UNIVERSITY OF SRI JAYEWARDENEPURA
Faculty of Computing
Bachelor of Computing Honours in Computer Science
Bachelor of Computing Honours in Software Engineering
Bachelor of Computing Honours in Information Systems

First Semester Examination
August/September 2024
CCS 1062 | CSE 1062 | CIS 1062 – Practical Fundamentals of Programming
Duration Two (03) Hours

INSTRUCTIONS / INFORMATION TO CANDIDATES:

1. Answer all two (2) Questions.
2. This paper contains Two (2) Questions on Four (4) pages.
3. This is a closed-book examination.
4. The marks assigned for each question and sections thereof are included in brackets.
5. Create a folder on your desktop and rename it with your index number.
6. Save all your C++ files in this folder, using the naming format "Question1partA.cpp
7. Take screenshots of the outputs for each C++ program. And Create a PDF document that includes all the screenshots of the outputs and save it in the folder you created.
8. Calculators, all other devices, and tools are not allowed.
9. All examinations of the Faculty of Computing are conducted under the Examination Rules and Regulations of the University of Sri Jayewardenepura

Question 01

The supermarket called GreenMart aims to launch an inventory management system to efficiently handle its vegetable stock. This system will store information for each vegetable, including the name, a unique item ID and price for each vegetable. During the billing process, sales representatives will use the unique ID to quickly identify the item being purchased. The system will allow for adding new vegetables as they arrive, updating prices in response to business changes, and removing items from the inventory when necessary. To attract customers, GreenMart also plans to offer discounts on purchases through the system.

Write the C++ program to perform the following tasks.

The list includes the following sample list of the vegetables shown in Table 01.

Item Name	Item ID	Item Price/kg
Carrot	1005	Rs. 650
Beans	1007	Rs. 758
Cabbage	1009	Rs. 105
Pumpkin	1004	Rs. 400
Ladies' Fingers	1006	Rs. 410

Table 01. The list of vegetable's unique item ID and price

(a) **Display the vegetables' price list:** Use the appropriate method to store the data, including the item ID and price for each vegetable. The program should display the vegetable price list on the screen in the following format.

Item ID: 1005, Item Price: 650.00
Item ID: 1007, Item Price: 758.00 (05 Marks)

(b) **Add price list data:** The program should add the following new item ID and price to the list.

Item ID	Item Price/kg
1008	Rs. 750
1003	Rs. 800

Table 02. New item list

Write the function to display all vegetable price list on the screen, showing only the item ID and price for each vegetable.

(10 Marks)

(c) **Update price:** The program updates the price of a vegetable based on its **Item ID** according to the following updated list. Prompt the user to enter the **Item ID** of the vegetable they wish to update and the new price.

Item ID	New Item Price /kg
1005	Rs. 800
1007	Rs. 1056
1009	Rs. 856
1004	Rs. 450

Table 03. Updated item list

The program should display the updated vegetable price list by using the implemented display function in the Question 01 (b).

(10 Marks)

(d) **Delete Items:** The program should delete the following items from the list. Use the appropriate technique to manipulate the deleted item from the list. Clearly mention the assumptions you have made.

Item ID	Item Price/kg
1006	Rs. 410
1008	Rs. 750

Table 04. The item list should be deleted

The program should display the vegetable price list after deleting the above items.

(10 Marks)

(e) **Counting and Displaying Items Priced Above Rs. 500:** The program should implement to count the number of items with item's price is greater than Rs. 500. And the program should display the list of all the items with prices exceeding Rs. 500. Consider the following output format to display on the screen:

Count of items with prices exceeding Rs. 500: 4
Item list with prices exceeding Rs. 500: 1005, 1007, 1009, 1003

(20 Marks)

(f) GreenMart plans to offer discounts on certain vegetables if a customer purchases quantities exceeding the specified quantity limits, as outlined in the following table.

Item ID	Quantity (kg)	Discount/kg
1005	5	20%
1007	2.50	5%

Table 05. Item's discounts rates

Note: If the customer purchases more than 5 kg of item with ID 1005, a 20% discount will be applied.

Customer Bill Calculation: The program should be designed to achieve the following tasks based on the customer's purchased items, their respective quantities and discounts.

I. The program should accept the customer's item ID and quantity, adding them to the bill one by one, until the customer chooses to stop adding new items to the list. Display the following sample output on your screen to achieve this task.

Sample Output:

Enter item ID: 1009
Quantity (kg): 2
Add the new item to the bill (1. Yes or 2. No): 1

Enter item ID: 1005
Quantity (kg): 6
Add the new item to the bill (1. Yes or 2. No): 1

Enter item ID: 1004
Quantity (kg): 1.5
Add the new item to the bill (1. Yes or 2. No): 1

Enter item ID: 1007
Quantity (kg): 3
Add the new item to the bill (1. Yes or 2. No): 2

II. The program should calculate the total gross amount of the purchased items and display the purchased item list as the following sample output.

Note:
pn = The price per kg for the nth item
qn = The quantity for the nth item
Gross amount = p1*q1 + p2*q2 + ... + pn*qn

Sample Output:
The customer's purchased item list.

Item ID	Quantity(kg)	Price (Rs.)
1009	2	1712
1005	6	4800
1004	1.5	675
1007	3	3168

Total gross amount = Rs. 10355

III. The program should calculate the total discount of the purchased items.
IV. The program should calculate and display the total net amount of the purchased items.

Note: Total net amount = Total gross amount - total discount

V. If the total net amount exceeds Rs. 5000, the supermarket gives 50% discount to the customer. The program should calculate and display the new net amount of the bill.

(25 Marks)

Question 02 (20 Marks)

Kamal wants to withdraw a certain amount of money (X LKR) from an ATM. The ATM will allow the transaction only under the following conditions:

- Condition 01: The ATM dispenses only 1000 LKR, 500 LKR, and 100 LKR notes. And Kamal can withdraw a maximum of 2000 LKR.

Write the C++ program to check these conditions before allowing the withdrawal. If the conditions are met, the program will calculate and display the number of Rs. 1000, Rs. 500, and Rs. 100 notes to dispense. If the conditions are not met, the program will inform Kamal that the transaction is invalid.

- Condition 02: Kamal's account balance must be sufficient to cover both the withdrawal amount and an additional bank charge of 5.00 LKR for each successful transaction.

The program should calculate and display Kamal's account balance after the transaction attempt. If the transaction is not possible due to insufficient funds, the program should output the invalid transaction message and current balance without making any changes. Clearly mention the assumptions you have made.