

CAMP # 4 ACTIVITIES

REF : myFlowLab-1602-4

REAL-WORLD PROTOTYPE PROJECTS WITH ARDUINO UNO IOT Project

MATROLL  myFlowlab

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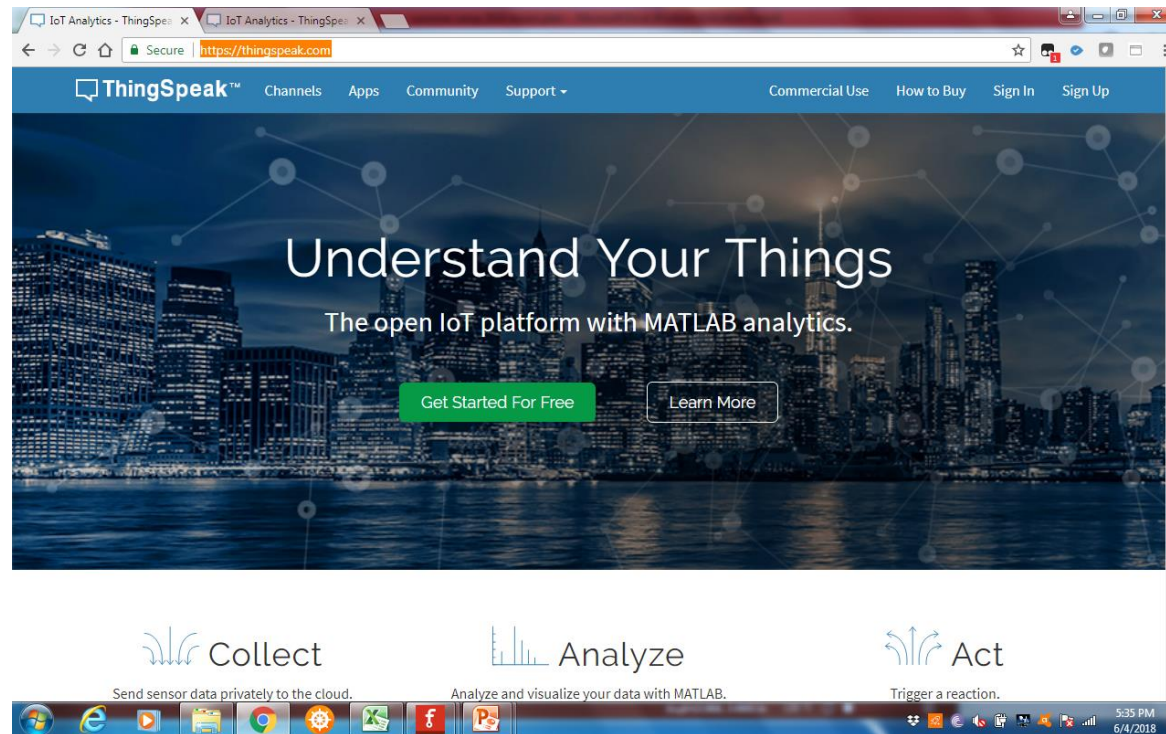
Day 1

IOT Platform and Temperature sensor

Setup a IOT (Internet of Things) Platform on your PC

Day 1

STEP 1 : Type <https://thingspeak.com> on Browser URL to go to Thing speak webpage



STEP 2 : Click “Get Started for free”

STEP 3 : Fill the sign-up form with valid information

Sign up for ThingSpeak

It is free to sign up for ThingSpeak. Free accounts offer a fully functional experience on ThingSpeak with limits on certain functionality. Commercial users may sign up for a time-limited free evaluation. To send data faster to ThingSpeak or to send more data, consider our [paid license options](#) for commercial, academic, home and student usage. To start using ThingSpeak you must create a new MathWorks account, or, click cancel and log in using an existing MathWorks account.

Create MathWorks Account

Email Address

i To access your organization's MATLAB license, use your school or work email.

User ID

Password

Malaysia

First Name

Last Name

I accept the Online Services Agreement

[See our privacy policy for details.](#)

SMART CONNECTED DEVICES

DATA AGGREGATION AND ANALYTICS
ThingSpeak

MATLAB
ALGORITHM DEVELOPMENT
SENSOR ANALYTICS

STEP 4: Once information entry complete, click “Continue”

Step 5: Go to your email inbox to verify your email

Step 6: Click “Verify your email” as shown on the email message from Thing Speak

Step 7: Click the “Continue” button on the above page

Step 8: Click “ OK”

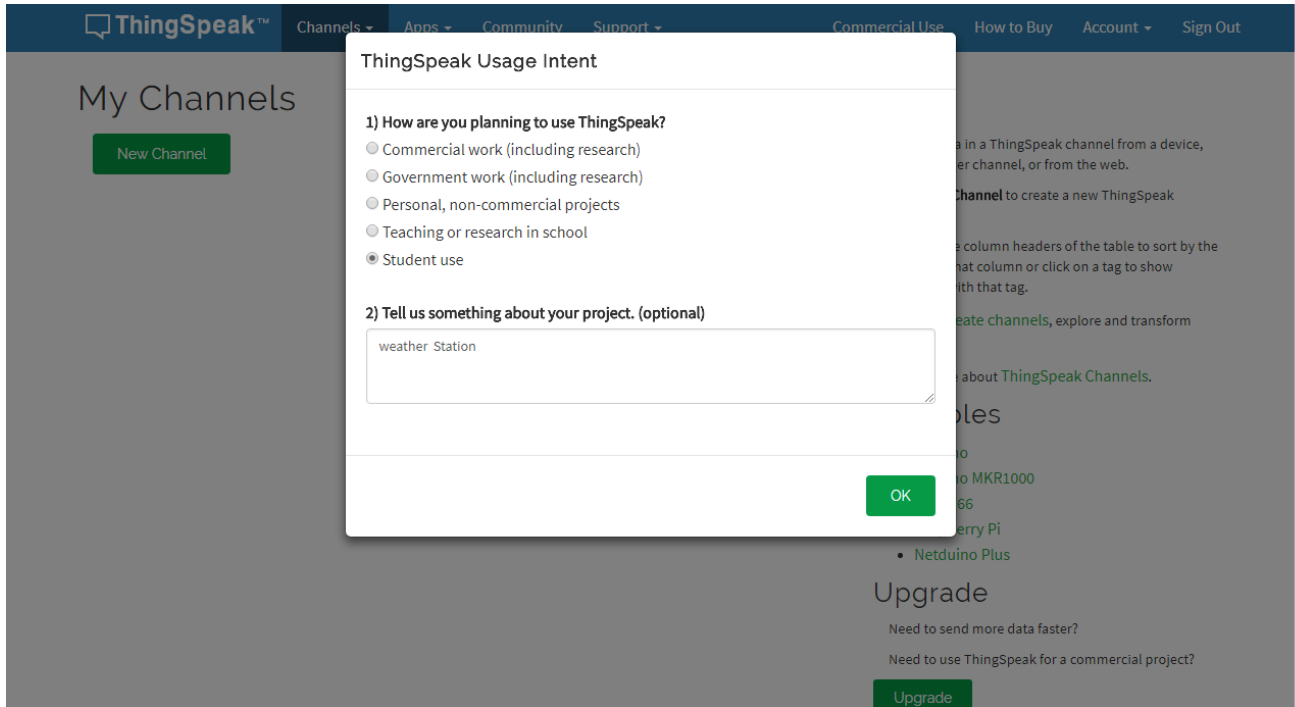
Sign-up successful

Congratulations, you have successfully linked your MathWorks account to ThingSpeak. Use the following email ID and its associated MathWorks account password on all subsequent logins to ThingSpeak.

