



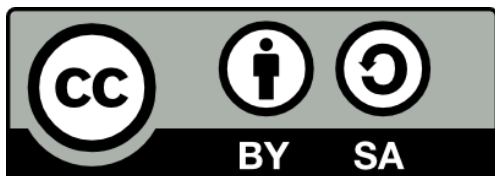
**MESH™**  
Make, Experience, Share

# MESH GPIO INSTRUCTION

*MOVE, CONTROL AND MORE!*

MESH GPIO Instruction - Move, Control and more! –  
Copyright © MESH project, Sony Corporation 2016  
<http://meshprj.com>

This work is licensed under the Creative Commons  
Attribution-ShareAlike 4.0 International License.  
To view a copy of this license, visit  
<http://creativecommons.org/licenses/by-sa/4.0/>.



# CONTENTS

How to use this book

What is MESH?

Kits for MESH GPIO tag

Materials of Motor kit

Materials of Motor Add-on

Materials of Infinite Kit

(For Motor Kit and Infinite Kit)

Activity: Move a motor

Activity: Move a geared motor

(For Motor Add-on and Infinite Kit)

Activity: Control a motor

(For Infinite Kit)

Activity: Make a game

Activity: Make an alarm system

Activity: Make a circuit with LED

# How to use this book

Welcome to the MESH GPIO Instruction!

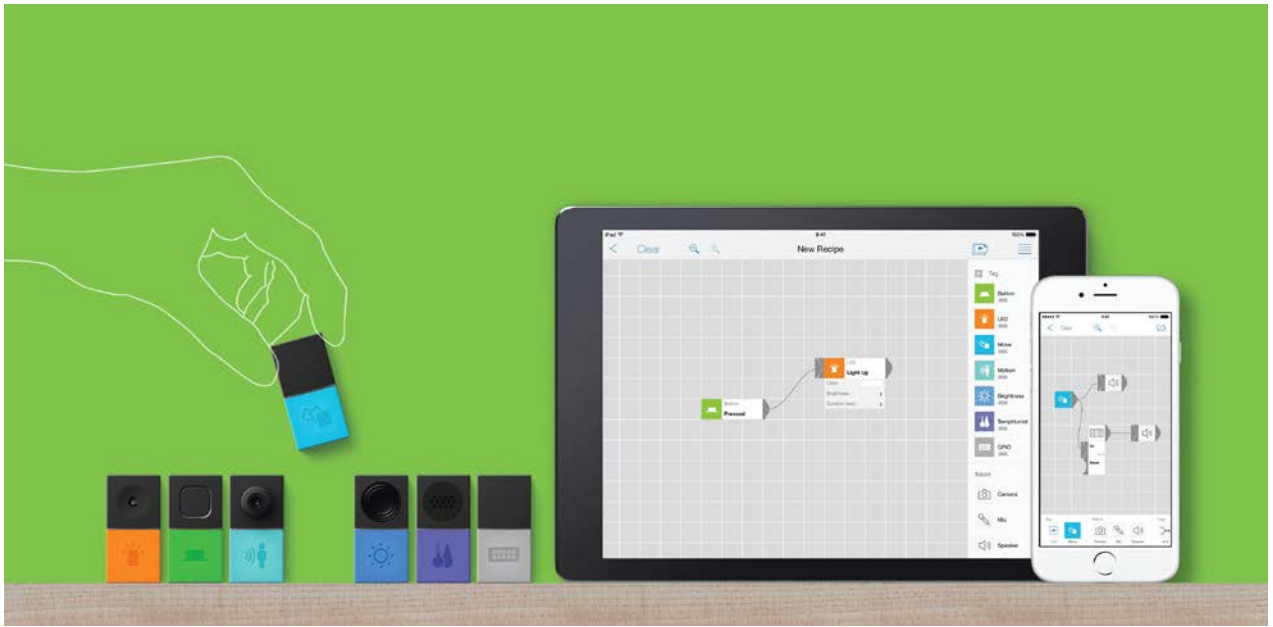
This book will guide you through the process of building something with MESH GPIO tag.

Start with “Materials of ~” section to get familiar with all the parts in your kit. Then go through the activities.

