

# AiTLE micro:bit Workshop

## Level 5 : micro:bit and Big Data, IoT

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**HKUSPACE**

HKU School of Professional and Continuing Education

# Level 5

- **micro:bit and Big Data, IoT**
  - Systematic use of data through micro:bit
  - IFTTT
  - IoT Modules

# What is IoT?

- Reference material

Introduction to the Internet of Things

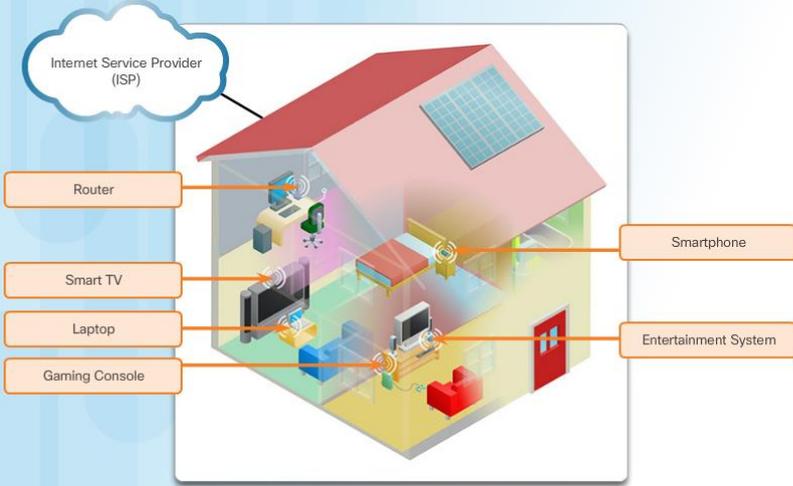
Chapter 3 Connecting the Unconnected

3.1 Introduction to the Cisco IoT System

3.1.1 Things to Connect

3.1.1.2 Connecting Things for Consumers

### Home Wireless Local Area Network (WLAN)



Internet Service Provider (ISP)

Router

Smartphone

Smart TV

Laptop

Gaming Console

Entertainment System

### Connecting Things for Consumers

How does connecting things impact us in our personal lives? Consider the structure of the average home network.

The home network is a LAN with devices that connect to the home router. Most likely, the router also has wireless capabilities. In this instance, the LAN provides wireless LAN (WLAN) access. Figure 1 shows a typical home WLAN with a connection to the Internet through a local Internet Service Provider (ISP). The collection of devices and connections within the ISP are not visible to the home-based customer but are critical for connectivity to the Internet.

The local ISP connects with other ISPs, allowing access to websites and content around the world. These ISPs connect to each other using various technologies that include WAN technologies, as shown in Figure 2.

M2M networks are unique to the IoT. Figure 3 depicts a series of home security sensors that can communicate with each other and send data through the gateway router (home router), through the ISP network, to a server environment in the Cloud. Here data can be accumulated and analyzed.

1 2 3 Figures

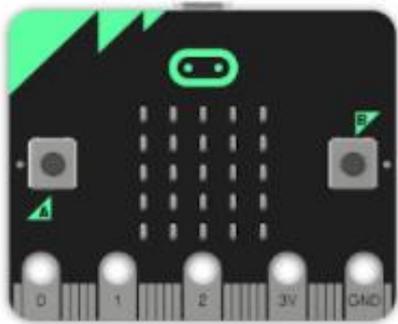
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Self-enroll Link