Email ID: **matrolsys@gmail.com**

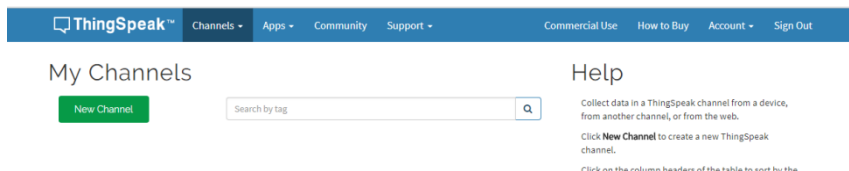
Welcome to ThingSpeak!

OK



STEP 9 : Select “Student use” and type “**weather station**” as your project

Step 10 : Click “OK” to continue



Click “New Channel ” to Set up new channel to collect data via the Internet

STEP 12 : Fill into the New Channel form the information as shown below

ThingSpeak™ Channels ▾ Apps ▾ Community Support ▾ Commercial Use How to Buy Account ▾ Sign Out

New Channel

Name

Description

Field 1

Field 2

Field 3

Field 4

Field 5

Field 6

Field 7

Field 8

Metadata

Help

Channels store all the data that a ThingSpeak application collects. Each channel includes eight fields that can hold any type of data, plus three fields for location data and one for status data. Once you collect data in a channel, you can use ThingSpeak apps to analyze and visualize it.

Channel Settings

- **Channel Name:** Enter a unique name for the ThingSpeak channel.
- **Description:** Enter a description of the ThingSpeak channel.
- **Field#:** Check the box to enable the field, and enter a field name. Each ThingSpeak channel can have up to 8 fields.
- **Metadata:** Enter information about channel data, including JSON, XML, or CSV data.
- **Tags:** Enter keywords that identify the channel. Separate tags with commas.
- **Latitude:** Specify the position of the sensor or thing that collects data in decimal degrees. For example, the latitude of the city of London is 51.5072.
- **Longitude:** Specify the position of the sensor or thing that collects data in decimal degrees. For example, the longitude of the city of London is -0.1275.
- **Elevation:** Specify the position of the sensor or thing that collects data in meters. For example, the elevation of the city of London is 35.052.
- **Link to External Site:** If you have a website that contains information about your ThingSpeak channel, specify the URL.
- **Video URL:** If you have a YouTube™ or Vimeo® video that displays your channel information, specify the full path of the video URL.

STEP 13 : Once complete, scroll down the page and click “Save Channel”

Show Status

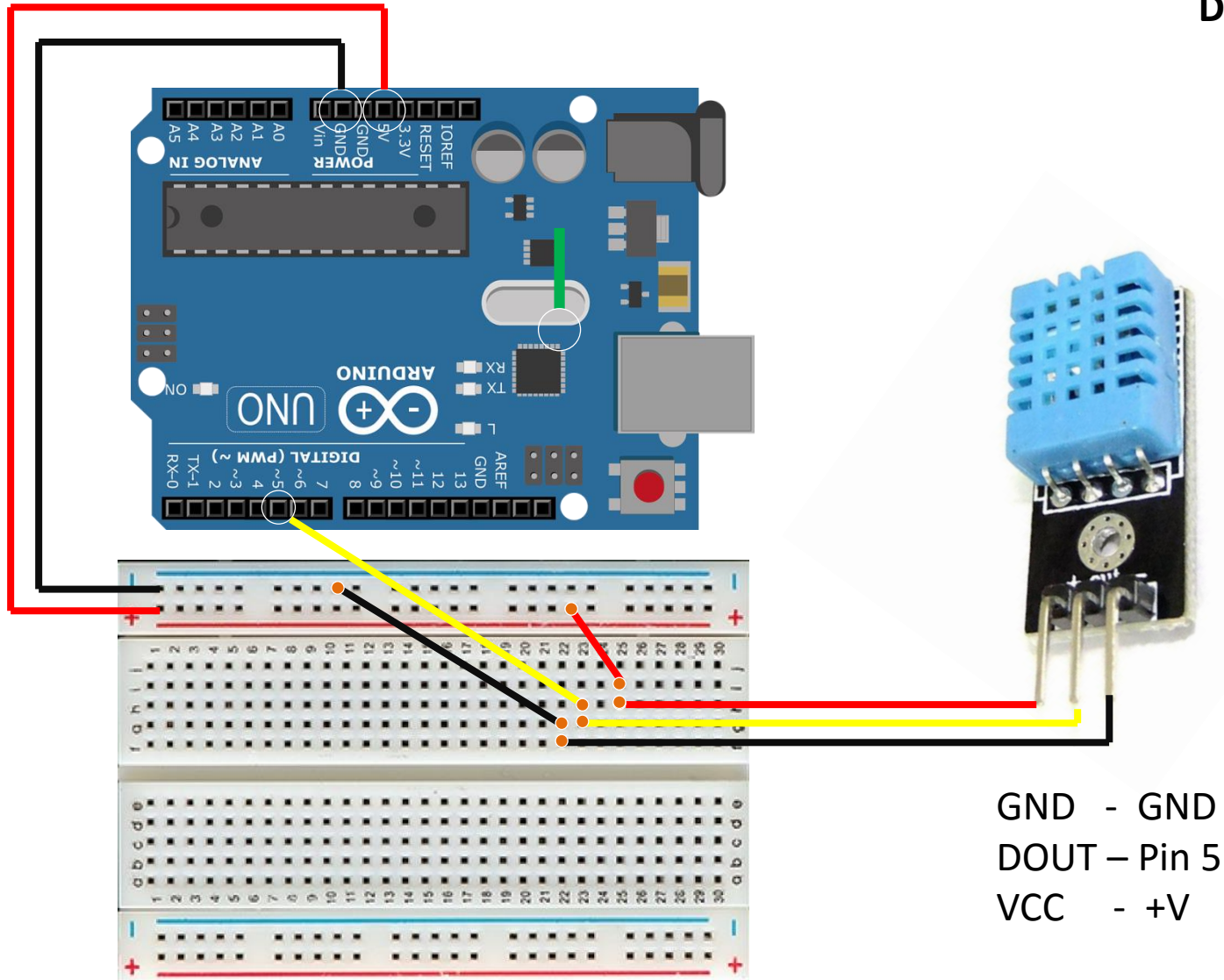
Save Channel

This page will capture the Sensor values from your weather station and displays it on the chart below

The screenshot displays the ThingSpeak interface for a channel named "Weather station". At the top, there is a navigation bar with the ThingSpeak logo and various menu items like "Channels", "Apps", "Community", "Support", "Commercial Use", "How to Buy", "Account", and "Sign Out". Below the navigation bar, the channel title "Weather station" is prominently displayed. Underneath, the channel ID "510511", author "flow4a", and access level "Private" are listed. A description states "Collecting weather data real time from sensors". There are several tabs for channel management: "Private View", "Public View", "Channel Settings", "Sharing", "API Keys", and "Data Import / Export". Action buttons include "Add Visualizations", "Add Widgets", "Data Export", "MATLAB Analysis", and "MATLAB Visualization". The "Channel Stats" section shows the channel was created and last updated "22 minutes ago" with "0" entries. At the bottom, there are four empty chart widgets, each with a title "Field 1 Chart" through "Field 4 Chart" and a "Weather station" subtitle. The y-axis of the first chart is labeled "Temperature" and the second "Humidity", both with "Date" on the x-axis.

