ideas were added and implemented continuously as they were brought up. The ideas of creating logs and method of adding the items and orders were added to the code as soon as they were received by any group member. Through this process of step by step addition of new elements for the enhancement of code we came to the final product which is hereby presented in the form of our Shipping Optimization System(SOS).

Outline Solution:

Our program consists of eight .java i.e. Each Assigned to a Class file. Their respective tasks and functions are outlined below:

SOMAGUI serves the purpose of calling all functions, inputting all libraries, calling functions and function for accessing the system time.

main(): to create objects and to call

functions. **SettingUpMainPanel():** sets

main panel for gui. **SettingUpPanel1():**

SettingUpPanel2():

GUI_Starter(): Basically it starts

the gui. **setModel():**

Actions(): It has action listener which checks the event in case of clicking. **DisplayTheMap():** Displays the map from the internet as imported by us.

Refresh(): it refreshes the panel incase of adding or subtracting of new orders. **LoadOrderDetails():** it Loads the details as the name implies.

Respective Libraries which we imported are:

```
import com.teamdev.jxbrowser.chromium.Browser;
import
com.teamdev.jxbrowser.chromium.swing.BrowserView;
import java.awt.BorderLayout;
import
java.awt.Color;
import java.awt.*;
import
java.awt.event.*;
import java.io.IOException;
import java.net.MalformedURLException;
import
java.util.logging.Level;
import
java.util.logging.Logger;
import javax.swing.*;
import javax.swing.border.Border;
import javax.swing.event.ListSelectionEvent;
import org.json.JSONException;
```

Detail of Non Built-in Libraries USED:

JX Browser:

- It Provides the Browsing capabilities to the java program.
- It's used to load the Map for the orders. We Got it on a license of 30 Days. Twice using our Emails.
- The issues was it expired and then we had to create a new project on a new Software i.e. to Shift from Netbeans to Eclipse.

JSON:

- JSON Java API was used when we used Google Maps Services API to get data in response to the request made using the Destination and Source of order.
- Then extraction of useful data only like the distance or the time etc. This would've been a lengthy process if this API wasn't used.

Google Maps Services API:

- The Main Feature of the Program after we thought it could be applied.
- It provided us the capability of getting data from the internet in response to the request.
- The Data was in JSON Format that is explained above how we extracted that data using JSON.

Exceptions Expected and Caught:

IOException: When Reading from the File the IO Exceptions were used to make sure that the files are being read.

JSONException: Used to ensure that the JSON is correctly being used to extract data from the Response.

NullPointerException: When Reading the Arrays we needed to ensure the order or the godown item index it is reading is not null, in which case the program may have crashed. So It's dealt with.

MalformedURLException: While reading the content from the response from a URL that there is no error parsing the Content into String using a buffered Reader.

Detailed Design OOP:

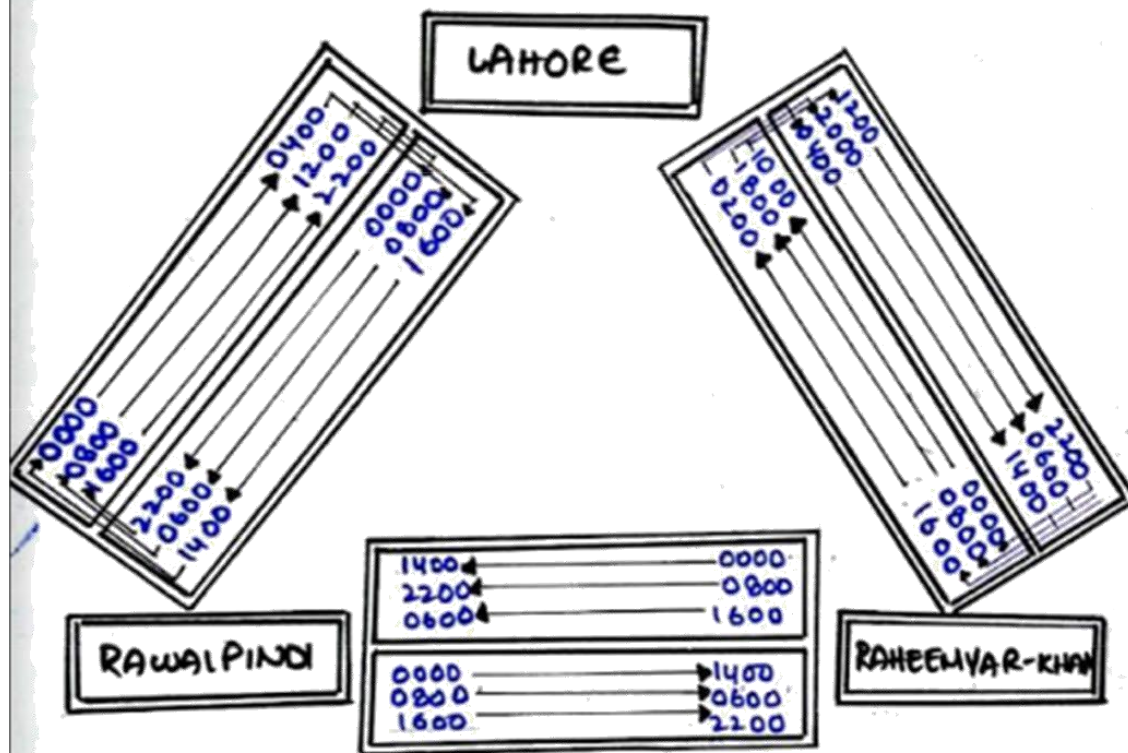
Each Order has Different Items in It. Each item has it's different properties described in the UML Above. Each Godown has different Items. Now These Items In the Order and Godown communicate with each other to work. They share certain data of their that is the quantity and item name and number to each other to subtract the item and similar functions. It doesn't require much of a polymorphism except that all the Orders were in a single Array of Orders and All Godowns were under same Godowns Array and Items as well similarly. Most of the work done is by composition i.e. of items in orders and items in Godowns.

