NED University of Engineering
and Technology

Object Oriented Programming
CT-260

Semester Project

# RESTAURANT APPLICATION

A user friendly Restaurant Application, implemented in C++ using OOP principles

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# PROJECT REPORT
# RESTAURANT

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## Problem Statement

The main objective of our project is the development of a user friendly restaurant management system using concepts of Object Orientated Programming (OOP). The project aims to automate various management related tasks including order placement, menu management, table reservation and customer management.

The current management systems often lead to numerous insufficiencies and difficulties in managing and maintaining accurate records, the proposed Management System will address the challenges of every domain and provide a user friendly interface resulting in better decision making and record management along with enhanced customer services and an error free working experience

## Project Introduction

The main source code constitutes a Restaurant management software that has been developed using OOP principles, the software focuses on two main domains i.e. customer services and customer management, the application allows user to sign in according to their respected domain and experience the comprehensive functionalities developed for the specific field. Our software simplifies tasks such as order management, inventory control, employee scheduling, and customer-management relationship. The management system empowers employees to make data driven decisions and manage workflow, in addition it also enables customers to explore the operations and reap the benefits according to their needs such as order placement, table reservation, billing methods.

## Implementation

We have utilized the Object-Oriented Programming (OOP) approach in developing the restaurant management system. OOP is a programming paradigm that focuses on organizing code into objects, which encapsulate data and behaviors. Key concepts of OOP, such as encapsulation, inheritance, polymorphism, and abstraction, have likely been employed in our project to achieve modularity, reusability, and maintainability.

## Inheritance

Inheritance is a mechanism in OOP where one class can inherit properties and behavior from another class. In our project, the classes Customer and Admin likely inherit from the base class Account. This allows the derived classes to inherit common attributes and methods from the Account class, such as login credentials and authentication functionality. By leveraging inheritance, you can avoid code duplication and promote code reuse by defining shared characteristics in the base class and extending or customizing them in the derived classes.

## Encapsulation

Encapsulation is the practice of bundling data and methods together within a class, providing access control to the internal state of an object. In our project, each class like Account, Tables, Product, Menu, and Order likely encapsulates relevant data and methods specific to its purpose. This allows for better organization and modularity within the codebase, ensuring that data and functionality are properly contained within their respective classes.

## Encapsulation

Abstraction involves creating abstract classes or interfaces that define the common structure and behavior of related classes. In our project, the use of a virtual base class for Account (from which Customer and Admin inherit) exemplifies abstraction. The base class defines the common attributes and methods that are applicable to all accounts, while the derived classes provide their specific implementations. This allows you to work with account objects generically, without needing to know the exact type of the derived class, promoting code flexibility and maintainability.