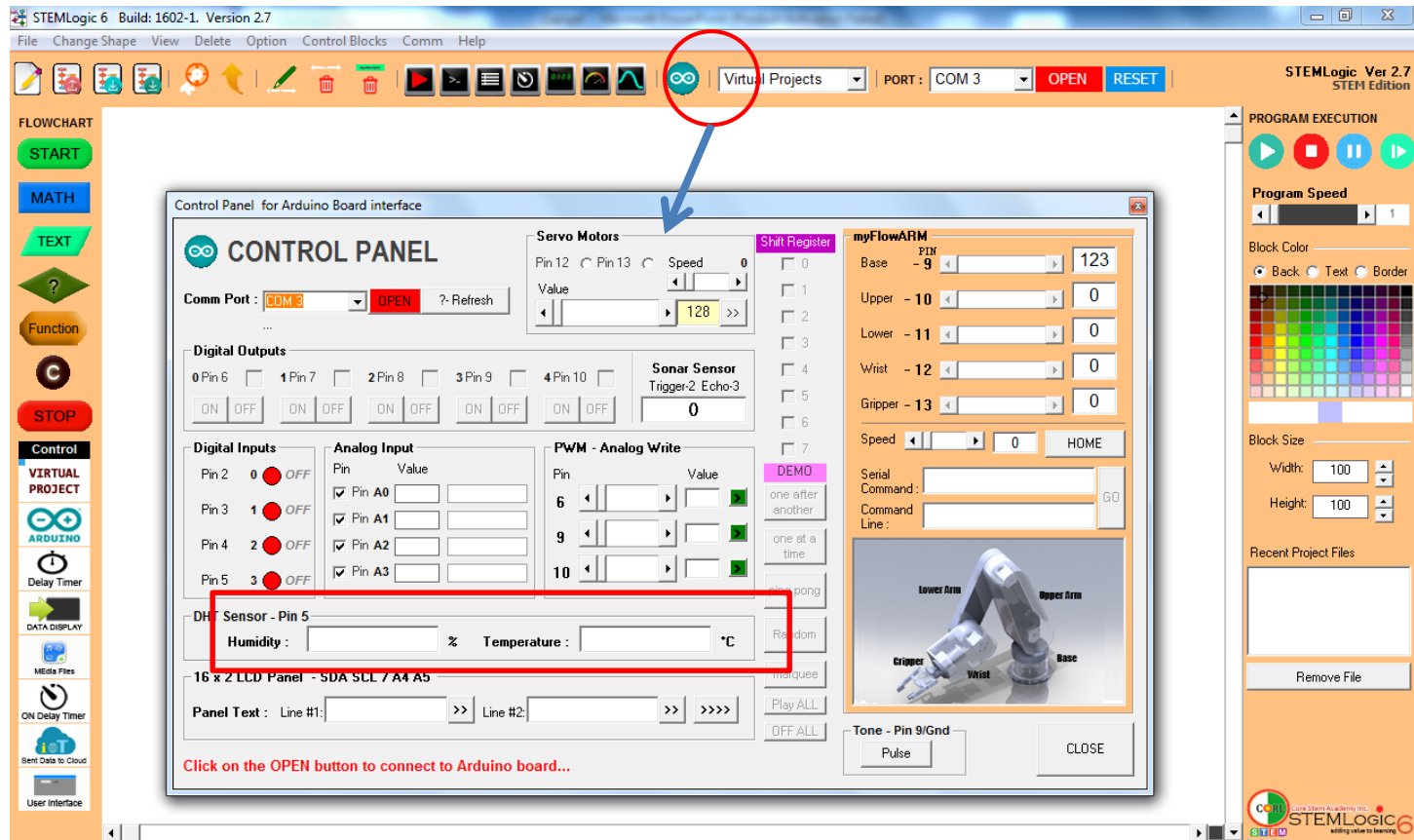
You have successfully set-up your IOT platform to capture data via internet.
For now , log out from Thing Speak.
We will work on the sensors to send its values to this page

Temperature and Humidity Sensor Connection DHT11 Sensor



GND - GND
DOUT - Pin 5
VCC - +V

Testing DHT11 Sensor Connection



Step 1: Launch FlowLogic 6 and click the Control Panel Icon

Step 2: Connect to the Brain Board and Click “Open”

Step 3: Check at the DHT Sensor segment , Humidity and temperature should appear if the connection is correct. If not, check the sensor connection again

Develop program to read Humidity and Temperature value from the DHT11 Sensor

The screenshot displays the STEMLogic 6 software interface. The main workspace shows a flowchart with the following steps:

- start** (green oval)
- DHT11 Sensor Temp, Humidity** (blue rectangle)
- Output "Temperature :", Temp** (pink parallelogram)
- Output "Humidity :", Humidity** (pink parallelogram)
- DELAY(1) S** (light blue rectangle)

The flowchart is connected to a **DHT11 Sensor** dialog box and a **Screen** window. The dialog box contains the following text:

DHT11 Sensor

Type in the Variable names to store the data from the sensor

Variable for Temperature : Temp

Variable for Humidity : Humidity

OK Cancel

The **Screen** window is currently blank, with the caption: "Console Window to display the Sensor values".

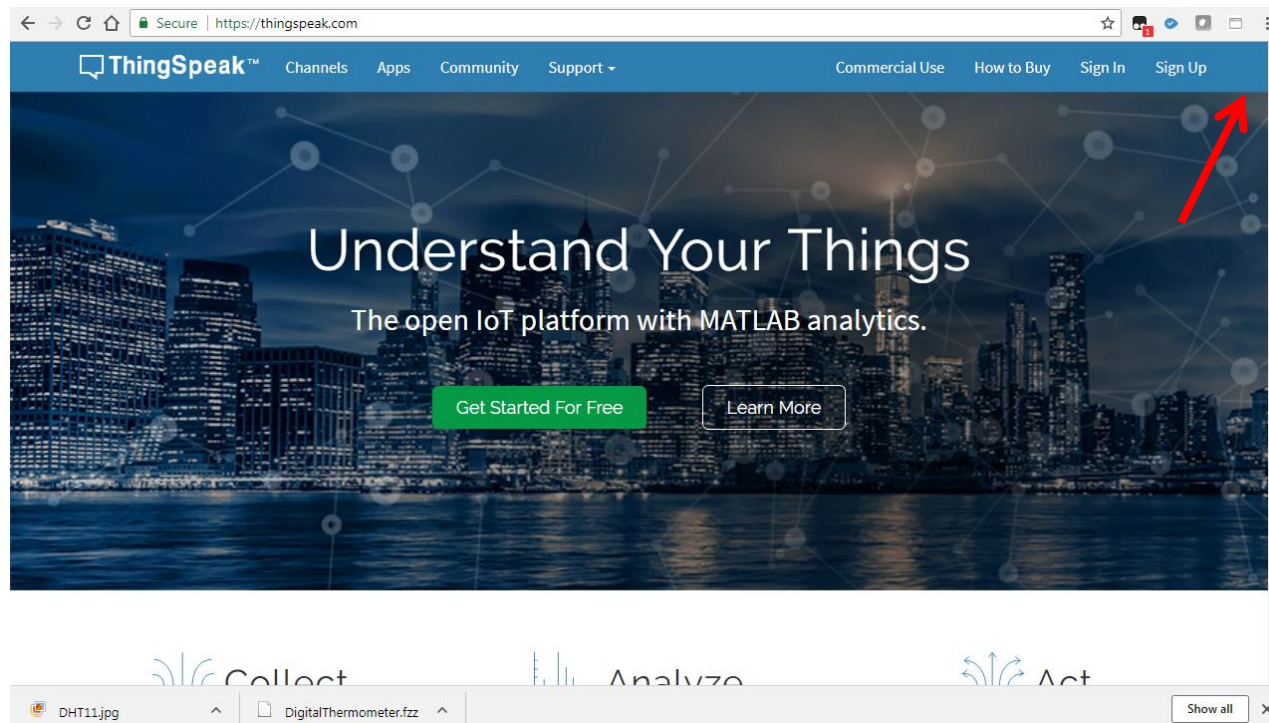
On the right side of the interface, the **PROGRAM EXECUTION** panel includes a play button, a stop button, a pause button, and a play button. Below this is the **Program Speed** slider set to 1. There are also options for **Block Color** (Back, Text, Border) and a color palette. The **Block Size** is set to Width: 130 and Height: 35. The **Recent Project Files** section is empty, with a **Remove File** button.