The program has been developed in order to make the process of shipping optimization system more efficient and easy to operate. It provides options for booking or cancellation of reserved orders as well as instant buying of orders as in the cart. For buying process it provides options for current buying and arrival terminals multiple times a day. The program pays prime importance to optimized transfer of goods and multiple lines of code have been designated to it. It also shows other routes in google maps which the drivers can access incase most efficient one is blocked. It provides information regarding routes of godowns and their current buying log while concerned for availability of items. Not only this but this system also provides best handling of all sorts of exceptions a person can think of. Thus, the program efficiently provides a computerized shipping optimization system.

Orders Array

	Departure	Arrival	Time Taken	
Order[][][]	RWP	RYK	0000	7
Order[][][]	RWP	RYK	0800	8
Order[][][]	RWP	RYK	1600	9
Order[][][]	LHR	RWP	0000	3
Order[][][]	LHR	RWP	0800	1
Order[][][]	LHR	RWP	1600	2
Order[][][]	LHR	RWP	0000	3
Order[][][]	LHR	RWP	0800	1
Order[][][]	LHR	RWP	1600	2
Order[][][]	LHR	RYK	0400	6
Order[][][]	LHR	RYK	1200	4
Order[][][]	LHR	RYK	2000	5

Order[][][]	LHR	RYK	0400	6
Order[][][]	LHR	RYK	1200	4
Order[][][]	LHR	RYK	2000	5
Order[][][]	RYK	RWP	0000	7
Order[][][]	RYK	RWP	0800	8
Order[][][]	RYK	RWP	1600	9
Order[][][]	RYK	RWP	0000	10
Order[][][]	RYK	RWP	0800	11
Order[][][]	RYK	RWP	1600	12
Order[][][]	RYK	LHR	0000	4
Order[][][]	RYK	LHR	0800	5
Order[][][]	RYK	LHR	1600	6
Order[][][]	RYK	LHR	0000	4
Order[][][]	RYK	LHR	0800	5
Order[][][]	RYK	LHR	1600	6



Special Feature:

The most important feature of our program is subtracting of items as soon as the manager completes the orders. Most online systems only provide interface and it is left up to minus the items from the godowns which causes great difficulty incase some other customer orders the same thing which has been finished.it may also be a cause of potential loss of customers which is bad for business of any enterprise. But our shipping OS provides check and ensures that the quantity of items in each godown remain the exact amount as available to stop this exploitation of customers. Thus this shipping OS not only provides efficient buying system according to the most suitable routes but also guarantees the correct details of everything and preserves it in log.

Testing and Validation:

After addition of every new feature to the program the program was tested by manual testing of code by multiple users. All errors and bugs encountered were fixed side by side. The major problems we encountered during the development of this system were logical errors majority of which were solved with the help of exceptional handling ,change of conditions for loops and related statements and adding multiple if else statements for checking all possible conditions and getting rid of any erroneous inputs. One of our most important strategies was syncing our project with the google maps for accurate distance calculation and showing of routes which was done by adding a maps library. Other schemes we employed included using dynamic array for storing orders and current items in the godowns. Also there was a need to split the orders as they contained the information of the address , name and other necessary information which was done by adding a logics to split it with ;(semi-colon) and :: (colon and semi colon).