If you run into problems, please visit our web site at <http://meshprj.com>

Enjoy your making with MESH!

# What is MESH?



MESH is a tool that let you explore the world of IoT (Internet of things) using everyday objects.

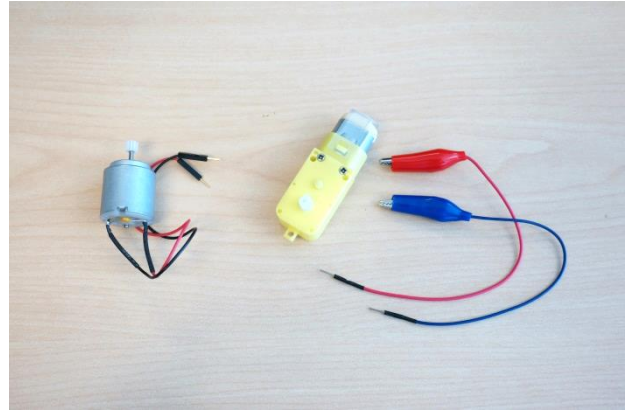
Just attach your MESH tag to any physical object, and connect it with various connected devices and Internet applications on the MESH app.

Your own personal IoT (Internet of Things) system is created, just like that!

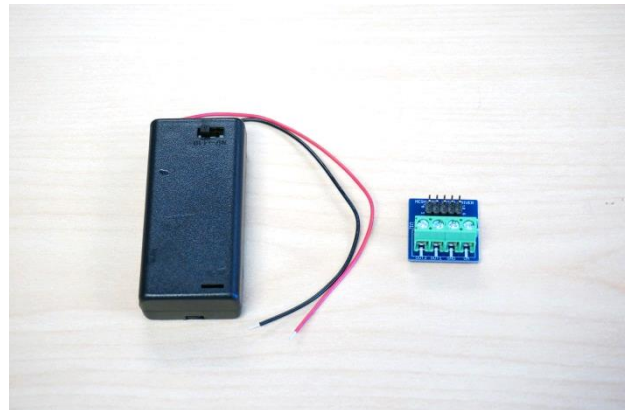
No matter what your knowledge level, MESH is easy to use. There is no need for electronics or programming expertise. Simply drag and drop to connect the icons on the MESH app.

# Kits for MESH GPIO tag

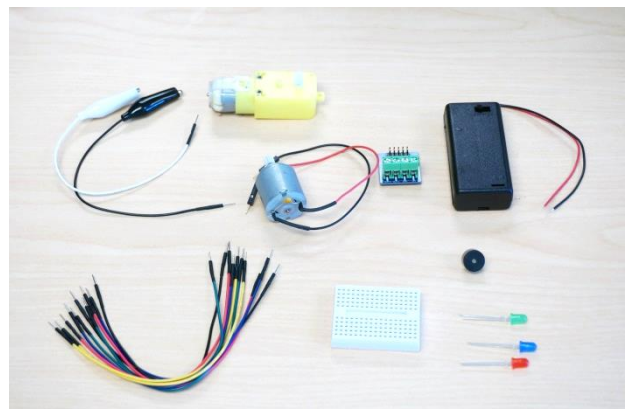
## 1. Motor Kit



## 2. Motor Add-on



## 3. Infinite Kit



# Materials of Motor Kit



## **Hobby Motor**

It is a motor that moves fast. It is to be directly connected to MESH GPIO tag.



## **Hobby Gearmotor**

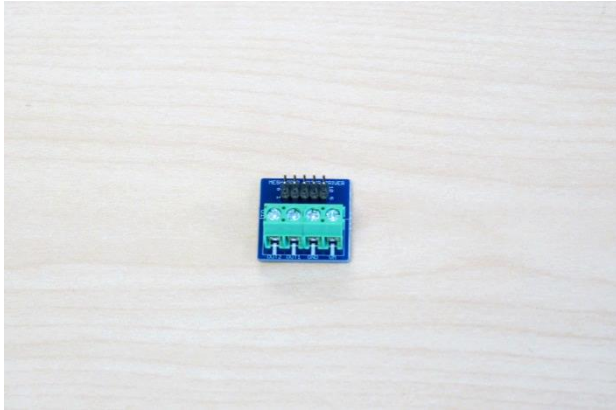
It is a motor that moves slowly. It has gears inside.