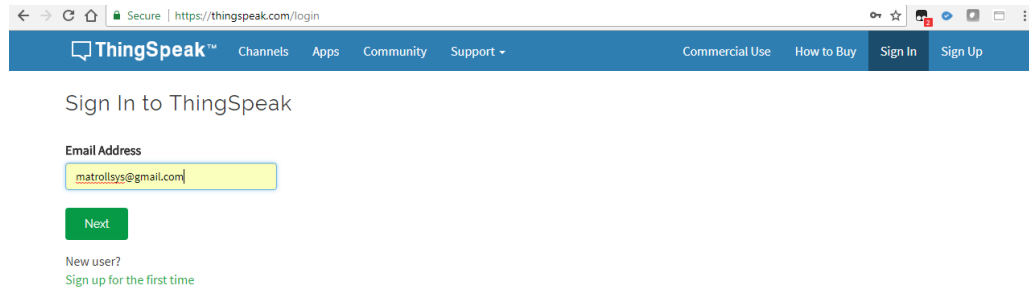
Send the Temperature and Humidity sensor Value to the **IOT Platform – Weather Station**

Note : In order for FlowLogic 6 to send the sensor values to Weather Station IOT Platform We need to first obtain API key from the Weather Station IOT Platform

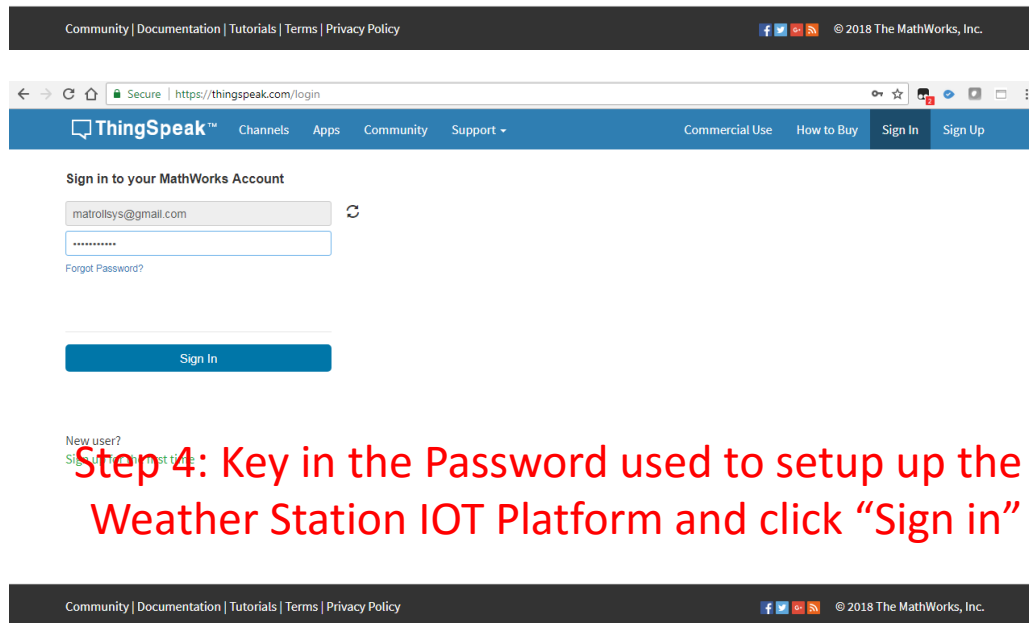
STEP 1 : Go to Thing Speak website

Step 2: Click “Sign In”





Step 3 :Key in the Email used to setup up the Weather Station IOT Platform and click “Next”



Step 4: Key in the Password used to setup up the Weather Station IOT Platform and click “Sign in”

My Channels

New Channel

Search by tag

Name	Created	Updated
Weather station	2018-06-04	2018-06-04 10:15

Private Public Settings Sharing **API Keys** Data Import / Export

Step 5 : Click "API Keys"

Weather station

Channel ID: 510511
Author: flow4a
Access: Private

Private View Public View Channel Settings Sharing **API Keys** Data Import / Export

Write API Key

Key OJG37ZK5KPAB8DEF

Generate New Write API Key

Read API Keys

Key NPZCSR0YI790CSI

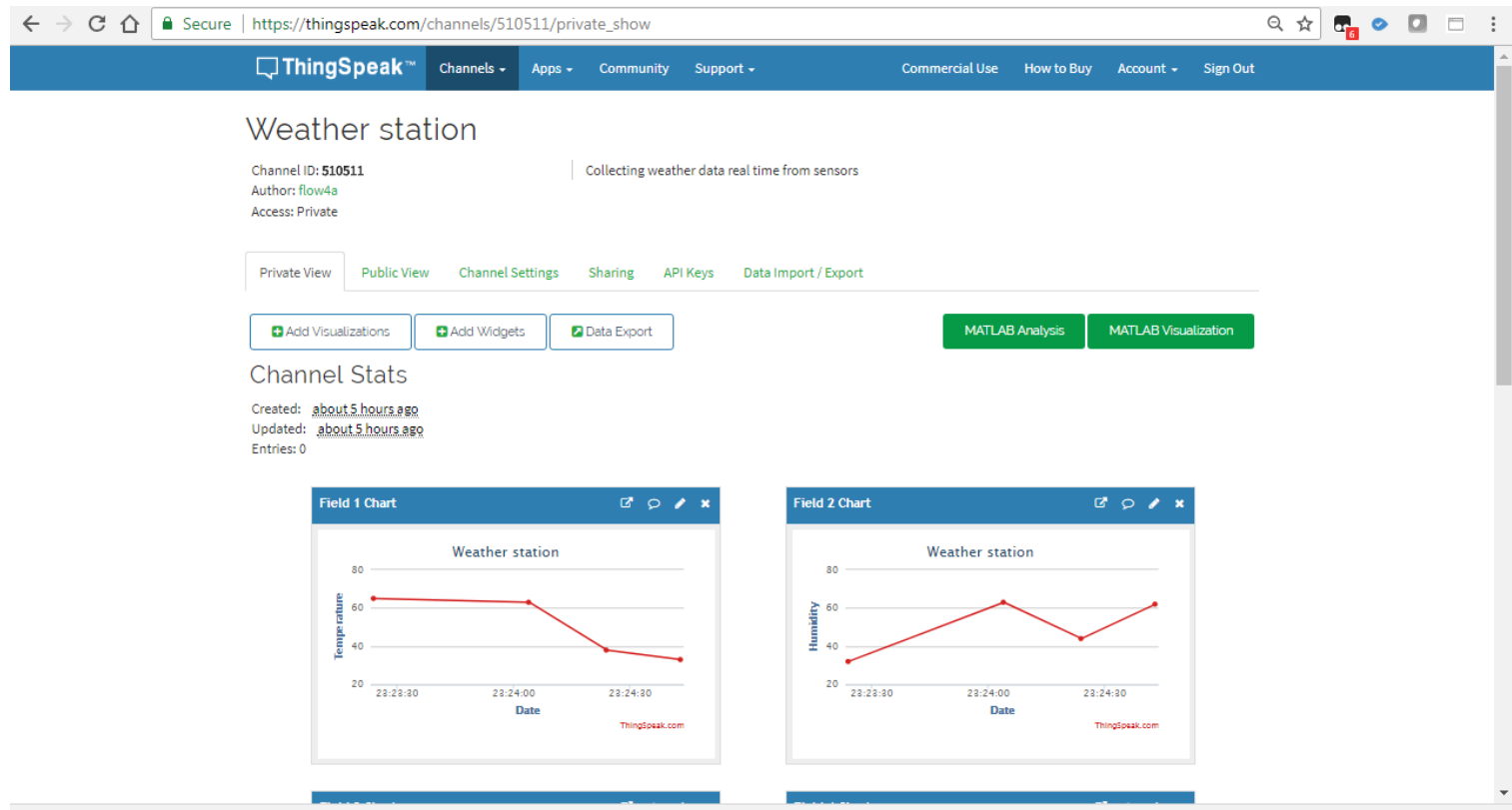
Step 6 : Take note of this API keys. Flow Program will require this key to send the Sensor Values to this IOT Platform