<https://www.netacad.com/web/self-enroll/course-625329>

# How micro:bit access Internet?



**micro:bit**

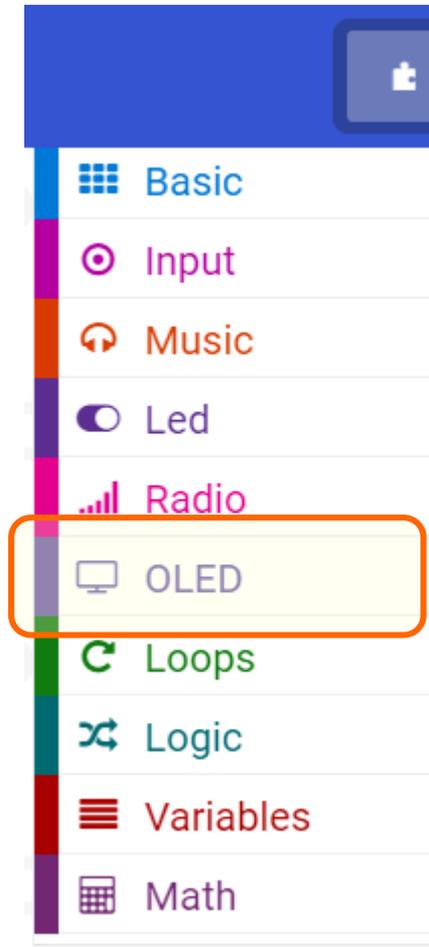
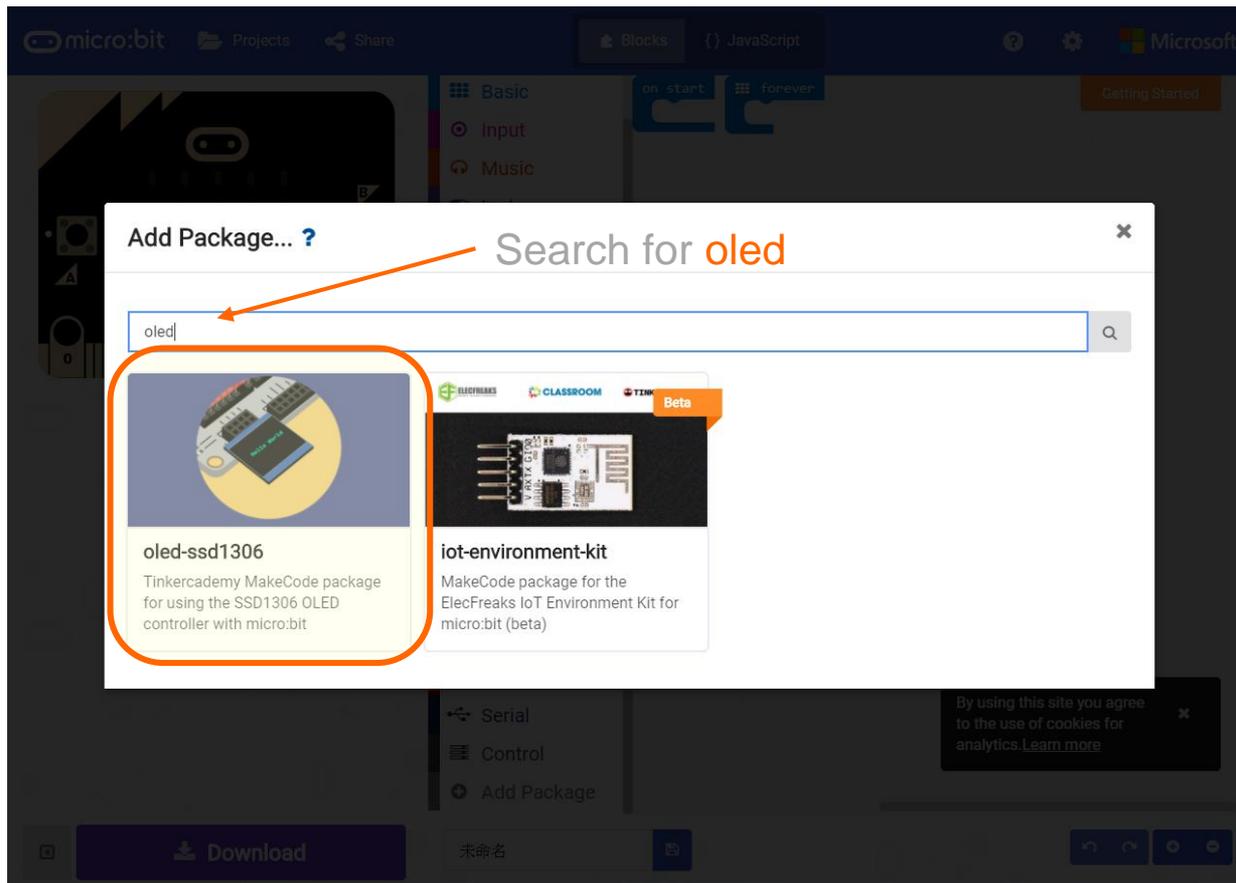


