

ASSIGNMENT III : SUBMISSION 18 JAN 2021

The Ministry of Health Malaysia is responsible for providing health services to help citizens of Malaysia in sustaining a certain level of health that allows them to lead a productive lifestyle. Assume that you are a programmer working for ministry. You have been asked to write a C++ program to facilitate the ministry to develop a health care system for Body Mass Index (BMI) Calculator module. The module is to measure body fat based on **height in meter** and **weight in kilogram** that applies to adult men and women.

There are seven (7) tasks already listed to complete the program. You are given a partial complete of C++ program (**Question2.cpp**) and an input data file (**input.txt**). Complete the source code according to the tasks given as follows;

TASK 1:

Complete the definition of function **readFile**. This function reads the patient data inputs from the provided input text file named **input.txt**. The patient data consists of patient's name along with their weight in kilogram and height in centimeter. The read data are then stored into arrays accordingly.

Input Validation: Please make sure that the program will only continue reading the file if it is successfully opened, otherwise print the error message and exit the program.

TASK 2:

Complete the definition of function **convertMeter**, which converts patient's height in centimeter to meter. The formula to convert is as follows:

$$\text{height (meter)} = \text{height (cm)} / 100$$

TASK 3:

Complete the definition of function **calculateBMI**, which calculates the patient's Body Mass Index (BMI) based on **weight in kilogram** and **height in meter** from two arrays correspondingly and puts the results into another array. The formula to calculate BMI is as follows:

$$\text{BMI} = \text{weight (kg)} / (\text{height (m)} * \text{height(m)})$$

TASK 4:

Complete the definition of function **average**. This function calculates the average value of array elements, which calculates the average weight of patients.

TASK 5:

Using all functions defined above, write a function call: (a) to read file from the input file, (b) to convert centimeter to meter, (c) to calculate BMI and (d) to calculate average weight of patients.

TASK 6:

Print the list of patient's names along with their weight in kilogram (kg), height in meter (m), and the calculated BMI to the output file named **output.txt** as shown in Figure 2.1.

Note: You should use proper output formatting (align output to the left and number formatting shows two (2) decimal places).

Name	Weight (kg)	Height (m)	BMI
Qisha Sumayyah	70.50	1.40	35.97
Anis Nabila	30.90	1.30	18.28
Adam Zakaria	50.10	1.55	20.85
Mohamad Hafetz	65.30	1.65	23.99
Asma Safiyyah	45.20	1.32	25.94
Ahmad Ali	85.60	1.72	28.93

Figure 2.1: Sample output in **output.txt**

TASK 7:

Print the number of patients and the average weight for all patients to the program screen as shown in **Figure 2.2**. *Note:* You should use proper output formatting (number formatting for average shows one decimal place).

```
Writing to the output file...

Number of patients : 6
Average weight    : 57.9
```

Figure 2.2: Sample output in program screen.

Table 1: Assessment Criteria

Item	Criteria	Marks
A	The program is able to run and display correct output	4
	Applying proper styles (e.g. indentation, comments)	1
B	Open and close input file	2.5
	Check if the file is successfully open ➔ if fail, display error message and exit the program	3
	Get the name of patients, weight and height from input file and store them into arrays accordingly.	4.5
C	Complete a function to convert centimeter to meter.	5
D	Complete a function to calculate BMI.	7
E	Find the total weight.	4.5
	Find the average weight.	2.5
	Return the average weight.	1
F	Call <code>readFile</code> function	2.5
	Call <code>convertMeter</code> function	2
	Call <code>calculateBMI</code> function	2.5
	Call <code>average</code> function	2
G	Open and close output file	2.5
	Print all patient's name, weight, height in meter and the calculated BMI to the output file with proper output formatting.	13.5
H	Print the number of patients and the average weight of patients to the program screen	5
	Total	65