Cohort Session 3, Week 2
Move the Robot

Objectives
1. Learn some basic concepts of Python.
2. Learn to write functions in Python.
3. Write a Python program to control some movements of the robot.

Please work on this lab in a group of **two or three**. Be sure to email your partner all the modified code, printouts and data. You may have to use them during your exams.

1 Equipment & Software

Download the Thymio software (pythymiodw) from **Thymio's Getting Started** and the materials for this week's project from eDimension.

Each group should have:

1. An Thymio with a USB cable for charging and communication.
2. Installed the pythymiodw package from **Thymio's Getting Started**.
3. `thymio_sample.py`, which contains basic code to get an Thymio up and running.
4. `wk2_template.py`, which you would be writing your code on.

WARNING!
- If the robot travels too fast and gets away from you, pick it up quickly to stop it from colliding into anything.
- The robot is to be placed on the floor when it is moving. Do NOT put it on a table, lovingly adore it on your lap, balance it on your fingertips, etc.
- Take **EXTREME CARE** when attaching and removing the cable from the robot's socket – it does not take too well to rough handling.

2 Warm-up: Basic Movements and LED Control

Tasks
1. Understand the code in `thymio_sample.py`.
2. Read from temperature sensor on Thymio and print out the value.

Instructions:

1. If you have not already installed the libdw package, please follow the instructions on **Thymio's Getting Started** to set up your Pi to connect to an Thymio.
2. Follow the instructions on **Thymio's Getting Started** to get your Pi connected to the Thymio.
3. Run the `thymio_sample.py`.
   a. Verify that the:
      i. robot moves forward for 5 seconds.
      ii. robot rotate counter-clockwise for 2 seconds.
      iii. top LED switches on for 2 seconds.
      iv. front top circle LED switches on for 2 seconds.
   b. Look for the instructors or TA if you need help with any of the above steps.
4. Modify the `thymio_sample.py` to read from the temperature sensor and print the value temperature in Celsius. You should refer to the **Thymio API reference** to find out what is the function to use in order to obtain the temperature value. The expected output of the program is:

```
The temperature reading in Celsius is 25
```

3 Functions and User Input

Tasks
1. Write function that moves the Thymio at a given speed for a certain duration.
2. Print temperature value in a specific format.

Instructions:

1. Modify the `wk2_template.py`. Your program should prompt the user to input the forward throttle value for both wheels and duration to move forward. Both of these values are passed as arguments to a function called `forward` which does not return any value. This function moves the robot forward for x number of seconds using these values. For example, if the input values are 70 and 3, the robot will move forward with speed of 70 on both wheels for 3 seconds. The maximum number for speed is 500, which is equivalent to about 20 cm/s.
2. At the end of the the movement, the program should print the temperature in Celsius and Fahrenheit. The expected output of the program is:

```
The temperature in Celsius is 25.000 and Fahrenheit is 77.000
```

Checkoff 1

Explain and demonstrate the working program to an instructor. The program must make use of the forward function and it should print the temperature value at the end of the movement. The temperature value should have three decimal places.