**WiFi IoT Shield**



# Activity 1: OLED

- Adding Package for OLED display



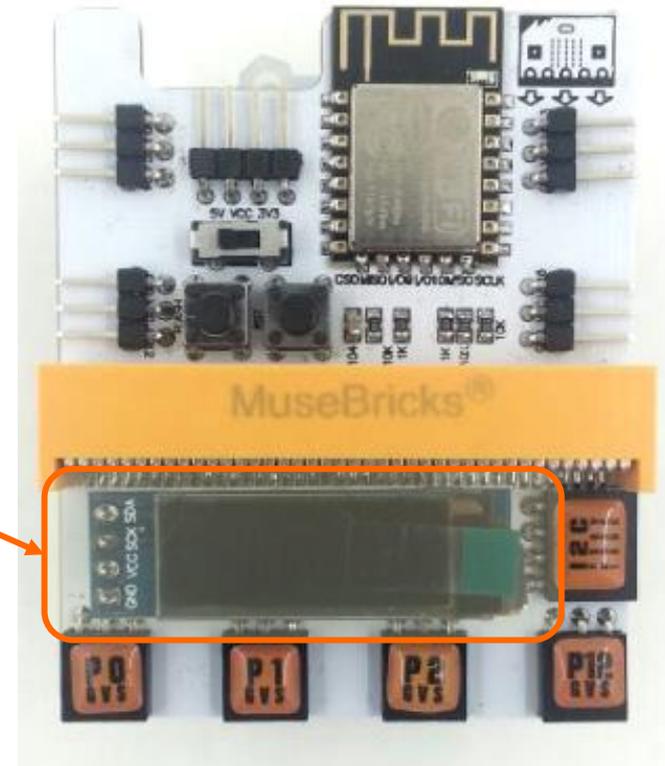
# Activity 1: OLED

- Showing "Hello World" on OLED

on start

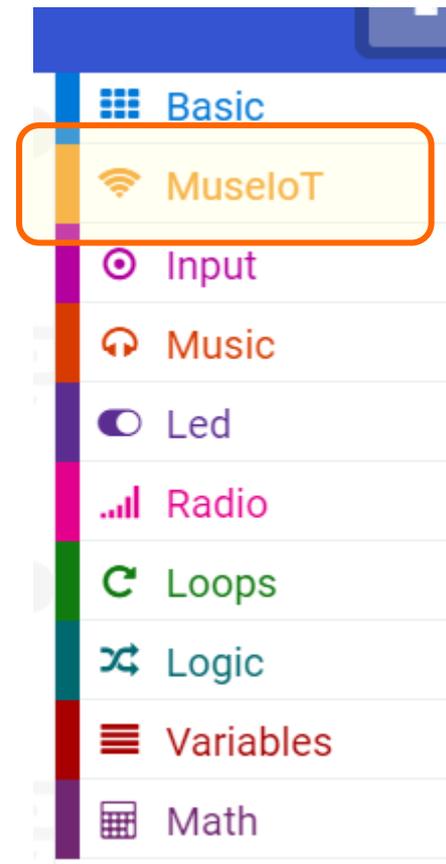
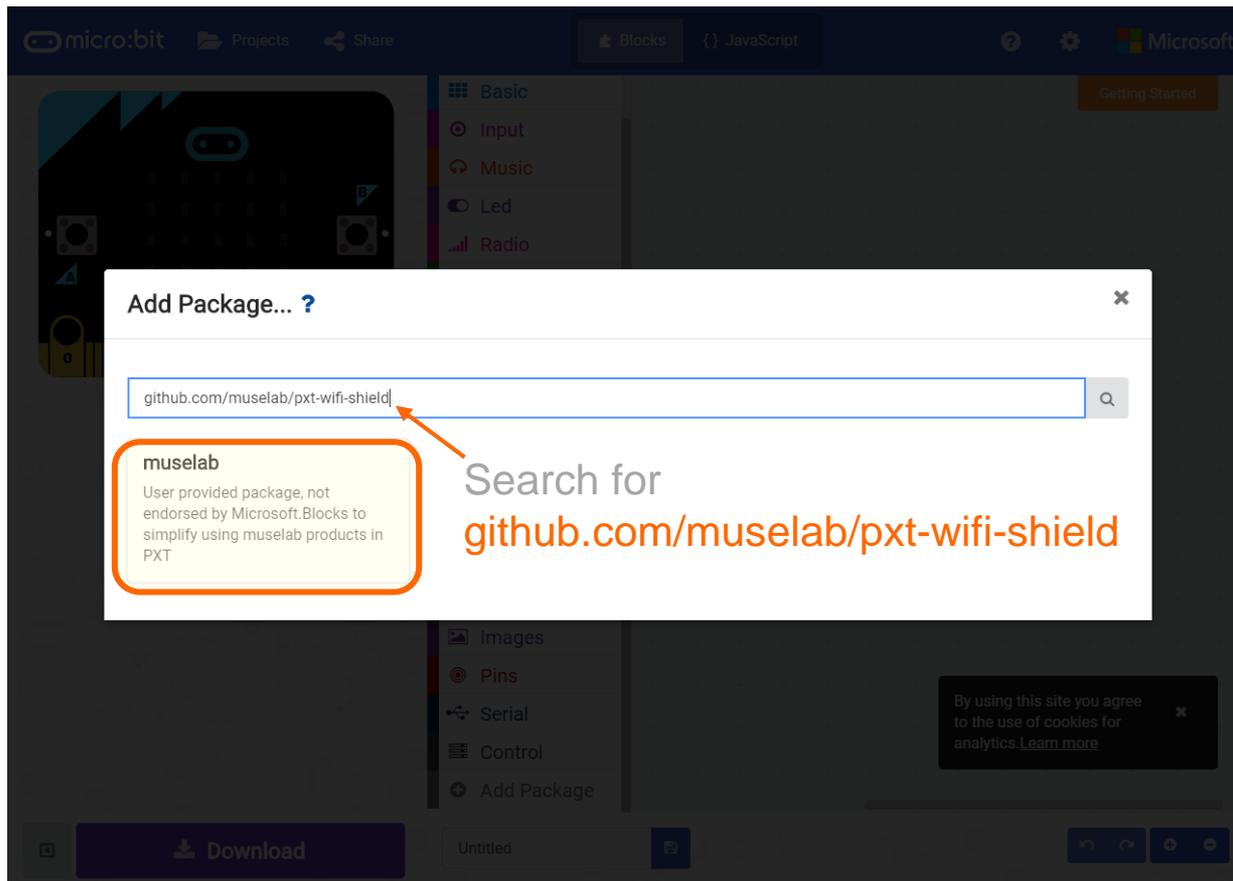
```
initialize OLED with height 32 width 128  
show string "Hello World"
```

- Why not using 5x5 LED matrix?