## **Alligator Clip with Pigtail**

It is a cable which enables to connect Gearmotor with MESH GPIO tag.

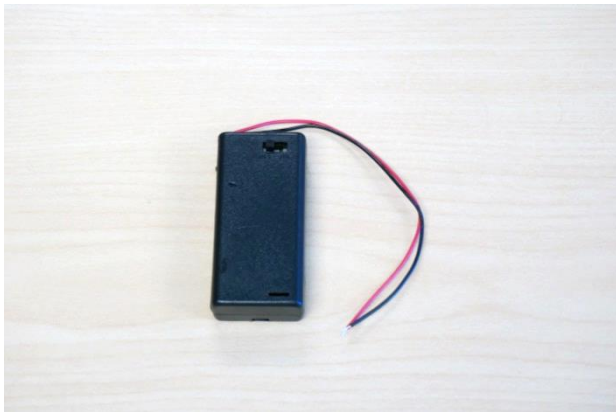
# Materials of Motor Add-on



## **Motor Driver for MESH GPIO**

It enables to control speed and direction of motor rotation.

You can use almost all different kinds of hobby motors (0~11V, 2.4A max)



## **Battery Holder 2xAA with Cover and Switch**

It supplies power to move motor through motor driver.



# Materials of Infinite Kit 1/1



## **Hobby Motor**

It is a motor that moves fast. It is to be directly connected to MESH GPIO tag.



## **Hobby Gearmotor**

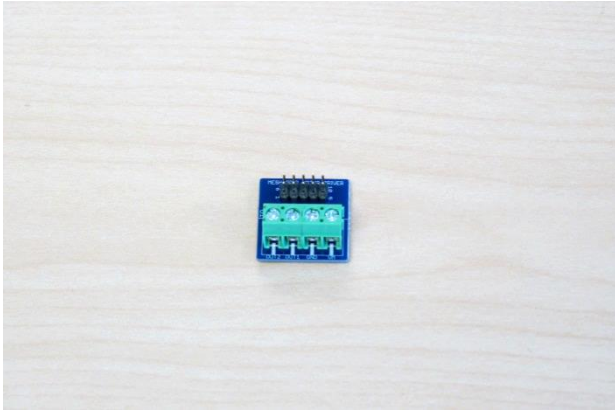
It is a motor that moves slowly. It has gears inside.



## **Alligator Clip with Pigtail**

It is a cable which enables to connect Gearmotor with MESH GPIO tag.

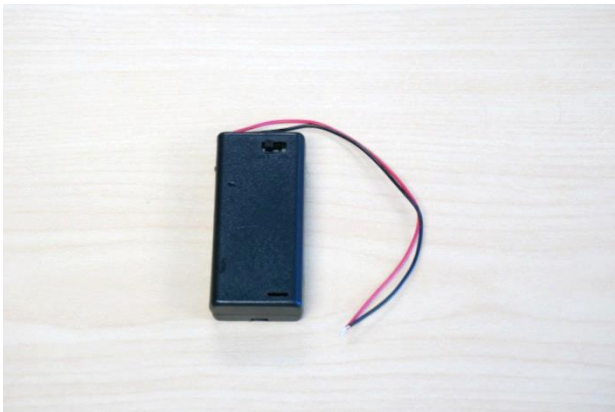
# Materials of Infinite Kit 2/2



## **Motor Driver for MESH GPIO**

It enables to control speed and direction of motor rotation.

You can use almost all different kinds of hobby motors (0~11V, 2.4A max)



## **Battery Holder 2xAA with Cover and Switch**

It supplies power to move motor through motor driver.



## **Resistor LED**

It is LED light with resistor.

