

ASSIGNMENT 1
PROGRAMMING TECHNIQUE 1 (SECJ1013)
SEM 1 (2021/2022)

INSTRUCTIONS TO THE STUDENTS

- This assignment must be done **in pairs** (a group consisting of 2 members).
- Please refer to the group list to find out your group members/ partner and your set of assignments.
- The application examples given in the figure in the question set can be used as a guide to design your solution (flow chart).
- Any form of plagiarisms is **NOT ALLOWED**. Students who copied other students' assignments will get **ZERO** marks (both parties, students who copied, and students that share their work).
- Please insert your **name and partner's name, matric number, and date** as a comment in your program.

SUBMISSION PROCEDURE

- Please submit this assignment no later than **October 29, 2024 (Tuesday, on / before 00:00 MYT)**.
 - Only one submission per pair (group) that includes one file is required for the submission which is the flow chart (the file with the extension .pdf).
 - Submit the assignment via the UTM's e-learning system.
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SET 1

Based on the problem given below, analyze the problem and design its solution using a **flow chart**. The flow chart must be drawn by using any appropriate drawing tools such as Microsoft Visio, draw.io (<https://app.diagrams.net/>), and Lucid chart (<https://www.lucidchart.com/pages/examples/flowchart-maker>).

You need to design a program that repeatedly accepts temperatures from the user in Celsius, converts them to Fahrenheit, and then classifies them into one of the following categories:

- a) Cold if the Fahrenheit temperature is below 50°F,
- b) Moderate if it's between 50°F and 77°F, and
- c) Hot if it's above 77°F.

The program will continue until the user enters a sentinel value (-999) to stop. Alongside the main function, you must define and call a user-defined function to handle the temperature conversion from Celsius to Fahrenheit.

Please take note that in your solution (flow chart), you **MUST** apply:

- a) Branching/ selection (if..else)
- b) Loop/ repetition (repeat..until/ do..while)
- c) User-defined function flow chart. Besides the **main** function flow chart, your solution needs to design at least **ONE** more other function flow chart. Use appropriate arguments for the function.

Sample Input & Output

Sample 1

Input: 25°C

Conversion:

$$\text{Fahrenheit} = (9/5 * 25) + 32 = 77^{\circ}\text{F}$$

Classification: Moderate

Display of input & output will be like below:

Sample 2

Input: -5°C

Conversion:

$$\text{Fahrenheit} = (9/5 * -5) + 32 = 23^{\circ}\text{F}$$

Classification: Cold

```
Enter temperature in Celsius (-999 to stop): 25
25°C is 77°F, classified as Moderate.

Enter temperature in Celsius (-999 to stop): 0
0°C is 32°F, classified as Cold.

Enter temperature in Celsius (-999 to stop): 30
30°C is 86°F, classified as Hot.

Enter temperature in Celsius (-999 to stop): -10
-10°C is 14°F, classified as Cold.

Enter temperature in Celsius (-999 to stop): -999
Program terminated.
```

SET 2

Based on the problem given below, analyze the problem and design its solution using a **flow chart**. The flow chart must be drawn by using any appropriate drawing tools such as Microsoft Visio, draw.io (<https://app.diagrams.net/>), and Lucid chart (<https://www.lucidchart.com/pages/examples/flowchart-maker>).

You need to design a program that allows users to calculate either Simple Interest or Compound Interest based on user input. The program will:

- Ask the user whether they want to calculate Simple Interest or Compound Interest.
- For both interest types, the user will input the Principal (P), Rate of Interest (R) (as a percentage), and Time (T) (in years).
- If the user chooses Simple Interest, calculate it using the formula:
Simple Interest (SI) = $\frac{P \times R \times T}{100}$
- If the user chooses Compound Interest, ask for the number of times interest is compounded per year (n) and calculate it using the formula:

Compound Interest (CI) =

$$CI = P \times \left(1 + \frac{R}{100 \times n}\right)^{n \times T} - P$$

- The program will allow the user to perform multiple calculations and will terminate when the user enters a sentinel value (0 for interest type).

Please take note that in your solution (flow chart), you **MUST** apply:

- Branching/ selection (if..else)
- Loop/ repetition (repeat..until/ do..while)
- User-defined function flow chart. Besides the **main** function flow chart, your solution needs to design at least **ONE** more other function flow chart. Use appropriate arguments for the function.

Sample Input & Output

Sample 1 (Simple Interest Example):

Input Principal (P): 1000

Input Rate (R): 5%

Input Time (T): 3 years

Calculation:

$$SI = \frac{1000 \times 5 \times 3}{100}$$

Result: Simple Interest = 150

Sample 2 (Compound Interest Example):

Input Principal (P): 1000

Input Rate (R): 5%

Input Time (T): 3 years

Input Number of Times Compounded Per Year

(n): 4 (quarterly)

Calculation:

$$CI = 1000 \times \left(1 + \frac{5}{100 \times 4}\right)^{4 \times 3} - 1000$$

Result: Simple Interest = 159.27

Display of input & output will be like below:

Sample Execution (Simple Interest):

```
Choose interest type (1 for Simple, 2 for Compound, 0 to exit): 1
Enter Principal (P): 1000
Enter Rate of Interest (R): 5
Enter Time (T in years): 3

Simple Interest is: 150.00

Choose interest type (1 for Simple, 2 for Compound, 0 to exit): 0
Program terminated.
```

Sample Execution (Compound Interest):

```
Choose interest type (1 for Simple, 2 for Compound, 0 to exit): 2
Enter Principal (P): 1000
Enter Rate of Interest (R): 5
Enter Time (T in years): 3
Enter number of times compounded per year (n): 4

Compound Interest is: 161.62

Choose interest type (1 for Simple, 2 for Compound, 0 to exit): 0
Program terminated.
```