ASSIGNMENT 1

PROGRAMMING TECHNIQUE 1

SEM 1, 2020/2021

INSTRUCTIONS TO THE STUDENTS

- *This assignment must be done **in pairs** (group consisting of 2 members).*
- *Please refer to the group list to find out your group members.*
- *Your programs 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 student's program/ assignment will get **ZERO** mark (both parties, student who copied and student that share their work).*
- *Please insert your **name and partner's name, matrics number and date** as a comment in your program.*

SUBMISSION PROCEDURE

- *Please submit this assignment no later than **December 20, 2020, Sunday (00:00 MYT)**.*
- *Only one submission per pairs (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.*

QUESTION

The Body Mass Index (BMI) is a quick and easy screening method to determine the weight status of a person. The BMI of a person is calculated as:

$$BMI = \frac{weight}{height^2}$$

where, *weight* and *height* are measured in kilograms and meters, respectively. A person is considered to be normal, if his or her BMI is between 18.5 and 25. If the BMI is less than 18.5, the person is considered to be underweight. If it is greater than 25 but not more than 30, the person is considered to be overweight. If the index is above 30, the person is considered to be obese.

Based on the information of BMI described above, draw a flow chart to determine the weight status of a list of person. The flow chart should fulfil the following requirements:

a) The user is required to enter the name, weight and height of each person in the list. The flow chart should provide a mechanism to control the loop of reading input. For example, the flow chart will keep reading input until the user enters an empty name. Another example is that the user is firstly asked for the number of person he or she wants to enter.

b) The output of the flow chart contains the following information:
   - The list of persons along with their names, weights, heights, BMIs, and weight status.
   - The overall BMI and weight status. The overall BMI is calculated as:

$$OverallBMI = \frac{OverallWeight}{OverallHeight^2}$$

where, *OverallWeight* and *OverallHeight* are obtained as the average weight and height over all persons in the list, respectively. Then the overall status should be determined based on the overall BMI.

c) The flow chart should provide the following functions:
   - **`getBMI`** to calculate BMI.
   - **`getStatus`** to determine the weight status based on BMI.

   Note: You may want to define other functions if necessary.

Figure 1 shows some example runs with their set of user inputs and corresponding output. ***Notes:*** As for example of the program, the mechanism used for controlling the loop of reading user inputs is that it ***keeps reading input until the user enters an empty name***.

```
Enter name or press <ENTER> key to end=> Hamid
Enter weight(kg) and height(m) => 76.8  1.6

Enter name or press <ENTER> key to end=> Elias
Enter weight(kg) and height(m)  => 64  1.6

Enter name or press <ENTER> key to end=> Amaleena
Enter weight(kg) and height(m) => 18.5  1

Enter name or press <ENTER> key to end=>
```

(a) User Inputs of Run 1

```
Name  : Hamid
Weight: 76.80 kilograms
Height: 1.60 meters
BMI   : 30.00
Status: Overweight

Name  : Elias
Weight: 64.00 kilograms
Height: 1.60 meters
BMI   : 25.00
Status: Normal

Name  : Amaleena
Weight: 18.50 kilograms
Height: 1.00 meters
BMI   : 18.50
Status: Normal

Overall BMI : 27.09
Overall Status : Overweight
```

(b) Output of Run 1

```
Enter name or press <ENTER> key to end=> Ali
Enter weight(kg) and height(m) => 74.6  1.71

Enter name or press <ENTER> key to end=> Bakar
Enter weight(kg) and height(m)  => 61  1.68

Enter name or press <ENTER> key to end=> Daud
Enter weight(kg) and height(m)  => 66.4  1.89

Enter name or press <ENTER> key to end=>
```

(c) User Inputs of Run 2

```
Name   : Ali
Weight: 74.60 kilograms
Height: 1.71 meters
BMI    : 25.51
Status: Overweight

Name   : Bakar
Weight: 61.00 kilograms
Height: 1.68 meters
BMI    : 21.61
Status: Normal

Name   : Daud
Weight: 66.40 kilograms
Height: 1.89 meters
BMI    : 18.59
Status: Normal

Overall BMI : 21.74
Overall Status : Normal
```

(d) Output file of Run 2

Figure 1: Example Runs