Department of Computer Engineering
Faculty of Engineering
University of Sri Jayewardenepura

Course	Object-Oriented Programming
Course Code	CO2203
Title	Supermarket Inventory System
Project Number	1
Outcomes	Designing and implementing a system using OOP concepts
Deadline	**7th July 2021**

General Instructions:

- Please archive all files to a zip file, upload the zip file to LMS, and send it as an attachment to coassignments@gmail.com.
- Use the following format when you are naming the zip file: yy_ENG_xxx_L.zip, yy_ENG_xxx is your registration number, and L stands for the practical number (e.g. 16_ENG_135_1.zip)

1. Supermarket Inventory Management.

An up and coming supermarket has been managing its inventory manually so far by entering details of inventory and sales on spreadsheets one by one by a staff member. However, due to the gradual expansion of the business, hiring of more staff and the recent increase in demand for online sales due to the pandemic, it has become increasingly difficult to keep track of everything manually and security risks have also become a major concern. Therefore, the owner has decided that it is in the best interest of the business to switch to an autonomous inventory management system and has hired your team to implement it.

2. Basic requirements.

After a meeting with the client, the following requirements have been roughly identified:

Stock

The Inventory management system is responsible for storing and managing all details regarding the stocks in the inventory. The details of items include the name of each item, how many of each item are in stock, retail price, any discounts/promotions and the final price after any discounts. Items in the inventory can be broken down into 10 major categories. Produce (fruits & vegetables), Meat & Seafood, Grains (rice, dhal etc.), Bakery products, Frozen foods, Dairy products, Snacks and Sweets, Beverages, Health & Beauty (toothpaste, shampoo etc.) and Condiments & Spices. The stock of Produce, Grains and Meat & seafood must be measured in grams. All other item categories should be measured by the number of items in stock. All item categories except the two fresh categories (Produce and Meat & seafood) must also record the brand of the product and whether it is a local or imported product. Promotions are special discounts that can apply to a single item, a brand of item or a category of item. The discounts are recorded as percentages; the final price must be calculated by deducting the discount percentage from the retail price of the eligible items.

Staff

The inventory system will be managed by the staff of the supermarket chain and the amount of control over the system will be decided by the position of the staff member. Each staff member has a username and password that must be entered in order to access the inventory system. The full name, position and join date of all staff members must be recorded. The lowest tier member of staff is the floor worker. The floor workers are responsible for stocking up the items and hence can only increase the number of

stock of an existing product in the inventory. Next are the cashiers, who are responsible for all transactions with the customers and have the ability to reduce the stock of the relevant items after a successful transaction with a customer. The transactions must be recorded separately, with the name of the cashier, customer and list of all the items bought. The managers can add or remove items from the inventory and check the details of other staff members in addition to being able to perform all the actions of the cashiers and floor workers. The owner is the only user that is able to add or remove staff members and is able to perform all other actions listed above. There can be only one owner account.

Supply

Finally, the details of the supply chain that brings stock into the inventory must be recorded. The supply to the supermarket comes from both local and international sources. The local supply is transported from various farms and factories throughout the island and in three types of vehicles; large trucks, small trucks and vans. Each vehicle can only transport one type of goods at a time and are identified by their vehicle registration number. Each local supply shipment must include the name of the item, quantity, name of origin (the name of the farm/factory, date of departure (from the farm or factory), date of arrival at the supermarket and vehicle used for the transportation. International supply shipments will only be imported overseas by ship and should include country of origin, the ship number, date it arrived at the local harbour and the date it was transported to the store. All supply shipments will be given a pending status until a staff member inspects the items and adds them to the stock. A floor worker is able to approve and add stock of an existing item in the inventory. If the received item does not yet have an entry in the inventory, a manager or the owner is required to first make a new entry for the item in the inventory before adding the stock. Once the stock has been successfully added to the inventory, the status of the supply shipment must be changed to “approved”.

3. Planning and Implementation.

I. Carefully observe the above requirements and come up with an abstract OOP design for the inventory system that meets all the requirements. Make sure to make use of concepts such as inheritance and polymorphism in your design to avoid cluttering and to reduce code redundancy as much as possible. Draw a UML class diagram showing all the classes (and subclasses) of your design before implementation.

II. Implement your design in a language of your choice. You may make slight changes to the design during the implementation if practical problems arise but make sure that you change your UML diagram accordingly.
III. A GUI interface is not a requirement of the client and hence a simple and readable command-line interface is sufficient. The user must first be greeted with a login screen, in which they can enter their credentials (username and password) to log in to the system. The client is planning on purchasing a third-party authentication system in the near future so encryption of the user credentials is **not** required at this stage.
IV. After the login screen, the program should consist of three major screens for each of the sections; Stock, Supply and Staff. The cashiers and floor workers must not have access to the “Staff” screen. The level of control each user is granted at each screen will depend on their position as mentioned in the requirements.
V. After the system is complete, create a script to fill the system with sufficient dummy data so that the client may test the system in-depth.

4. Report

Write a report detailing the process of designing and implementing the inventory system. Your report should include the following:

- Designing the system; How each of the OOP concepts (Abstraction Encapsulation, Inheritance, Polymorphism) were used in your design.
- A UML class diagram of your design and reasoning of the design choices.
- Challenges faced when implementing the system.
- Limitations
- Further improvements

5. Submission Guidelines

Submit all the source files for the implemented systems along with the report.