Getting Started with the ACM Environmental Workshop

1. Download Arduino IDE
    a. Visit the Arduino website: https://www.arduino.cc/en/software

    b. Choose the platform that you are using for the download (as shown in Figure 1):

Figure 1

    c. When the download is completed double click on the ".exe" file that you just download.

    d. Then follow the instructions to install the IDE.

2. Install "Time" library to Arduino.
    a. Before we open the file we need to add the "Time" library to Arduino because it is an external library that is used in this project. First we click on the "Sketch" tab (as shown in Figure 2).

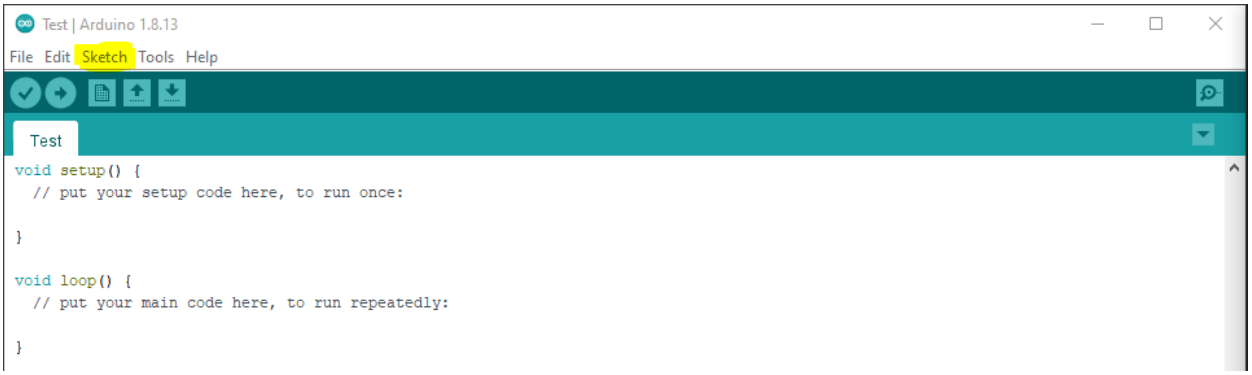

Figure 2

b. Then click in “Include Library” >> “Manage Libraries” (as shown in Figure 3):

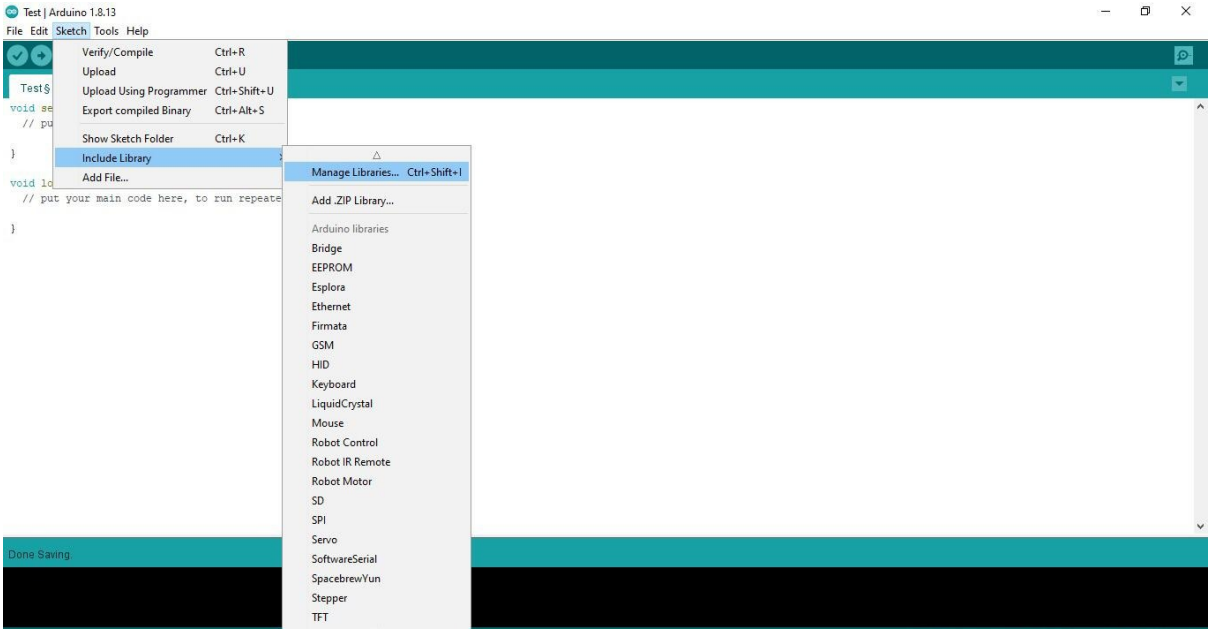

Figure 3

c. Search for the library “Time” by Michael Margolis, then select the version (v1.6.0) and click install (as shown in Figure 4).

