1. Introduction:

The C++ provided along with this report format is an invoice management system which is designed to handle customers, add items based on the category, generate detailed invoice and keep track of invoice history. This program also provides a user-friendly interface to handle the transaction and invoices. This program includes the concepts of object oriented programming like polymorphism, encapsulation, inheritance and also file handling.

2. Objective:

The objective of this project is to make it efficient for the invoicing that meets the needs of any retail businesses. The system aims to:

a. Accurate Invoices.
b. Menu driven UI
c. Show the application of oop principles.

3. System Design:

The invoice system has the following features. Starting from User Interface. It provides a way to interact with the invoice system along with login functionality. After login functionality, the invoice system provides options like generateinvoice, invoicehistory and exiting the system. Generate invoice helps to create invoice with functions like addproduct in the console along with that it also writes the content of invoices into the InvoiceHistory.txt file. Invoicehistory is used to read the history of the transactions which is written in the InvoiceHistory.txt.
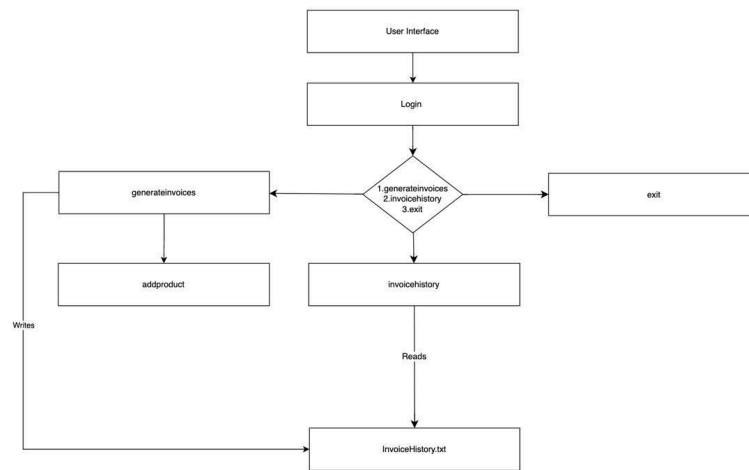
Fig: Component diagram of the Invoice System

4.Implementation:

Invoice process is automated as every invoice is saved to a file named "InvoiceHistory.txt" for record-keeping. Along with the content inside the file can be viewed using this program. The OOP concepts are implemented. Polymorphism is implemented by creating an abstract class called products and its derived classes which are Electronics and Clothing. The concept of Encapsulation is implemented by creating a Class named Customer and product details within their respective classes. The program also provides a friendly user interface with properly formatted outputs.