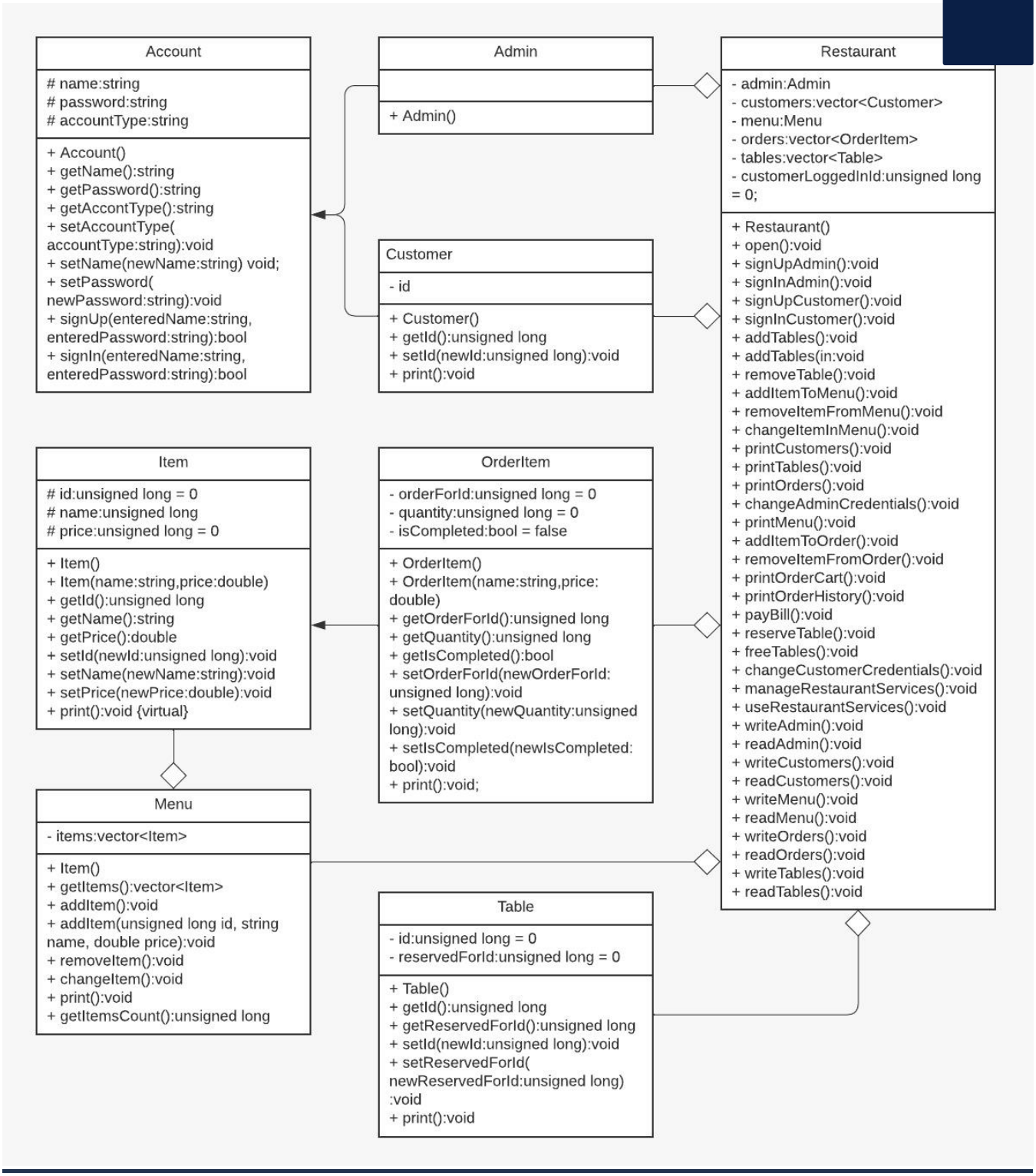
## Polymorphism

we have effectively used polymorphism to enhance the flexibility and versatility of the functions in our code. Polymorphism allows us to define multiple ways or implementations of a function that can be invoked based on the specific context or parameters provided. This means that the same function can behave differently depending on whether or not it receives parameters.

## Filing

Filing has been used to keep track of customer personal record, order history and details.

# UML Diagram/Structure;



## Specifications

The code has been designed to work for customer and management domains collectively the following functionalities have been employed to provide users an error free working environment.

## Customer Specifications

- **Print Menu:** The print menu displays the menu to the customer and enables the customer to select items according to their own preference.
- **Order:** After going through the menu the program allows the customer place the order according to their own selected items.
- **Print Order:** The print order function displays the selected order.
- **Cancel Order:** We also provide a function to users that enables them to cancel their orders when they are no longer willing to proceed
- **Print Bill:** The program includes a billing system that displays the bill after every order placement.
- **Reserve Table:** The customers will have the leverage to select the table or booth according to their convenience and preference.
- **Change Credentials:** By the use of filing the program keeps record of the customer and their history, the program allows the customer to change their username or password anytime.
- **Sign Out:** The sign out option enables the customer to log out of their accounts at their convenience

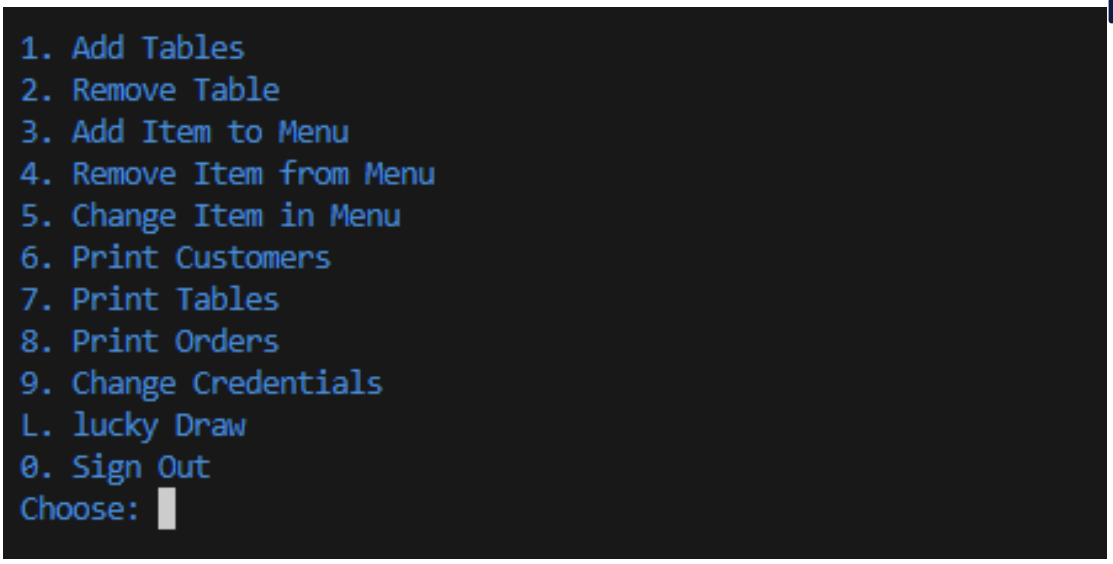
These are some of the main features of the application, some additional features may be seen in the real Application.