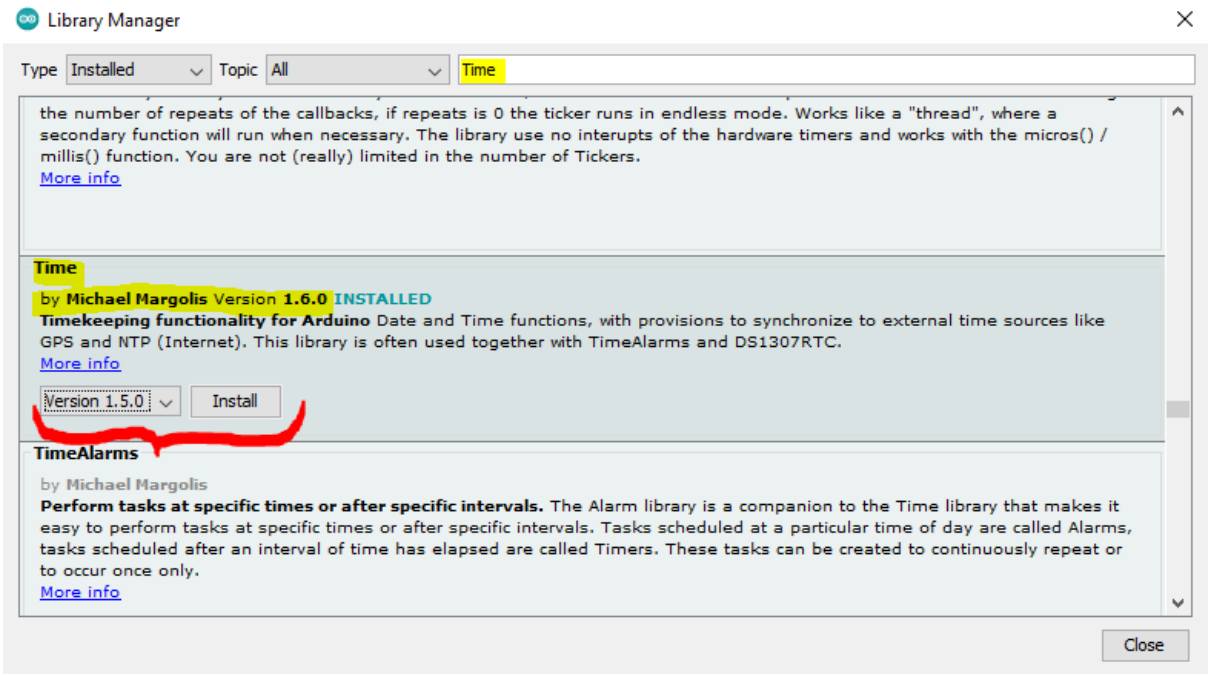

Figure 4

d. Now you are ready to open the project.

If you have questions with the library visit the library repository:
https://github.com/PaulStoffregen/Time

3. Moisture sensor calibration
    a. The values for minimum and maximum value of the humidity of the soil depends on every soil. Therefore to know the minimum and maximum values of the soil you need to calibrate the moisture sensor. First you need to know the ideal humidity of the plant and the soil you are using.

    b. Then replicate the maximum and minimum humidity on two amounts of soil.

    c. Using the code and the sensor, read both values.

    d. Those values will be the maximum and minimum values of your plant. Then write those values on the maximum humidity and minimum humidity variables in the code (as shown in Figure 5).

```
#include <Time.h>
#include <TimeLib.h>

//Schedule
int startTime[] = {00, 00, 00, 1, 1, 2021}; //hour, minute, second, day, month, year
int dailyAlarm[] = {00, 00, 10};  //hour, minute, second

//Pins
const int buzzerPin = 9; //buzzer to arduino pin 9
const int temperaturePin = 0;//temperature sensor to analog arduino pin 0
const int humPin = A1; //humidity sensor to analog pin 1
const int tempLed = 3; //Temperature LED to arduino pin 3
const int humLed = 4; //Humidity LeD to arduino pin 4
const int humPower = 7;//humidity sensor power to arduino pin 7

//Alarms specifications
const int ALARM = 0; //Alarm Tone
const int alarmDuration = 1; //duration in seconds
const int frequency = 1000;

//Temperature Alarm Specifications
const int tempAlarm = 1; //Alarm Tone
const int minTemp = 65; //Minimun Temperature
const int maxTemp = 90; //Maximun Temperature

//Humidity Alarm Specifications
const int humAlarm = 2; //Alarm Tone
const int minHum = 10; //Minimun Humidity
const int maxHum = 540; //Maximun Humidity
```

Figure 5

References:

Temperature Sensor -
https://learn.adafruit.com/tmp36-temperature-sensor/using-a-temp-sensor
Moisture Sensor -
https://learn.sparkfun.com/tutorials/soil-moisture-sensor-hookup-guide#soil-moisture-sensing-basic-example

Helpful Links:

GitHub - https://www.youtube.com/watch?v=7SV4R5LPl-Y

Arduino - https://www.arduino.cc/en/Guide