CSE2218: DSA II Lab (Summer '25)

Assignment – 1 Total – 15 marks

1. A company is tracking its profit for the last 10 months.**[4 marks]**

Month	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**
Profit	3	-1	9	-2	4	3	1	-5	3	2

Here, positive value means company has made profit and negative value means it has made loss. The manager wants to know the **longest period of months** during which the company continuously made profit in every month.
Expected output:
Longest consecutive profit period = 3 months
Month range = {M5, M6, M7}
Now, solve the problem using **Divide and Conquer** technique.

2. You are on a **hill climbing expedition**, and to stay energized, you can carry **3 types of energy drinks**. Each drink contains a different amount of glucose per liter, and your goal is to choose which drinks to consume in order to **minimize the glucose level** while maintaining your energy. You can drink a **maximum of 6 liters** in total. **[3 marks]**

Drink type	**Bottle size**	**Total glucose per bottle**
Galxose-D	3L	75gm
GlucoMax	4L	80gm
Sting	5L	150gm

Print the minimum glucose level you have to consume and which drinks in what amount.

3. A retailer is purchasing products from a supplier to stock in their store. Each product is sold in **bundle** with a specific **weight.** The retailer purchases product in wholesale rate and sale them in retail price. The retailer can purchase a fraction of the bundle if he wants. The warehouse has a fixed capacity, and the retailer aims to maximize the **total profit** while staying within the weight limit.
Consider the following products with the total weight, wholesale price and retail price (per kg). **[4 marks]**

product	**Weight of a bundle (kg)**	**Wholesale price of the bundle**	**Retail price of per kg**
Rice	100	4000	55
Sugar	200	9000	62
Wheat	350	7000	30
Onion	250	12000	80

If the warehouse capacity is 600 kg, then find out which products the retailer should buy so that he can make maximum profit. Print the maximum profit and selected items.
[**Note that:** profit = retail price - wholesale price]

4. A meteorologist is analyzing temperature trends over several days. They have recorded the daily temperatures in an array and want to identify the **maximum average temperature trend** over any 3-day period to understand the warmest trends in a region.

   You are given an array where each element represents the daily temperature. Using the **divide and conquer technique**, find the 3 consecutive days (subarray of size 3) that have the **highest total temperature**. **[4 marks]**

   Example:

   - Array of daily temperatures: [28, 31, 29, 34, 30, 33, 27, 35, 32].
   - Output: The 3-day subarray with the maximum total temperature is [34, 30, 33] (total = 97).

Submission guideline:

- Solve 4 problems in 4 .cpp files and rename them as 011XXXXX_1.cpp(for problem 1), 011XXXXX_2.cpp(for problem 2) and so on. Replace 011XXXXX with your student Id.
- Submit only the 4 cpp files in eLMS.
- **Submission deadline**: 11 PM , 19 September 2025 (Friday)

****You will be asked to write pseudocodes as part of the viva. So, write the code on your own and try to understand each line of it. Your assignment will be evaluated based on your written viva****