Step 7 : Expand the Flow program to include the Send Data to Cloud command block . In the Property window ,type in the API keys obtained from the Weather Station IOT Platform and select the variables that stores the Sensor values as shown below.

The screenshot displays the STEMLogic 6 software interface. The main workspace shows a flowchart for a program named 'WStation'. The flowchart starts with a 'start' block, followed by a 'DHT11 Sensor Temp, Humidity' block, then two 'Output' blocks for 'Temperature : Temp' and 'Humidity : Humidity', a 'DELAY(5) S' block, and finally an 'IOT Platform API : OJG37ZK5KPAB8DEF Data = Temp, Humidity, ...' block. A 'Screen' window is open above the flowchart. A 'THINGS to cloud' dialog box is open, showing the API WRITE Key 'OJG37ZK5KPAB8DEF' and two fields: 'Field 1 : Temp' and 'Field 2 : Humidity'. The 'Send Data to Cloud' block in the flowchart is connected to the 'THINGS to cloud' dialog. The right sidebar contains a 'PROGRAM EXECUTION' panel with play, stop, and pause buttons, a 'Program Speed' slider, and a color selection palette. The bottom of the interface shows the 'Flow Program Name : WStation'.

**Please ENSURE the pc running FlowLogic 6 is connected to internet
RUN the program, the Sensor values will be sent to the Weather Station IOT platform every 5 sec.**

Step 8 : Click “Private View “ on the Weather Station IOT Platform . The Temperature and Humidity Chart will be Updated every 15 Sec as shown below.

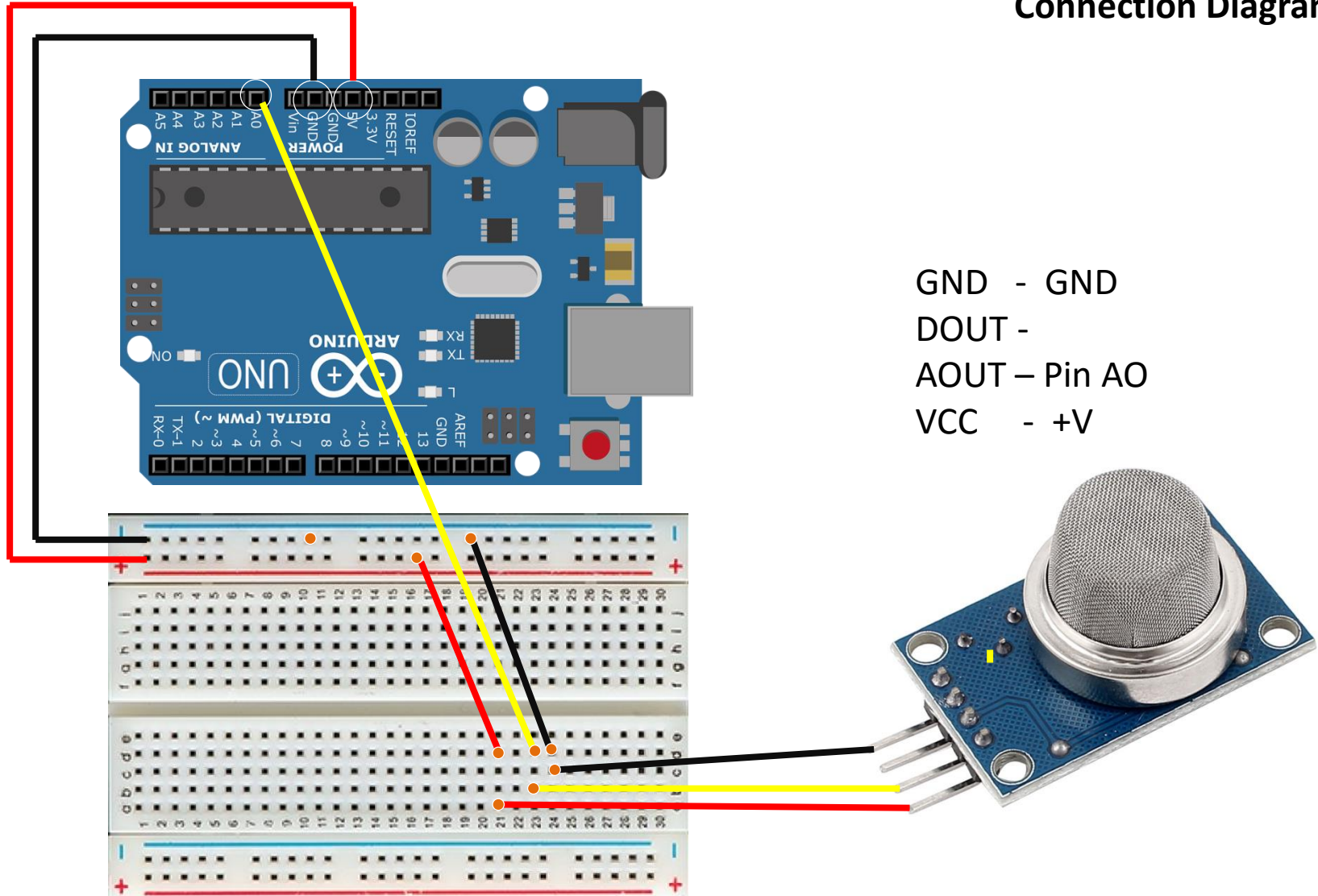


NEXT, lets connect various others sensor to the Weather Station and send the value to the Weather Station IOT Platform

Day 2

Weather Station - Gas Sensor

Measure Environment Cleanness using Gas Sensor Connection Diagram



GND - GND
DOUT -
AOUT - Pin AO
VCC - +V

Expand Flow Program *Wstation* to Read and send Gas sensor value to Weather Station IOT Platform .