# Activity 2: IoT Shield

- Adding Package for IoT Shield



# Activity 2: IoT Shield

- Connect to Wi-Fi hotspot (IEEE 802.11 b/g/n)
- Not supporting cert-based Wi-Fi and Wi-Fi using landing page at the moment

```
on start
  initialize OLED with height 32 width 128
  Initialize WiFi IoT Shield
  Set wifi to ssid "muselab" pwd "12345678"
```

Your Wi-Fi hotspot settings

```
serial on data received new line
  show string serial read line
```



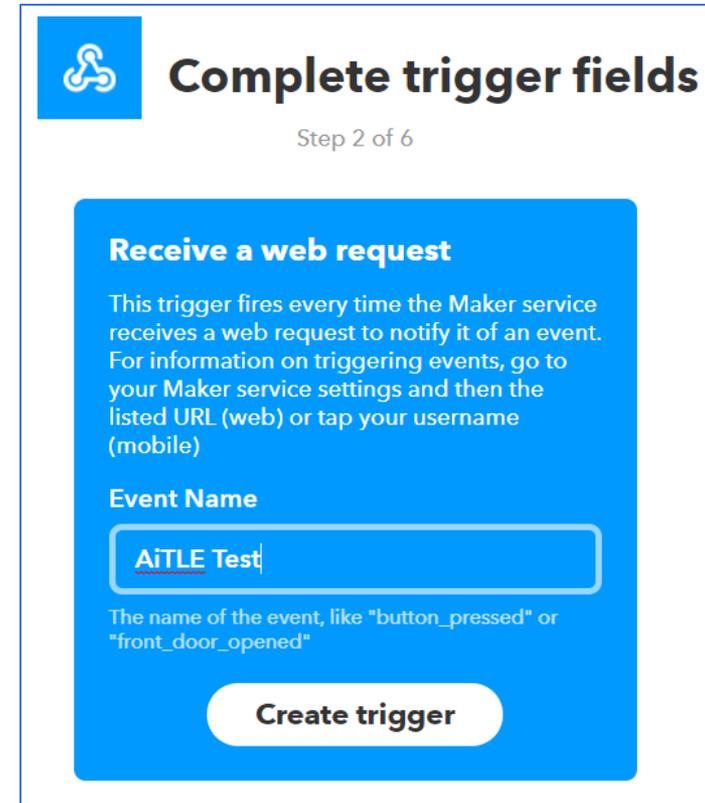
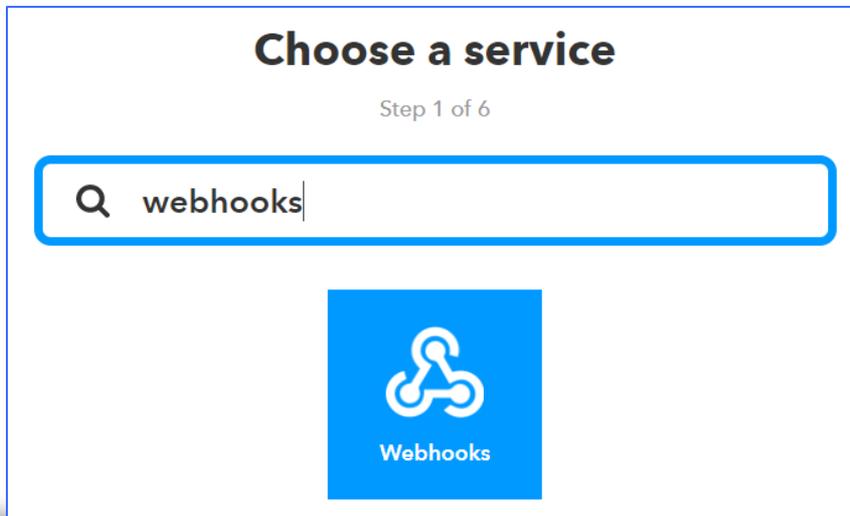
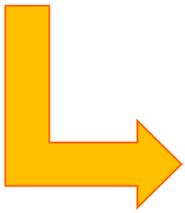
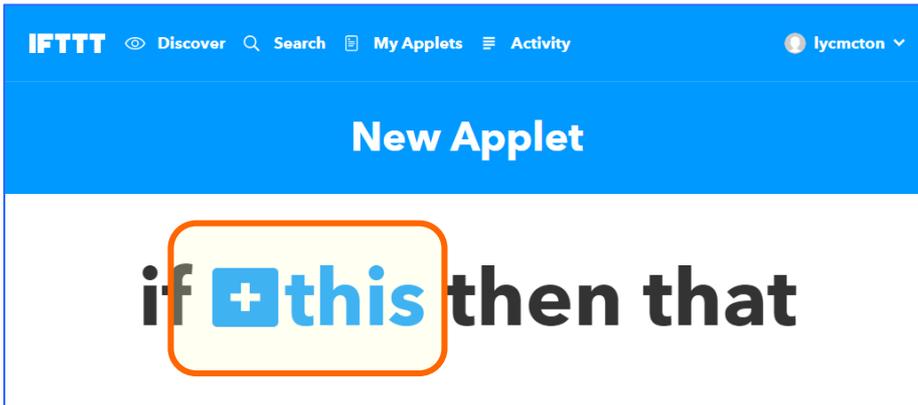
# What is IFTTT?