Problem Specification:

- Choice of Data Structures To be Used for Inventory Listing and Efficiently linking the Warehouses, Orders and Items with each Other Using OOP Concepts.
- Optimization of the old Approach towards the Solution to make it more time efficient.
- First Time Using the External APIs and Browser which isn't efficient, having a limited time license.
- Scrapping the Data in JSON Format using Google Maps API and Extracting useful information like distance and time from it.

Future Development:

Even though we gave our best in generating a Shipping optimization system providing all necessary availabilities and options and was successfully implemented. But the project still lacked a few details and implementations due to certain limitations of time. There was no method of adding a godown as they were hard coded and their number of items were hardcoded as well. In order to change them we had to change it in the bas file of godowns. These elements will also be dealt with manually rather than providing details through system. Moreover, we could add a feature of showing the image of the order as well like some shirt not only just the name.

This addition can be made in future provided the appropriate circumstances, knowledge and skills and most importantly time. Apart from that some additions could not be made as they required manual handling. The system in the future can be made to store data related to employees of shipping system and also about the vehicle data. An important addition would be the implementation of it on android to make the program more attractive and easily available to the customers at a fingers touch. Another future development could include terminals from more cities outside Pakistan rather than limited number of cities. Also it can be made possible for users to avail advance booking options for multiple days. Unfortunately, we had to place certain limitations due to availability of time.