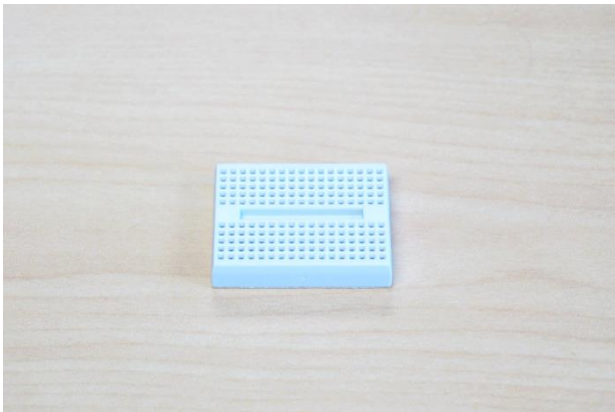
It can be directly connected to MESH GPIO.

# Materials of Infinite Kit 3/3



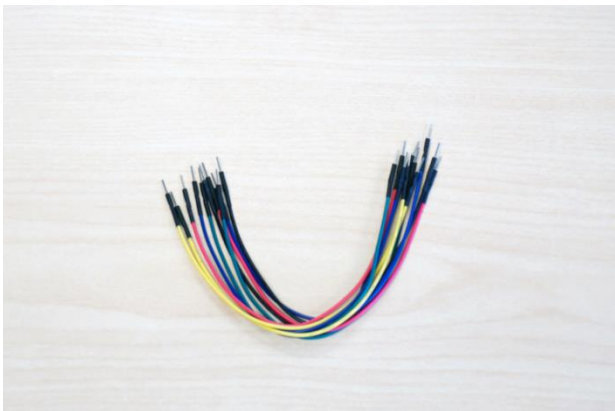
## **Buzzer**

It is a buzzer which can make a beep sound. It can be connected to MESH GPIO.



## **Mini Breadboard**

It is a breadboard. It's a good start for making great things with MESH GPIO!



## **Jumper Wires**

These wires are used for connecting MESH GPIO and breadboard.

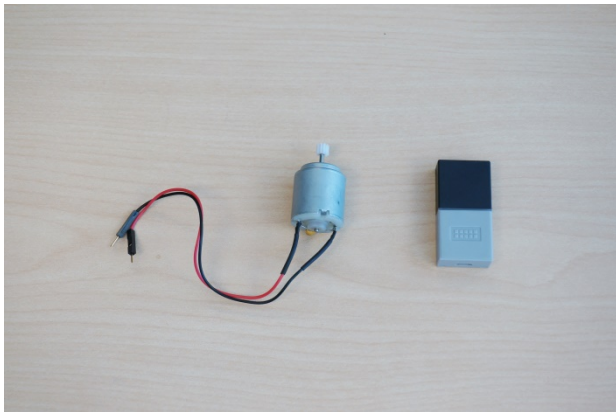
(For Motor Kit and Infinite Kit)

# Activity:

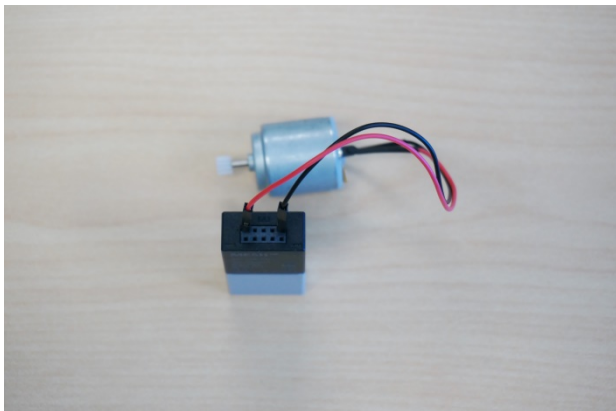
## Move a motor 1/6

### Goal:

Understand how to move a motor using MESH GPIO tag.



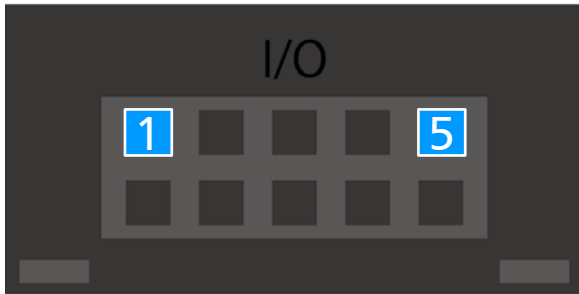
Prepare a hobby motor and MESH GPIO tag.



