School of Science and Engineering

Semester Final Assignment **Semester: Summer 2024**
Course Code: CSE1102 **Course Title: Introduction to Programming**
Section: All **Course Teacher: SCB, NTNH, FK, MNM, MAP**
Submission deadline: 11:59PM, 18 September 2024 **Full Marks: 40**

PLEASE ANSWER ALL QUESTIONS.

Question 1: **(5*2 = 10 Marks)**

CO1

a) In a local grocery store, customers purchase items, and the store needs to calculate various costs based on quantities and prices. Imagine you are tasked with determining the total cost of items using C programming concepts. Discuss how you would declare and use variables to store the price and quantity of three different items (apples, bread, and milk). Additionally, explain which arithmetic operators you would use to calculate the total cost of the items, apply a 5% sales tax, and display the final amount. You may assume that the price and quantity are simple integers or floating-point numbers. How would you ensure accuracy in your calculations using C operators?

b) Design a flowchart that accepts two numbers as input and uses `if-else` statements to determine the appropriate arithmetic operation based on the values of the numbers. If both numbers are positive, the flowchart should calculate and display their sum. If one number is positive and the other is negative, it should calculate and display their product. Lastly, if both numbers are negative, the flowchart should compute and display their absolute difference. The flowchart should visually represent the decision-making process, showing the conditional checks with `if-else` statements and the corresponding arithmetic actions.

Question 2: **(10 Marks)**

CO2

Write a C program to calculate the energy required to turn ice into steam. The program should take two inputs: the initial temperature of the ice (in Celsius) and the weight of the ice (in kilograms). The output should display the total energy consumed to turn the ice into steam.

Input: temperature, weight ⇒ -10, 2

Output: consumed energy ⇒ 1,047,400 Joules

Question 3: **(10 Marks)**

CO2 You have to design a C program to monitor temperature fluctuations throughout a single day. The program should prompt the user to input temperatures for each hour, one at a time. After collecting all the temperatures, the program should determine and display the highest and lowest temperatures recorded during the day. Additionally, the program should count and display how many times the temperature dropped below a user-defined threshold. The threshold value must be provided by the user before entering the temperatures. To determine this threshold, extract the last two non-zero digits from your ULAB ID and arrange them in ascending order. For example, if your ULAB ID is 341011207, the last two non-zero digits are 7 and 2, making the threshold temperature 27. You must write the code and also show the expected outputs by providing putting input as instructed.

Sample input:
27
34 41 15 11 25 30 41 19 36 40 17 29
Sample output:
Maximum temperature: 41
Minimum temperature: 11
Temperature dropped below the threshold: 5 times

Question 4: **(10 Marks)**

CO2 You are required to design a C program that simulates a custom shopping cart system using loops and a switch-case statement. The program should take your university ID as input and use the last digit to determine a discount rate on the total purchase amount. Using a switch-case: if the last digit is 0-3, apply a 10% discount; if the last digit is 4-6, apply a 15% discount; and if the last digit is 7-9, apply a 20% discount. Additionally, if the last digit of your university ID is divisible by 2, you must use a for loop; otherwise, you may choose between a while or do-while loop. Your program should sum up the total cost and then apply the appropriate discount based on your ID. The output should display the original total, the discount applied, and the final price. You must write the code and also show the expected outputs by providing your university ID as input to the program.

----------✸Good Luck✸----------