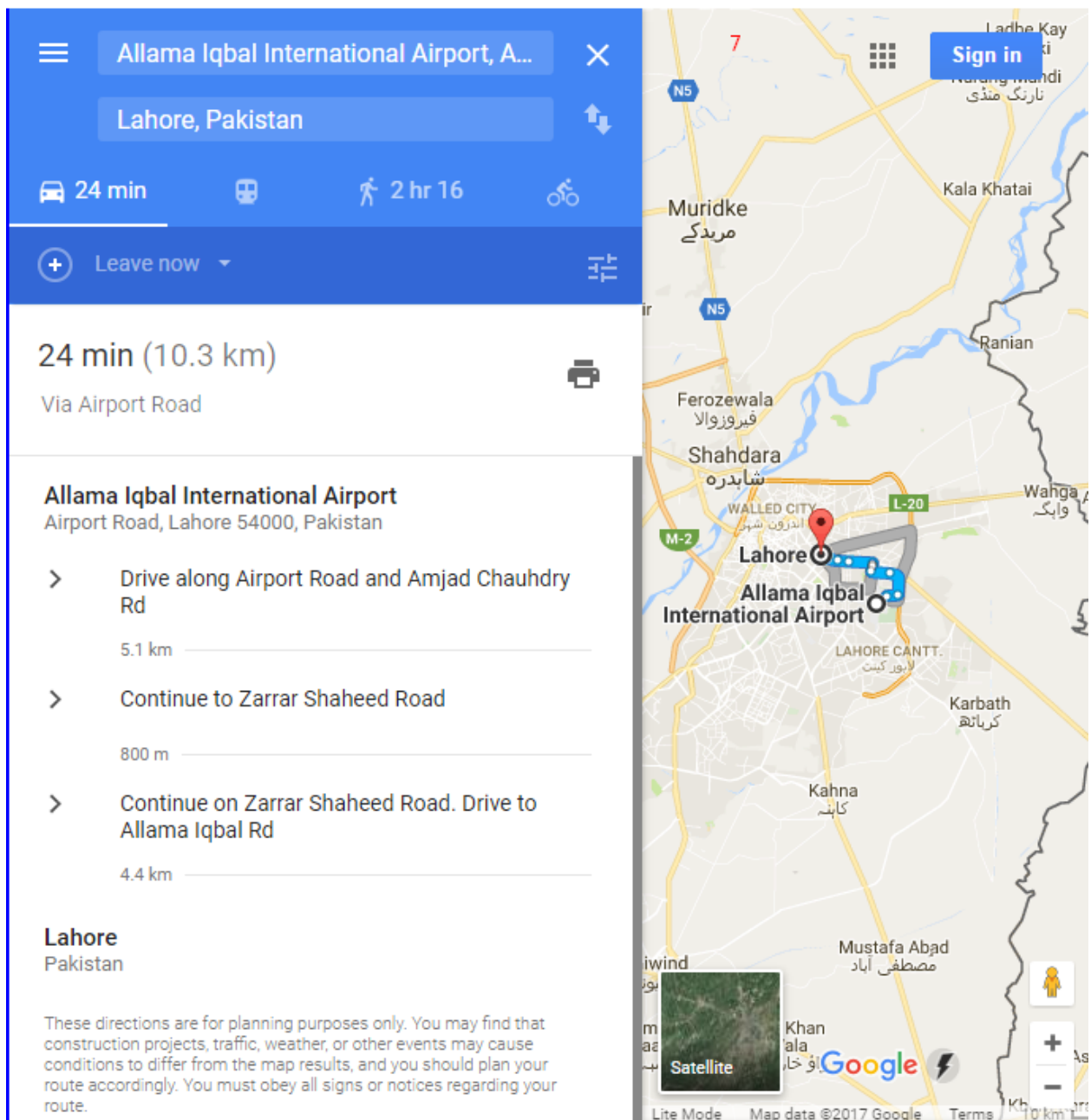
Working

1. When, New Orders Are Added or Some Old Order is Edited Under Certain Conditions New Orders are Added only to the List using a check to reduce processing. For Example if you have sent the item you cannot change the destination and stuff of the order it will not set as the setter is defined accordingly.

2. The Search Button can be used to get information about both complete/processed orders.

3. List Provides the Already Sent orders which are to be completed and Display the Information About the Selected Order In the Text Area.

4.Text Area has the Client Name, Order Number, The Source i.e.Selected Godown, Destination, Distance to the Destination from Selected Godowns and What are the Items In the Order and their Quantities respectively.



5.Complete Button Is Used to Complete the order it checks the completion check to true and then remove the completed order from the List containing the waiting for completion orders.

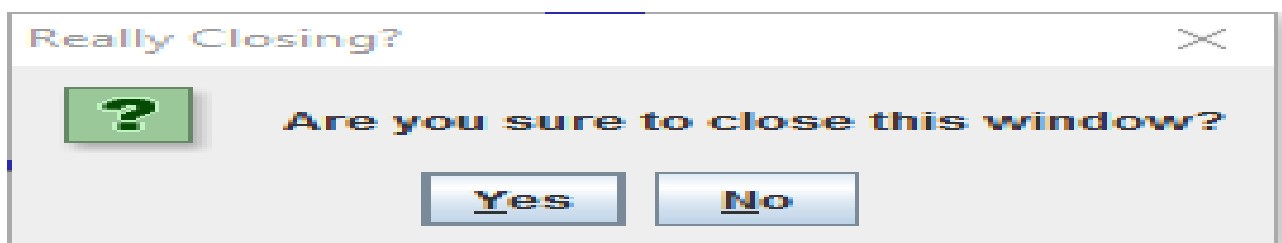
6. Show Logs Button is Used to Get Information about how and under what conditions the Order Was processed and what was the quantities of the items in the godowns and distances and how the preffered godown was selected and at What Time and Date was the order processed i.e. a Basic work of

Inventory.

```
Order = 5 *** The Selected Godown is *** = 2
Location is " Airport Lahore PK" The Distance from the Godown is = 10.287
* Order Item Number: 1 *
Before Deduction = Item: Register Quantity:71870
To Be Deducted Quantity = 50
After Deduction = Item: Register Quantity:71820
* Order Item Number: 2 *
Before Deduction = Item: Play Station Quantity:49717
To Be Deducted Quantity = 9
After Deduction = Item: Play Station Quantity:49708
* Order Item Number: 3 *
Before Deduction = Item: Bed Quantity:53379
To Be Deducted Quantity = 3
After Deduction = Item: Bed Quantity:53376
* Order Item Number: 4 *
Before Deduction = Item: Computers Quantity:64730
To Be Deducted Quantity = 10
After Deduction = Item: Computers Quantity:64720
* Order Item Number: 5 *
Before Deduction = Item: Laptops Quantity:47962
To Be Deducted Quantity = 10
After Deduction = Item: Laptops Quantity:47952
Processing Data and Time: 2017/06/05 10:04:48
```

7.The Map Feature Displays The Map from The Source to Destination and time and distance there is between. It is kind of visual of the logs. It maybe required at times and for getting information faster i.e. Visually.

8.When you are Exiting the Program, The Information may get deleted if it is not saved properly. There is a writer class which is called at some special events like refresh or quitting the program. This Class saves the data into files. As there are checks which do not let the order to deduct the inventory more than once and hence It works good till where I have checked it.It doesn't let you exit until the Data is saved in your files.



Conclusion:

The shipping optimization system provides easy and efficient handling and storage of data of customers and orders details. Details include buying, cancellation of orders, and showing of shortest and most efficient routes on Google maps. This system has revolutionized the process of shipping of items by computerizing the process and also saved time which was previously consumed by manual work. The program effectively stores all records through 3D dynamic arrays in the files by file handling, assuring no data is lost and also makes data easily accessible. Now customers have a selection of multiple items, on multiple days, multiple times in the most efficient way possible. Thus, attracting future customers aslo good from the marketing point of view.