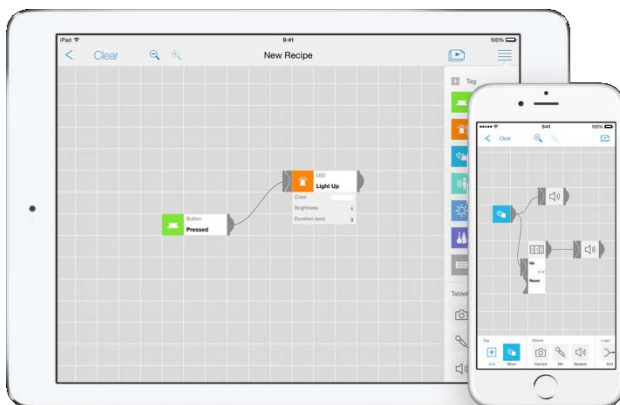
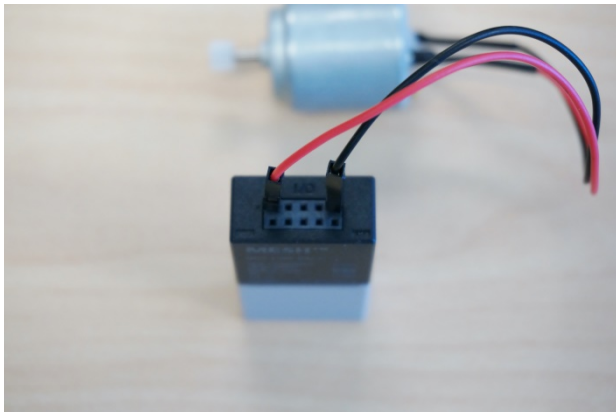
Connect a hobby motor with MESH GPIO tag.

# Activity:

## Move a motor 2/6



Connect the cable of hobby motor into socket 1 (Vout Supply) and 5 (GND) of MESH GPIO tag.



From this step, use MESH app.

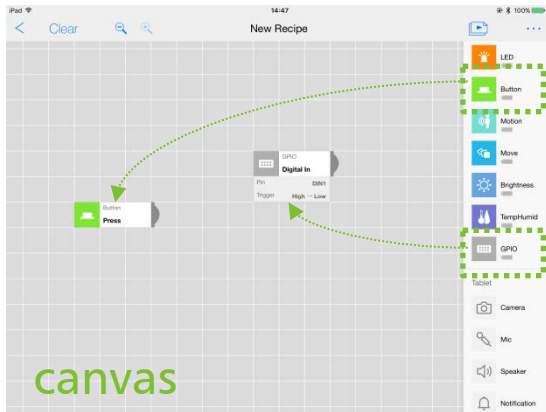
MESH - Creative DIY Toolkit



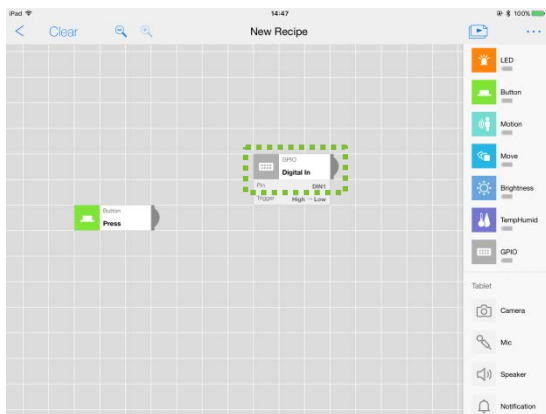
More info about MESH app, visit <http://meshprj.com/en/app/>

# Activity:

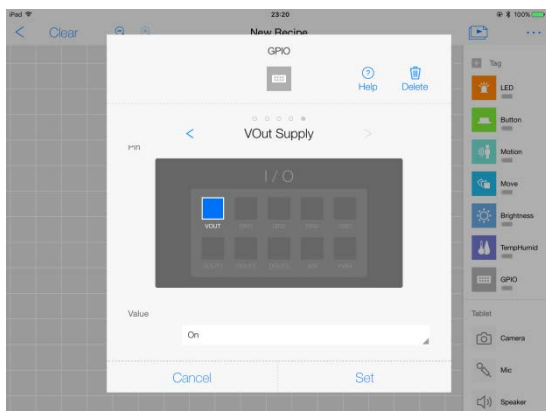
## Move a motor 3/6



Launch MESH app and create new recipe.  
 Drag and drop GPIO tag and other tag which you have (MESH Button tag in this case) to the canvas.