- IFTTT = **IF** This **Than** **T**hat

The screenshot shows the IFTTT website interface. At the top, there is a navigation bar with the IFTTT logo, a search icon, and links for 'Discover', 'Search', 'My Applets', and 'Activity'. A user profile icon labeled 'lycmcton' is on the right. Below the navigation bar, there are two tabs: 'Applets' (selected) and 'Services'. A 'New Applet' button is located in the top right corner. In the center, there is a dark grey card with a blue and red square icon, the text 'Get an email with the latest IFTTT updates', and a toggle switch labeled 'On'. Below the card, it says 'works with' followed by icons for RSS and email. At the bottom, there is a footer with links for 'About', 'Blog', 'Help', 'Jobs', 'Terms', and 'Privacy'. Below these links are buttons for 'Download on the App Store' and 'GET IT ON Google play'. At the very bottom, there is a call to action: 'Add your service and become a partner' with the IFTTT Platform logo.

# Activity 3: IFTTT

- Create new IFTTT Applet



# Activity 3: IFTTT

if  then  that

## Choose action service

Step 3 of 6

Q gmail



Gmail



## Complete action fields

Step 5 of 6

### Send yourself an email

This action will send yourself an email. HTML, images and links are supported.

#### Subject

AiTLE IFTTT Test

Add ingredient

#### Body

What: {{EventName}}<br>  
When: {{OccurredAt}}<br>  
Extra Data: {{Value1}}, {{Value2}},  
{{Value3}},

Some HTML ok

Add ingredient

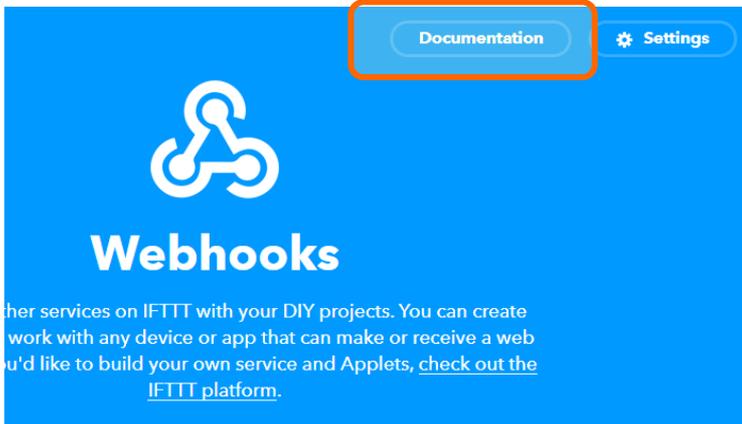
#### Attachment URL

URL to include as an  
attachment

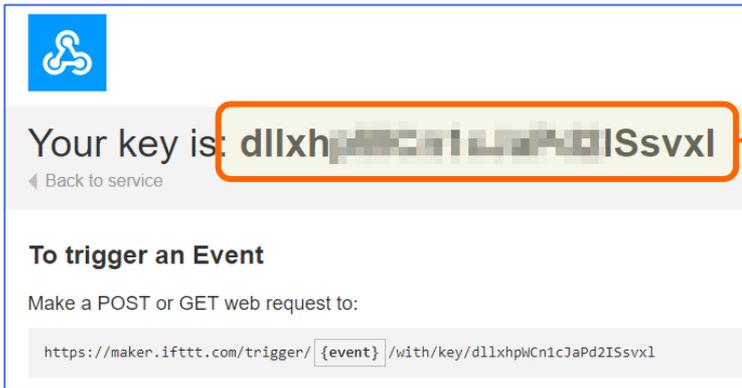
Add ingredient

Create action

# Activity 3: IFTTT



The image shows the IFTTT Webhooks interface. At the top, there are two buttons: "Documentation" (highlighted with an orange border) and "Settings". Below the buttons is the IFTTT logo and the word "Webhooks" in large white text. Underneath, there is a short paragraph of text explaining how to use webhooks with DIY projects.



This block shows the IFTTT interface for a specific service. It displays the IFTTT logo and the text "Your key is: dllxhpwCn1cJaPd2ISsvx1", where the key is highlighted with an orange border. Below this, there is a "Back to service" link and a section titled "To trigger an Event" which provides instructions on how to make a web request to trigger an event, including a URL template: `https://maker.ifttt.com/trigger/{event}/with/key/dllxhpwCn1cJaPd2ISsvx1`.