5. Sample Output:

```
||                                                                      ||
||                                                                      ||
||                                                                      ||
||                                                                      ||
||                                                                      ||
||                        Welcome to Login Portal                       ||
||                            User ID: 11210                            ||
||                         Password: drowssap                           ||
||                   You have successfully logged in!                   ||
||                                                                      ||
||                                                                      ||
||                                                                      ||
||                                                                      ||
||                                                                      ||
||                                                                      ||
||.--------------------------------------------------------------------.||
```

```
.'--------------------------------------------------------------------'.
||                  Welcome to Professional Invoice Software            ||
||                          Designed By Rizan K.C.                      ||
||                       Date Accessed: Jan  5 2025                     ||
||                        Session Started:20:32:13                      ||
||                                                                      ||
||                       The software is ready to use.                  ||
**                         What would you like to do?                   **
**                        Enter 1 for Invoice Generation                **
**                        Enter 2 for Invoice History                   **
**                        Enter 3 to end this session                   **
                Based on your preference, Enter your option: 1
||                             New Invoices                             ||
  Name of the customer: Younesh K.C.
  Contact Number: 9218391012
=============================================INVOICE============================================
                CATEGORY(e for Electronics, c for Clothing): e
                      PRODUCT NAME: Classical Music Player
                          INDIVIDUAL PRICE: 200
                                QUANTITY: 1
                   Enter the warranty period (in years): 1
                    Do you want to add more products?(y/n): y
                CATEGORY(e for Electronics, c for Clothing): c
                          PRODUCT NAME: Jacket Adidas
                          INDIVIDUAL PRICE: 100
                                QUANTITY: 1
                              Enter size: XL
                    Do you want to add more products?(y/n): n
                           The Grand Total is 300
                         Invoice Saved Successfully!
```

```
.'--------------------------------------------------------------------'.
||                  Welcome to Professional Invoice Software            ||
||                          Designed By Rizan K.C.                      ||
||                       Date Accessed: Jan  5 2025                     ||
||                        Session Started:20:32:13                      ||
||                                                                      ||
||                       The software is ready to use.                  ||
**                         What would you like to do?                   **
**                        Enter 1 for Invoice Generation                **
**                        Enter 2 for Invoice History                   **
**                        Enter 3 to end this session                   **
                Based on your preference, Enter your option: 1
||                             New Invoices                             ||
  Name of the customer: Prashish Sapkota
  Contact Number: 9219301021
=============================================INVOICE============================================
                CATEGORY(e for Electronics, c for Clothing): c
                          PRODUCT NAME: TrackSuit
                          INDIVIDUAL PRICE: 70
                                QUANTITY: 1
                              Enter size: XXL
                    Do you want to add more products?(y/n): y
                CATEGORY(e for Electronics, c for Clothing): e
                          PRODUCT NAME: Headphone Sony
                          INDIVIDUAL PRICE: 300
                                QUANTITY: 1
                   Enter the warranty period (in years): 2
                    Do you want to add more products?(y/n): n
                           The Grand Total is 370
                         Invoice Saved Successfully!
```

```
||                        Welcome to Professional Invoice Software                        |
||                              Designed By Rizan K.C.                                     |
||                             Date Accessed: Jan  5 2025                                  |
||                             Session Started:20:32:13                                    |
||                                                                                         |
||                            The software is ready to use.                                |
||                           What would you like to do?                                    |
**                         Enter 1 for Invoice Generation                              **
**                         Enter 2 for Invoice History                                 **
**                         Enter 3 to end this session                                 **
                           Based on your preference, Enter your option: 2

========================= Invoice History ======================================
DATE: Jan  5 2025        TIME: 20:32:13
Name of the Customer: Younesh K.C.
Contact: 9218391012
--------------------------------------------------------------------------------
| Product Name              | Price (each) | Quantity | Additional Information    |
--------------------------------------------------------------------------------
Classical Music Player      | 200          | 1        | 1            year(s)    |
Jacket Adidas               | 100          | 1        | Size:              XL   |
Grand Total:                  300
--------------------------------------------------------------------------------


DATE: Jan  5 2025        TIME: 20:32:13
Name of the Customer: Prashish Sapkota
Contact: 9219301021
--------------------------------------------------------------------------------
| Product Name              | Price (each) | Quantity | Additional Information    |
--------------------------------------------------------------------------------
TrackSuit                   | 70           | 1        | Size:             XXL   |
Headphone Sony              | 300          | 1        | 2            year(s)    |
Grand Total:                  370
--------------------------------------------------------------------------------

================================================================================
```
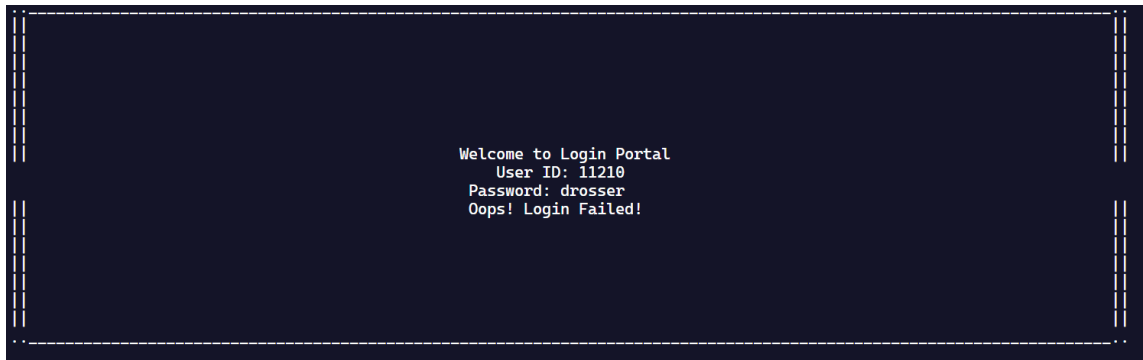
```
DATE: Jan  5 2025    TIME: 20:32:13
Name of the Customer: Younesh K.C.
Contact: 9218391012
------------------------------------------------------------------------------
| Product Name                 | Price (each) | Quantity | Additional Information    |
------------------------------------------------------------------------------
Classical Music Player         | 200          | 1        | 1            year(s)    |
Jacket Adidas                  | 100          | 1        | Size:              XL   |
Grand Total:            300
------------------------------------------------------------------------------


DATE: Jan  5 2025    TIME: 20:32:13
Name of the Customer: Prashish Sapkota
Contact: 9219301021
------------------------------------------------------------------------------
| Product Name                 | Price (each) | Quantity | Additional Information    |
------------------------------------------------------------------------------
TrackSuit                      | 70           | 1        | Size:             XXL   |
Headphone Sony                 | 300          | 1        | 2            year(s)    |
Grand Total:            370
------------------------------------------------------------------------------
```

6. Testing and Debugging:

Login Functionality was tested with correct credentials once which is(User ID=11210, Password=drowssap). With the correct credentials, the login functionality properly worked.

When tested with incorrect credentials. The login was unsuccessful.

Demo:


```
                    Welcome to Login Portal
                         User ID: 11210
                       Password: drosser
                       Oops! Login Failed!
```

ctime functions were used to dynamically set time updates. Before __TIME__ macro was used but the issue with macro was the time was set at compile time.

7. Challenges Faced:

The formatting inside the text file as well as the console was the challenge and managing the saving and reading of files. The next challenge was modularity of code.

8.   Conclusion:

This program properly implements an invoice system with all the required features like adding multiple products. The program can also further be improved and easy to maintain by implementing additional features like searching mechanism in files, enhancing the login mechanism and introducing database for adaptability for future.

9. References

Links:

a. https://www.geeksforgeeks.org/object-oriented-programming-in-cpp/

b. https://www.geeksforgeeks.org/ctime-function-in-c-c/