Specify Variable as "Gas" for Pin A0

Select from the list Gas Variable for Field 3

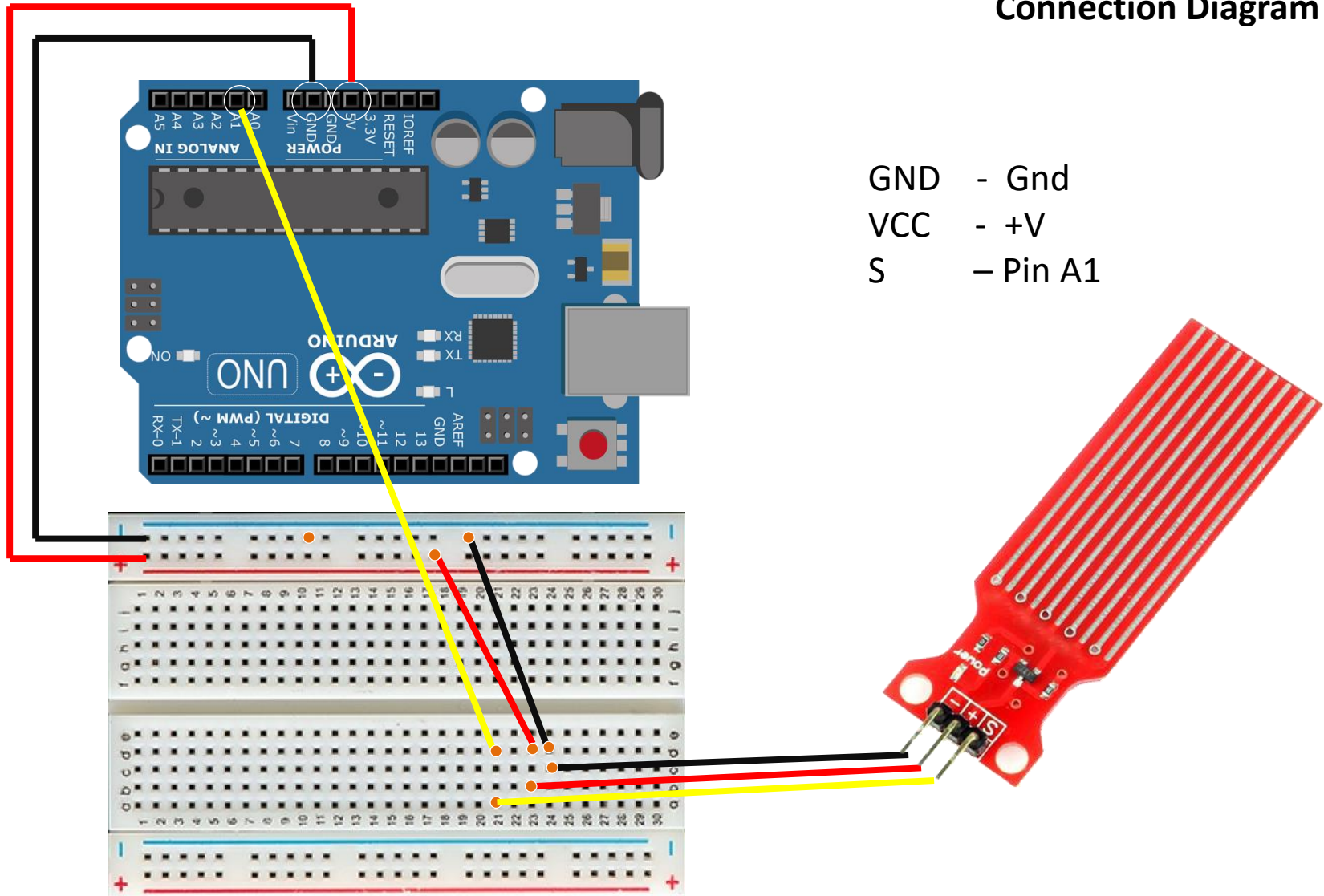
Save and Run the program.

View the chart for Gas sensor data on your Weather Station IOT Platform

Day 3

Weather Station –
Water Level Sensor

Water Level measurement using Water level sensor Connection Diagram



GND - Gnd
VCC - +V
S - Pin A1

Expand Flow Program *Wstation* to Read and send Water Level sensor value to Weather Station IOT Platform .

The screenshot displays the STEMLogic software interface for editing a flowchart program. The flowchart starts with a 'start' block, followed by a 'DHT11 Sensor Temp, Humidity' block. Below this is an 'AnalogRead(A0, Gas)' block, then another 'AnalogRead(A1, WLevel)' block. A red arrow points to the 'WLevel' variable in the second AnalogRead block with the text 'Specify Variable as "WLevel" for Pin A1'. The flowchart continues with four 'Output' blocks: 'Output "Temperature :", Temp', 'Output "Humidity :", Humidity', 'Output "Gas :", Gas', and 'Output "WLevel :", WLevel'. This is followed by a 'DELAY(15) S' block and an 'IOT Platform API : OJG37ZK5KPAB8DEF Data = Temp, Humidity, Gas, ,' block. A red arrow points from this IOT block to a 'THINGS to cloud' configuration dialog. In this dialog, the 'API WRITE Key' is 'OJG37ZK5KPAB8DEF'. Under 'Field Data', 'Field 4' is set to 'WLevel'. A red arrow points to this selection with the text 'Select from the list WLevel Variable for Field 4'. The right sidebar shows 'PROGRAM EXECUTION' controls and a 'Block Color' palette. The bottom right corner features the STEMLogic logo and the text 'STEM Edition'.

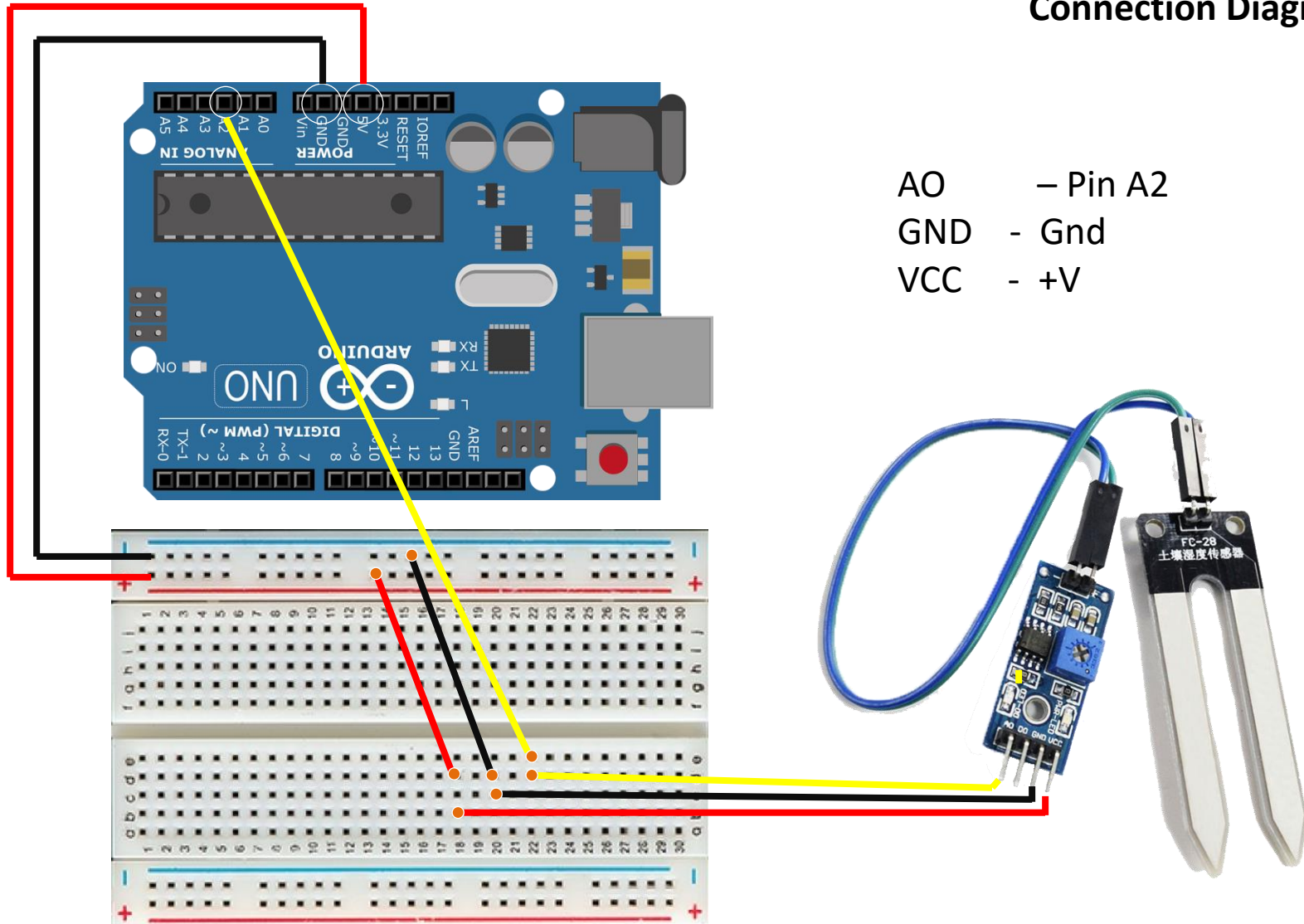
Save and Run the program.

