# 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

A hospital supply company wants to market a program to assist with the calculation of intravenous rates. Draw a flow chart that helps the company to calculate intravenous rates. The flow chart should perform the following steps. (*Note:* that the values in *italics* are input by the user while the values in **bold** are the final result for each problem)

1. Provide a menu driven screen for user to select the problem choice.
2. If the user enters **1**, the program should ask the user
   a) to enter the rate of intravenous drop in ml/hr
   b) to enter the intravenous tubing drop factor (drops/ml)

   From the given information, calculate and display the intravenous drop rate per minute. The screen displays for problem 1 is as in **Figure 1**.

```
INTRAVENOUS RATE ASSISTANT

Enter the number of the problem you wish to solve.
     GIVEN A MEDICAL ORDER IN            CALCULATE RATE IN
(1) ml/hr & tubing drop factor              drops/min
(2) mg/kg/hr & concentration in mg/ml     ml/hr
(3) QUIT

Problem => 1
Enter rate in ml/hr => 150
Enter tubing's drop factor(drops/ml) => 15
The drop rate per minute is 38.
```

**Figure 1**: Screen Display for Problem 1

3. If the user enters **2**, the program should ask the user
   a) to enter input rate in mg/hr
   b) to enter the patient weight in kg
   c) to enter the concentration rate of the drug in mg/hr

From the given information calculate and display rate in millilitres per hour. The screen displays for problem 2 is as in **Figure 2**.

```
    INTRAVENOUS RATE ASSISTANT

    Enter the number of the problem you wish to solve.
         GIVEN A MEDICAL ORDER IN            CALCULATE RATE IN
    (1) ml/hr & tubing drop factor              drops/min
    (2) mg/kg/hr & concentration in mg/ml       ml/hr
    (3) QUIT

    Problem => 2
    Enter rate in mg/hr => 0.6
    Enter patient weight in kg => 70
    Enter concentration in mg/ml => 1
    The rate in millilitres per hour is 42.
```

**Figure 2**: Screen Display for Problem 2

4. If the user enters **3**, the program will display the screen as in Figure 3.

```
    INTRAVENOUS RATE ASSISTANT

    Enter the number of the problem you wish to solve.
         GIVEN A MEDICAL ORDER IN            CALCULATE RATE IN
    (1) ml/hr & tubing drop factor              drops/min
    (2) mg/kg/hr & concentration in mg/ml       ml/hr
    (3) QUIT

    Problem => 3
    You have chosen to quit the program.
    Thank you for using our system.
```

**Figure 3**: Screen Display for Problem 3

5. If the user enters any other problem number besides 1, 2 or 3, it will display the screen as in **Figure 4**.

```
    INTRAVENOUS RATE ASSISTANT

    Enter the number of the problem you wish to solve.
         GIVEN A MEDICAL ORDER IN            CALCULATE RATE IN
    (1) ml/hr & tubing drop factor              drops/min
    (2) mg/kg/hr & concentration in mg/ml       ml/hr
    (3) QUIT

    Problem => 6
    Please run the system again and choose a problem number between 1 and 3.
```

**Figure 4**: Screen Display for Invalid Problem Choice

You should implement the following functions:

**getProblem** – A function with no input parameters. It will display the user menu, then inputs and returns from the function the value of the problem number selected.

**getRateDropFactor** – This is a non-returning function which prompts the user to enter the data required for problem 1, and sends this data back to the calling module through the use of reference parameters.

**getKgRateConc** – This is also a non-returning function which prompts the user to enter the data required for problem 2, and sends this data back to the calling module through the use of reference parameters.

**figDropsMin** – This function takes rate and drop factor as input parameters and it returns the value of drops/min (rounded to the **nearest** whole drop, for example 23.2 to 24 and 23.7 to 24).

**byWeight** – This function takes as input parameters rate in mg/hr, patient weight in kg, and concentration of drug in mg/ml and it returns the value ml/hr (rounded, for example 26.2 to 26 and 26.6 to 27). *Note:* Formula to calculate rate in ml/hr = rate in mg/hr × weight in kg × concentration of drug in mg/ml.

Your flowchart should also be drawn to show the implementation of a loop(s).

On the whole, the example of program execution for all problem choices will be depicted as follows:

```
INTRAVENOUS RATE ASSISTANT

Enter the number of the problem you wish to solve.
     GIVEN A MEDICAL ORDER IN          CALCULATE RATE IN
(1) ml/hr & tubing drop factor            drops/min
(2) mg/kg/hr & concentration in mg/ml     ml/hr
(3) QUIT
Problem => 1
Enter rate in ml/hr => 150
Enter tubing's drop factor(drops/ml) => 15
The drop rate per minute is 38.

Enter the number of the problem you wish to solve.
     GIVEN A MEDICAL ORDER IN          CALCULATE RATE IN
(1) ml/hr & tubing drop factor            drops/min
(2) mg/kg/hr & concentration in mg/ml     ml/hr
(3) QUIT

Problem => 2
Enter rate in mg/kg/hr => 0.6
Enter patient weight in kg => 70
Enter concentration in mg/ml => 1
The rate in millilitres per hour is 42.

Enter the number of the problem you wish to solve.
     GIVEN A MEDICAL ORDER IN          CALCULATE RATE IN
(1) ml/hr & tubing drop factor            drops/min
(2) mg/kg/hr & concentration in mg/ml     ml/hr
(3) QUIT

Problem => 3
You have chosen to quit the program.
Thank you for using our system.

For choices which are not in the range of 1 to 3 example -1 or 6:

Problem => 6
Please run the system again and choose a problem number between 1 and 5.
```