## Admin Specifications

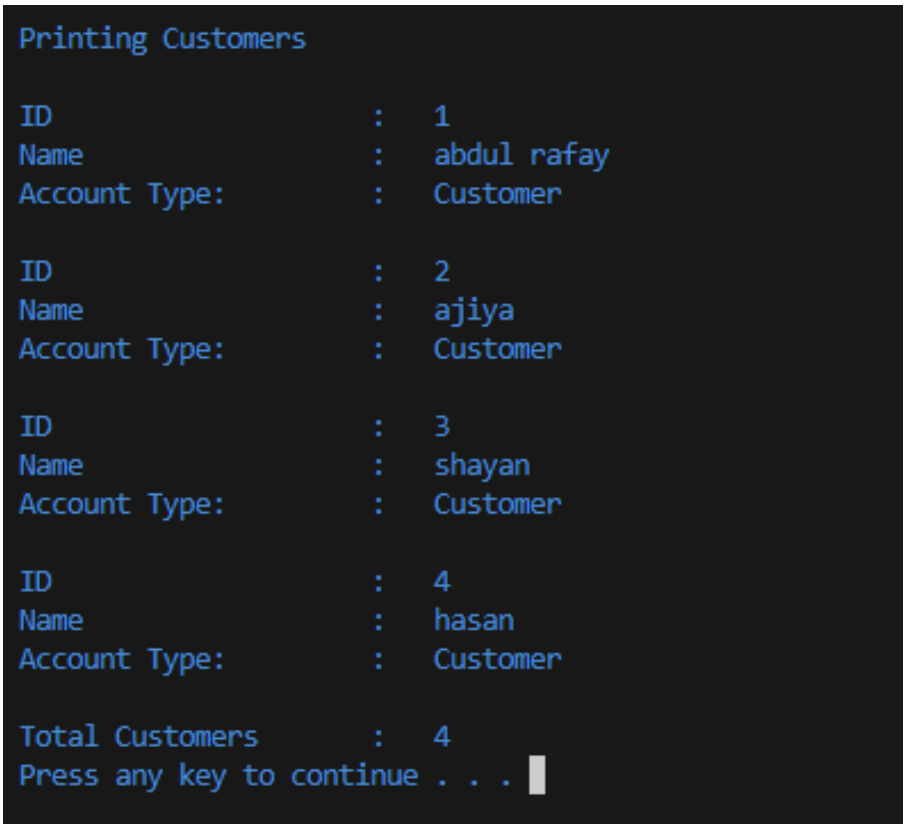
- **Open Tables:** This function has been specialized for the use of admin class, in case of such increase in data set of customers that exceeds the limit of availability of tables the software will enables the addition of new tables through admins in real time.
- **Manage Menu:** The admin has the ability to add or remove item anytime and make required updates and changes according to fluctuations in availability and prices.
- **Manage Customers:** Incase the admin is willing to go through the customer list, the program allows him to print all the current customers.
- **Manage Tables:** Likewise, the admin can also print all the table numbers, reserved or empty tables.
- **Manage Orders:** The program keeps record of every sign up, the admin can later change their ID name or password.
- **Change Credentials:** Along with keeping track of all previous orders this function grants admin the opportunity to print order history
- **Sign out:** The sign out option enables the admin to log out of their accounts at their convenience.

## Screenshots:\

### Admin Controls




### All Customers record



## All Orders history

```
Printing All Orders

ID                  :   1
Name                :   pizza
Price               :   600
Order For ID        :   2
Quantity            :   2

ID                  :   2
Name                :   fries
Price               :   100
Order For ID        :   4
Quantity            :   1

ID                  :   3
Name                :   burger
Price               :   200
Order For ID        :   3
Quantity            :   1

ID                  :   4
Name                :   fries
Price               :   100
Order For ID        :   3
Quantity            :   1

ID                  :   5
Name                :   burger
Price               :   200
Order For ID        :   4
Quantity            :   1

Total Orders        :   5
Press any key to continue . . .
```

## Customer Controls

```
1. Print Menu
2. Add Item to Order
3. Remove Item from Order
4. Print Order Cart
5. Print Order History
6. Pay Bill
7. Reserve Table
8. Free Tables
9. Change Credentials
0. Sign Out
Choose:
```

## Conclusion:

A conclusion can be drawn that our proposed software will enhance the dining experience for customers and management experience for admins leveraging the use OOP principles it provides a seamless and error free platform for ordering, exploring menu, making reservations and interaction between customers and management. However various additional specifications like push notifications, customer reviews, loyalty and rewards can be developed to maximize potential and enhance success. Furthermore, timely updates will also play an important role in increasing the potential of the software.

## Contributions:

Application Structure, Implementing the application

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Report and UML

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