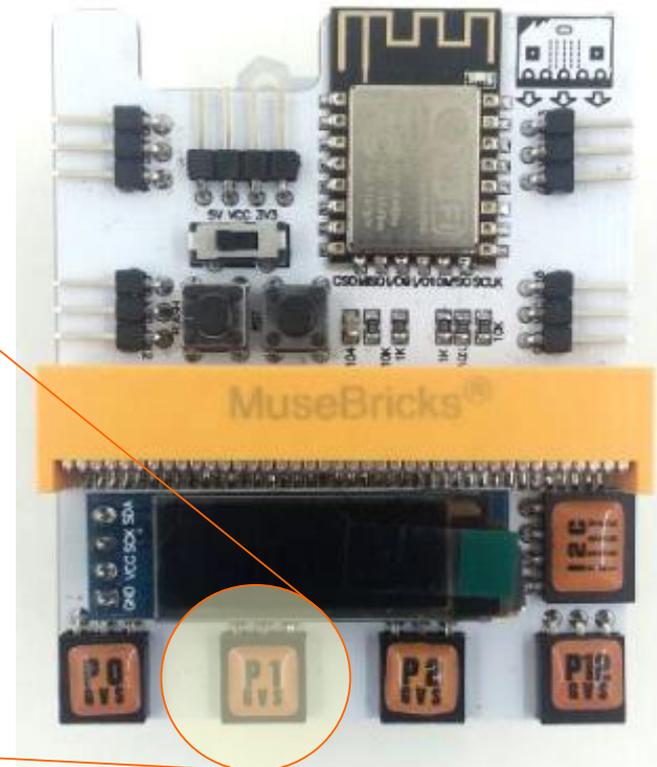
The image shows a sequence of Arduino code blocks in a block-based programming environment. The first block is "on start" and contains three blocks: "Initialize WiFi IoT Shield", "Set wifi to ssid 'muselab' pwd '12345678'", and "initialize OLED with height 32 width 128". The second block is "serial on data received" with a "new line" dropdown and a "show string" block connected to "serial read line". The third block is "on button A pressed" and contains a "Send IFTTT key" block with the key "dllxhpwCn1cJaPd2ISsvx1" (highlighted with an orange border) and an event name "A1LE test".

# Project – Anti-theft Alarm

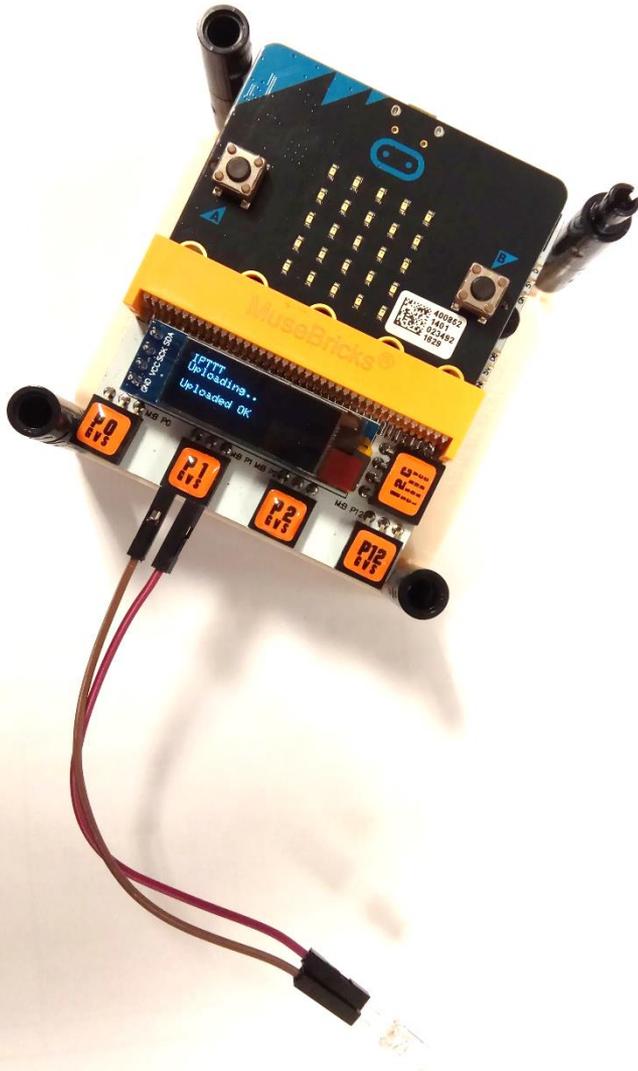
- Using micro:bit to detect on light level
- If the light level is unexpectedly high:
  - turn on the LED
  - alert the house owner by email (or else)