Tap GPIO on the canvas.

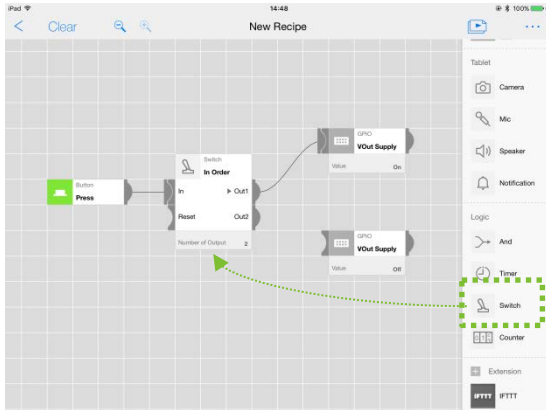


Change function to "VOut Supply" and set value "On".



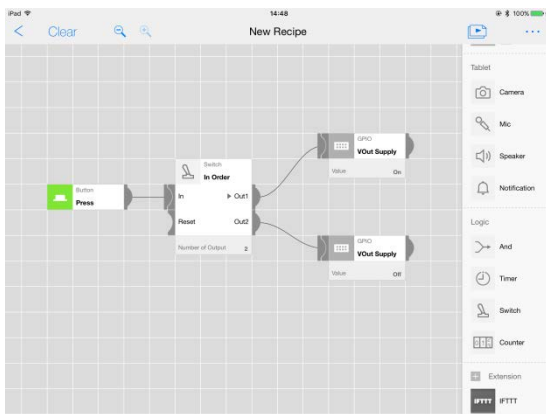
# Activity:

## Move a motor 4/6

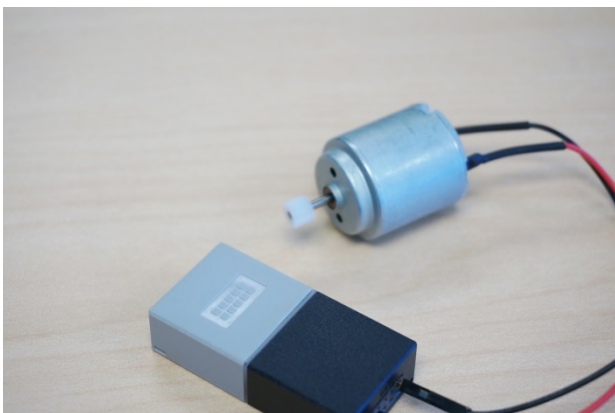


Drug and drop one more GPIO tag and Switch tag.

Change function of GPIO to “VOut Supply” and leave its value off.



Connect wires on MESH app like this.



Press MESH Button tag, and see hobby motor move!

# Activity:

## Move a motor 5/6



Let's create a drawing robot!

Prepare these items.

MESH GPIO tag, Hobby motor, Alligator clip, Plastic bottle (recycle), 4 Markers and Masking tape.



Put markers on a plastic bottle.  
These makers will be legs of drawing robot. Keep balance of legs to stand.



Put a hobby motor on a plastic bottle.



# Activity:

## Move a motor 6/6



Put MESH GPIO tag and Alligator clip like this.



Check the balance!



You can control this robot with any sensors or button of MESH.  
Enjoy your own "interactive" drawing robot!

