

**EXERCISE (SECJ1013)**  
**PROGRAMMING TECHNIQUE 1**  
**SECTION 02, SEM 1, 2023/2024**

**INSTRUCTIONS TO THE STUDENTS**

- This exercise must be done ***individually***.
- Your program must follow the input and output as required in the text and shown in the examples. You must test the programs with (but not limited to) all the input given in the examples.
- Any form of plagiarisms is ***NOT ALLOWED***. Students who copied other students' programs will get ***ZERO*** marks (both parties, students who copied, and students that share their work).
- Please insert your ***name, matrix number, and date*** as a comment in your solution.

**SUBMISSION PROCEDURE**

- Please submit this exercise before ***January 5, 2025, Friday***.
- Two files are required for the submission which is the source code (the file with the extension .cpp), and the input file (the file with the extension .txt).
- Submit the assignment via the UTM's e-learning system.

**QUESTION**

Given the formula for converting Fahrenheit (F) to Celcius (C):

$$C = 5/9 \times (F - 32)$$

where C is the unit of temperature in Celcius and F is the unit of temperature in Fahrenheit. Write a complete C++ program that reads in a list of data F from a text file, then calculates the values of C using the formula given. The program should use an array to store the values of F as example shown in Figure 1.

130.89
67.75
200.67
56.78
84.15
92.48
75.32
61.75

**Figure 1:** Example of data F in the input file

The program then prints a summary output onto the screen and the detail output into a text file as shown in Figures 2 and 3. Grades 'H' mean high temperature; 'M' is medium temperature and 'L' is low temperature.

Your program must define several functions at least as listed in Table 1. You are also required to apply the concept of parameter passing to these functions.

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Average of the temperature in Celcius: 35.7
Number of high temperature: 2
Number of medium temperature: 3
Number of low temperature: 3

```

**Figure 2:** Example of output on the screen

C (Celcius)	F (Fahrenheit)	Description
=====	=====	=====
54.94	130.89	H
19.86	67.75	L
93.71	200.67	H
13.77	56.78	L
28.97	84.15	M
33.60	92.48	M
24.07	75.32	M
16.53	61.75	L

**Figure 3:** Example of content in the output file

**Table 1**

Function	Description
readFile	This function reads in a list of numbers from a text file and stores them into a one-dimensional array. It receives the following parameters: <ul style="list-style-type: none"> <li>a. The name of the text file to be read from</li> <li>b. An array to store the list of numbers read</li> <li>c. A variable to store the number of data read</li> </ul>
computeC	This function computes the values of C. It receives the following parameters: <ul style="list-style-type: none"> <li>a. An array that contains data F</li> <li>b. An array to store the calculated values of C</li> <li>c. The number of data</li> </ul>
average	This function computes the average of a list of numbers stored in an array.
grade	This function determines either temperature (C) is high or medium or low. This function will return 'H' if $C \geq 35$ , 'M' if $C < 35$ and $C \geq 20$ , and 'L' if $C < 20$ .
writeFile	This function prints the output file as in Figure 7. It receives the following parameters: <ul style="list-style-type: none"> <li>a. An array that contains data F</li> <li>b. An array that contains data C</li> <li>c. The number of data</li> </ul>

For printing summary output onto the screen, you may define another function or you may just put the code into the main function.