G: Ground (0V)  
V: Voltage (3V)  
S: Signal



# Project Answer



on start

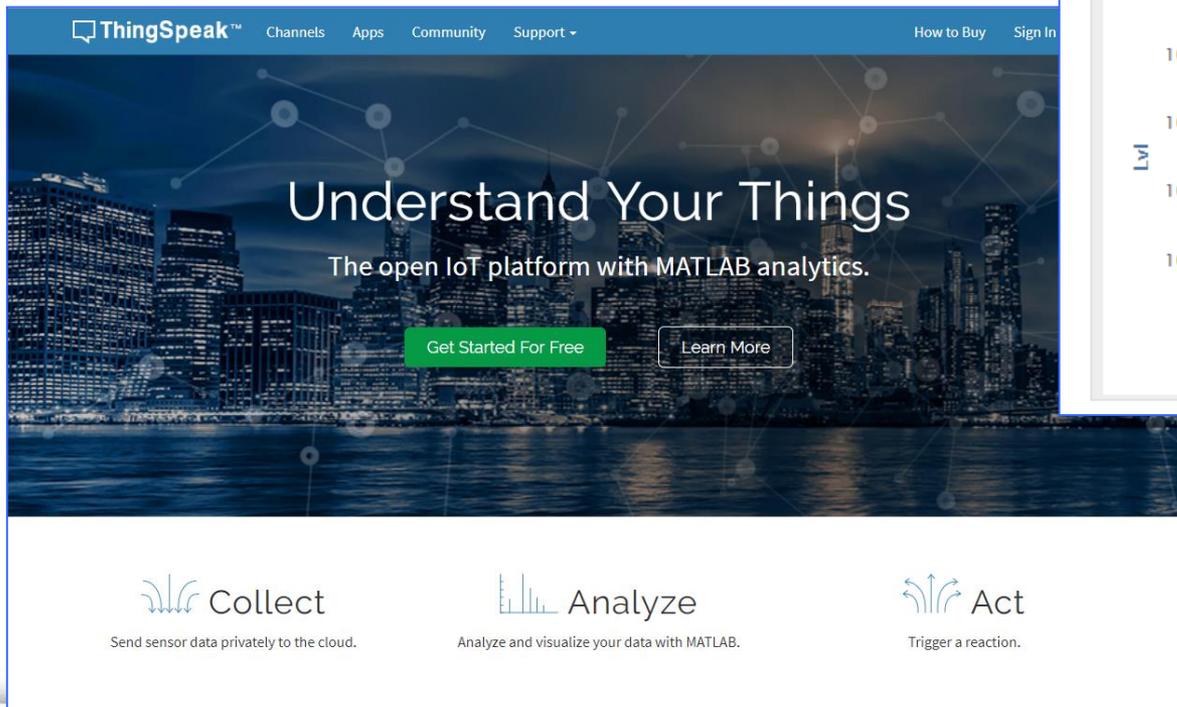
```
initialize OLED with height 32 width 128
Initialize WiFi IoT Shield
Set wifi to ssid "muselab" pwd "12345678"
```

```
serial on data received new line
show string serial read line
```

```
forever
  if (light level > 200)
  then
    Send IFTTT key "dllxh Ssvxl"
      event_name "AiTLE Test"
      value1 0
      value2 0
    digital write pin P1 to 1
  else
    digital write pin P1 to 0
  pause (ms) 1000
```

# What is ThingSpeak?

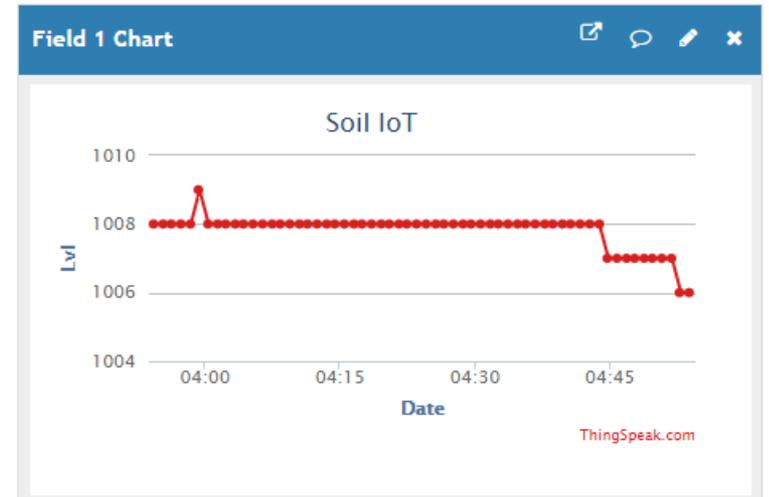
- Collect IoT data
- Visualize data in charts
- Export data for analysis



The image shows the ThingSpeak website homepage. At the top, there is a navigation bar with links for Channels, Apps, Community, and Support. The main heading is "Understand Your Things" with the subtitle "The open IoT platform with MATLAB analytics." Below this are two buttons: "Get Started For Free" and "Learn More". At the bottom, there are three icons representing the platform's capabilities: "Collect" (Send sensor data privately to the cloud), "Analyze" (Analyze and visualize your data with MATLAB), and "Act" (Trigger a reaction).

## Channel Stats

Created: [5 days ago](#)  
Updated: [4 days ago](#)  
Last entry: [4 days ago](#)  
Entries: 340



<http://www.thingspeak.com>

# Activity 4: ThingSpeak

- To upload data to ThingSpeak, you need to
  - Open a channel
  - Get its **API Key**

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

## Write API Key

Key

[Generate New Write API Key](#)