View the chart for Water Level sensor data on your Weather Station IOT Platform

Day 4

Weather Station –
Moisture Sensor

Soil measurement using Soil Moist sensor Connection Diagram



Expand Flow Program *Wstation* to Read and send Soil Moisture sensor value to Weather Station IOT Platform .

The screenshot shows the STEMLogic software interface with a flowchart and a dialog box. The flowchart starts with a 'start' block, followed by 'DHT11 Sensor Temp, Humidity', 'AnalogRead(A0, Gas)', 'AnalogRead(A1, WLevel)', and 'AnalogRead(A2, SMoist)'. Below these are five 'Output' blocks: 'Temperature : Temp', 'Humidity : Humidity', 'Gas : Gas', 'WLevel : WLevel', and 'Soil Moisture : SMoist'. A 'DELAY(15) S' block follows, leading to an 'IOT Platform API : OJG37ZK5KPAB8DEF Data = Temp, Humidity, Gas, WLevel, SMoist' block. A dialog box titled 'THINGS to cloud' is open, showing the API key 'OJG37ZK5KPAB8DEF' and a list of fields: Field 1: Temp, Field 2: Humidity, Field 3: Gas, Field 4: WLevel, and Field 5: SMoist. A red arrow points to the 'SMoist' variable in the flowchart with the text 'Specify Variable as "SMoist" for Pin A2'. Another red arrow points to the 'SMoist' field in the dialog box with the text 'Select from the list Smoist Variable for Field 5'. The interface also shows a 'Screen' window, a 'PROGRAM EXECUTION' panel with play, stop, and pause buttons, and a 'PROGRAM SPEED' slider. The bottom right corner features the STEMLOGIC 6 logo with the tagline 'adding value to learning'.

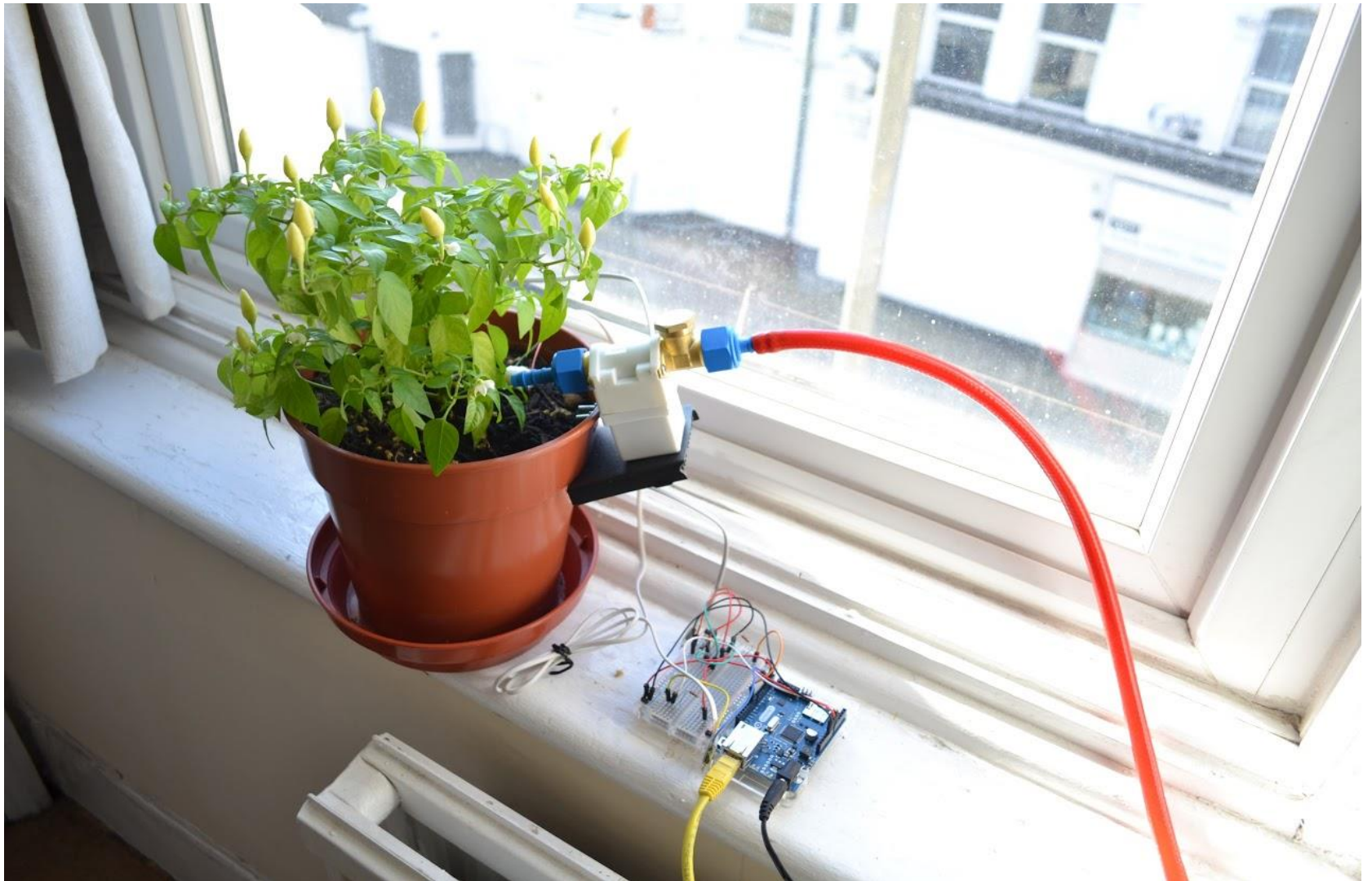
Save and Run the program.

