

**Question****[65 Marks]**

Dato' Vina has her own business and a founder of a few products. She has a few agents to sell her products. The agents will get some commission for each product that has been sold to the client. Write a complete C++ program that helps Dato' Vina to see the full sales report of her own products. The program should perform the following tasks:

**Task 1:** Write a function named ***readQty***. **(8 marks)**

- a) This is a non-returning function.
- b) It takes the quantity for Product A, Product B and Product C that have been sold by an agent as input parameters.
- c) The function should ask the user to enter the quantity for each product. ***Input validation***: the quantity entered by user must be between 0 to 100 marks only. If the input is out of the range, the user must enter the quantity again.
- d) It sends all the values entered by the user in (c) back to the function caller / calling module using reference parameters.

**Task 2:** Write a function named ***displayHighProd***. **(8.5 marks)**

- a) This is a non-returning function.
- b) It takes the total of commission of each product for each agent as an input parameter.
- c) The function should display the product that the agent got highest commission based on the percentage in Table 1.

*Table 1*

Product	Price (RM)	Percentage of Commission
A	150	2.5%
B	300	5%
C	450	10%

**Task 3:** Write a function named ***calcAvg***. **(4 marks)**

- a) It takes the number of agents and total of commission for all agents as input parameters.
- b) The function should calculate the average of commission for all agents.
- c) It should return the average of commission calculated in (b).

**Task 4:** Write a function named ***summaryCom***. **(4 marks)**

- a) This is a non-returning function.
- b) It takes the total of commission of each product and total of commission for all products for each agent as an input parameter.
- c) The function should display the product that the agent got highest commission by calling the ***displayHighProd*** function.

**Task 5:** Write a main function to perform the following tasks: **(31.5 marks)**

- You need to use an appropriate **LOOP** to perform the process in this function. The loop will be terminated when the user press ENTER without any value for student's name.
- You are **NOT ALLOWED** to use **arrays** except an array of characters.
- The function should ask the user to enter an agent's name.
- The function may need to call the functions that are defined in Task 1, Task 3, and Task 4.
- The function should calculate the total of commission of each product and total of commission for all products for each agent based on the following formula in Table 2:

*Table 2*

Total of commission for each product	Total Product A = quantity * ((150*0.025))
	Total Product B = quantity * ((300*0.05))
	Total Product C = quantity * ((450*0.1))
Total of commission for all products	Total Product A + Total Product B + Total Product C

- The function should determine the agent with the highest and lowest total of commission for all products, and highest commission for each product, calculate the number of agents, and the average of commission for all agents. **Note:** You are **NOT ALLOWED** to use any **predefined function(s)** to determine the highest and lowest total of commission.
- The program should produce the output as in the sample execution given below. **Note:** The values in **bold** are input by the user.

**Task 6:** List all function prototypes. **(4 marks)**

**Task 7:** You must ensure your program fulfil the following criteria: **(5 marks)**

- The program can be run.
- The program uses an appropriate structure for the program (e.g., all required header files are included, the program is properly written, proper indentation, etc.)

### **SAMPLE PROGRAM EXECUTION**

```
-----AGENT-----
Agent Name: AFIQ ROSDI
Product A: 56
Product B: 34
Product C: 20
-----SALES SUMMARY-----
Total of commission for three products: RM1620
Highest commission - Product C: RM900
```

-----AGENT-----

Agent Name: **SHIRA ATINI**

Product A: **50**

Product B: **87**

Product C: **8**

-----SALES SUMMARY-----

Total of commission for three products: RM1852.5

Highest commission - Product B: RM1305

-----AGENT-----

Agent Name: **ZAMRI HUSIN**

Product A: **99**

Product B: **21**

Product C: **7**

-----SALES SUMMARY-----

Total of commission for three products: RM1001.25

Highest commission - Product A: RM371.25

-----AGENT-----

Agent Name: **NANA ALIA**

Product A: **30**

Product B: **100**

Product C: **110**

Product C: **-1**

Product C: **11**

-----SALES SUMMARY-----

Total of commission for three products: RM2107.5

Highest commission - Product B: RM1500

-----AGENT-----

Agent Name:

-----SALES ANALYSIS-----

Lowest commission for three products: RM 1001.25 (ZAMRI HUSIN)

Highest commission for three products: RM 2107.5 (NANA ALIA)

Highest commission for Product A: RM 371.25 (ZAMRI HUSIN)

Highest commission for Product B: RM 1500 (NANA ALIA)

Highest commission for Product C: RM 900 (AFIQ ROSDI)

Total of commission for 4 agents: RM 6581.25

Average commission for 4 agents: RM 1645.31