## Help

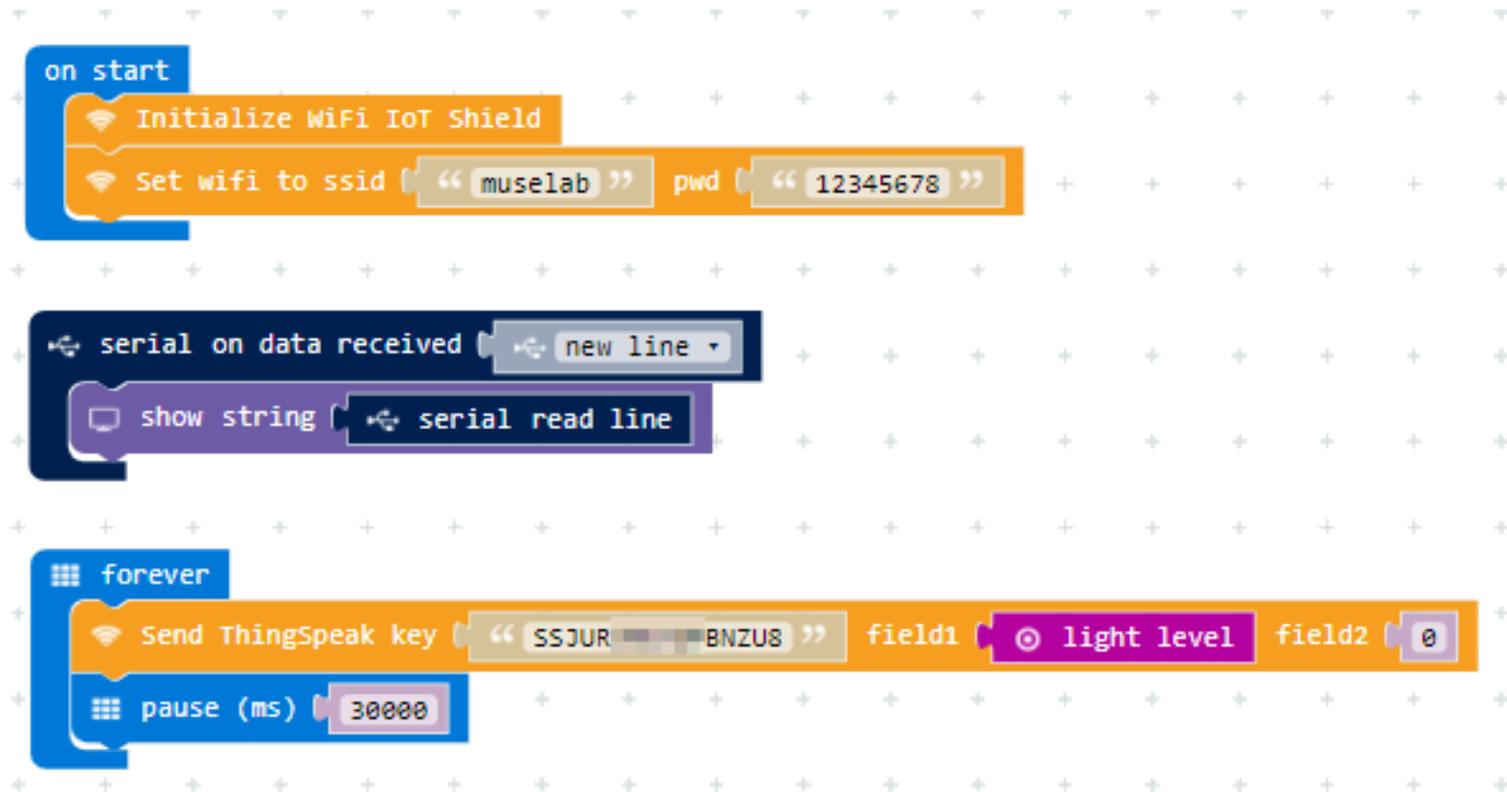
API keys enable you to write data to a channel or read data from a private channel. API keys are auto-generated when you create a new channel.

## API Keys Settings

- **Write API Key:** Use this key to write data to a channel. If you feel your key has been compromised, click **Generate New Write API Key**.

# Activity 4: ThingSpeak

- Note: Each channel can accept data upload every **15 seconds** only



```
on start
  Initialize WiFi IoT Shield
  Set wifi to ssid " muselab " pwd " 12345678 "

serial on data received new line
  show string serial read line

forever
  Send ThingSpeak key " S5JUR BNZUS " field1 light level field2 0
  pause (ms) 30000
```

The image shows a Scratch-style code editor with three main blocks:

- on start** block containing:
  - `Initialize WiFi IoT Shield`
  - `Set wifi to ssid " muselab " pwd " 12345678 "`
- serial on data received** block with a dropdown set to `new line`, containing:
  - `show string serial read line`
- forever** loop block containing:
  - `Send ThingSpeak key " S5JUR BNZUS " field1 light level field2 0`
  - `pause (ms) 30000`

# References

- Quick Start Guide for MuseLab Wi-Fi IoT Shield (v6.1)
- MuseLab IVE Workshop PowerPoint
- <http://muselab.cc/setup/>

# Training Score Redeem Code

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Education School leaders Educators Students Products Training News How to buy

Community menu Hi, how can I assist you today? Messages Community Support Translate Hello, Eric

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Topic	Other - Duration is from 1.51 to 3 hours
Training Start Date	7/1/2017
Training End Date	6/30/2018

**Events**

Start Date	End Date	Event Name	Number of Attendees	
12/1/2017	12/1/2017	IT in Education Subject-related Series: Use of Office 365 for Education to conduct e-Learning in Mathematics classes (Secondary School)	30	View



Redemption  
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