View the chart for Soil Moisture sensor data on your Weather Station IOT Platform

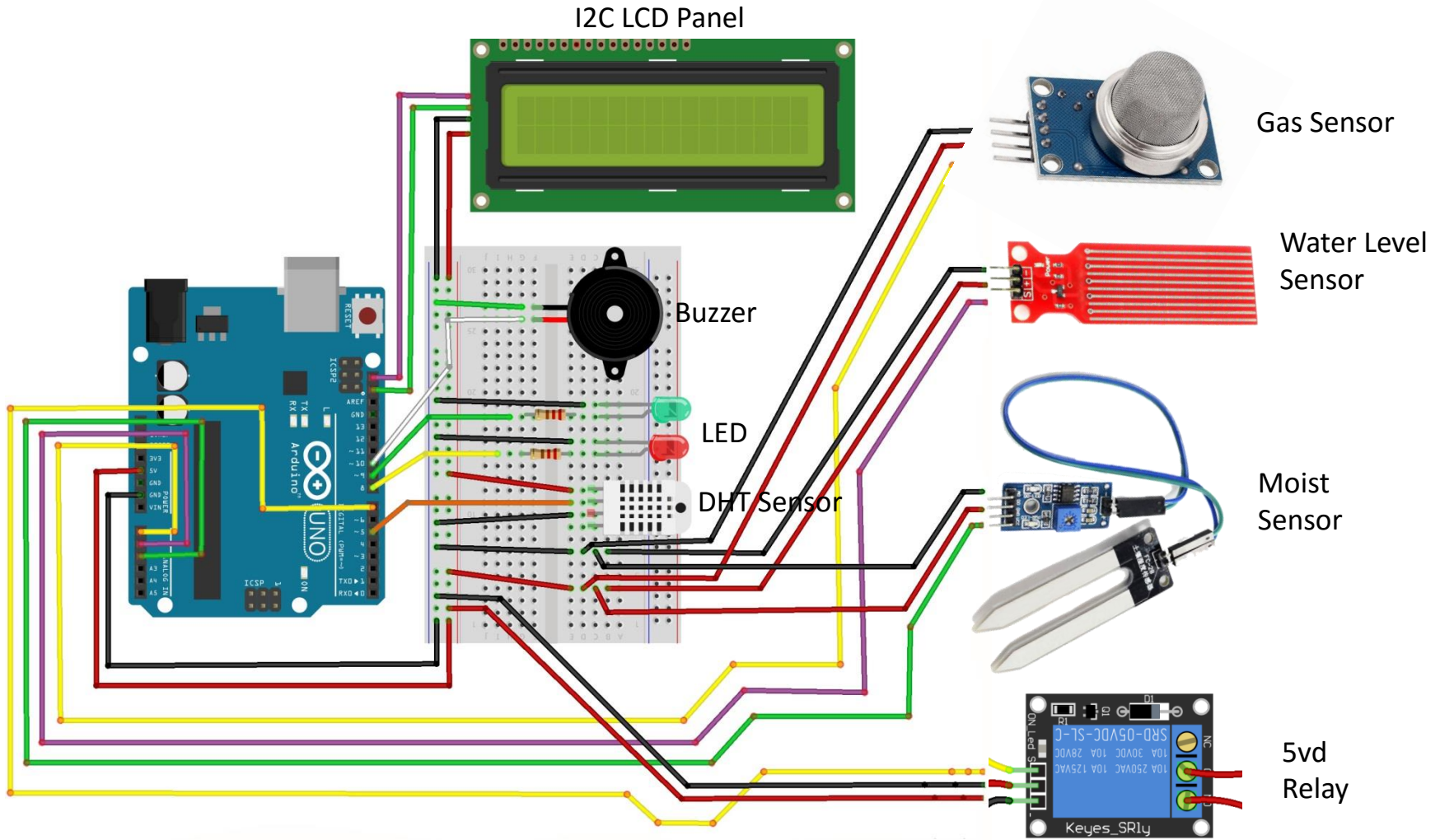
Day 5

Self Watering Plant and
IOT Plant Monitoring

Self Watering Plant project Connection Diagram

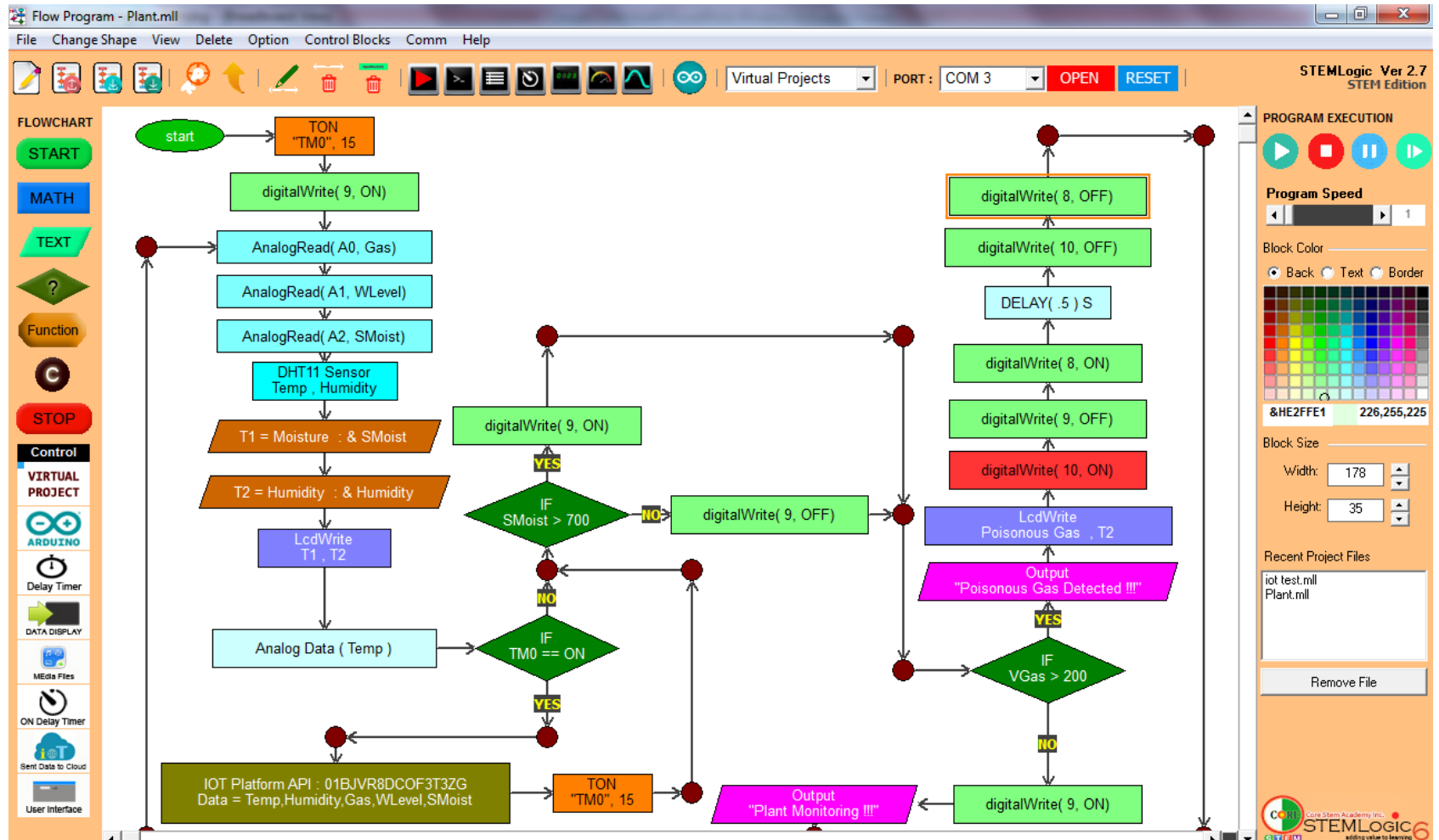


Self Watering Plant project Connection Diagram



Self Watering Plant project

Flow Program



END OF
CAMP # 4
LESSON PLAN