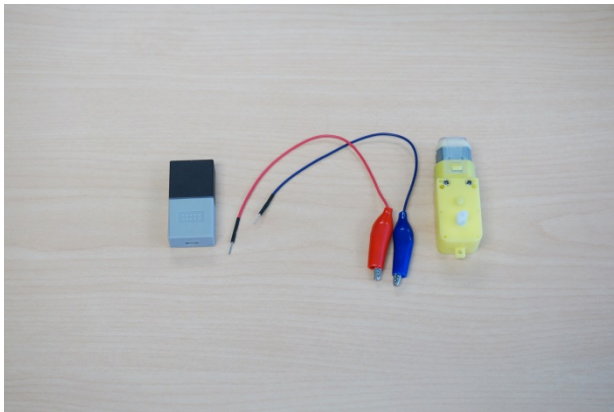
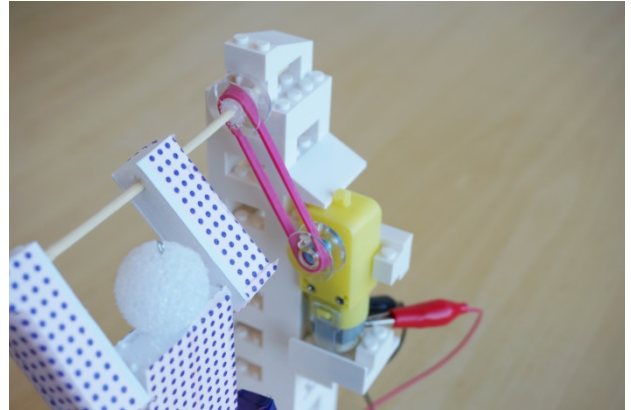
(For Motor Kit and Infinite Kit)

# Activity:

## Move a geared motor 1/3

### Goal:

Understand how to move a gearmotor using MESH GPIO tag.



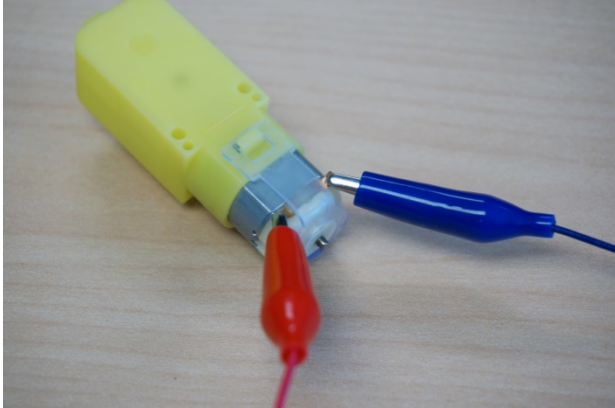
Prepare a Hobby gearmotor, two Alligator clips and MESH GPIO tag.



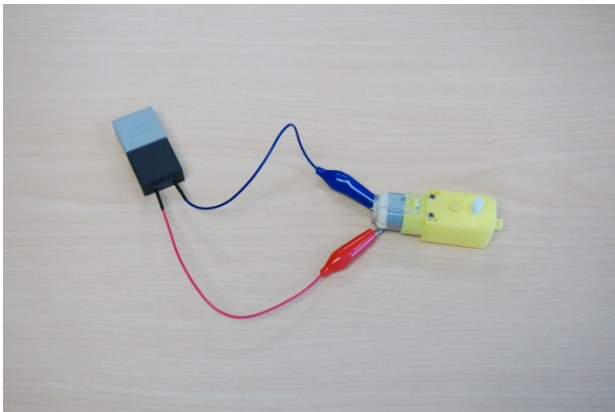
Clip a end terminal of hobby gearmotor.

# Activity:

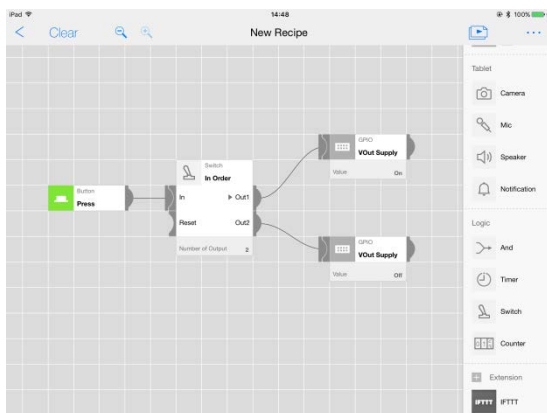
## Move a geared motor 2/3



Clip each end terminal.



Connect other side of Alligator clips with MESH GPIO tag

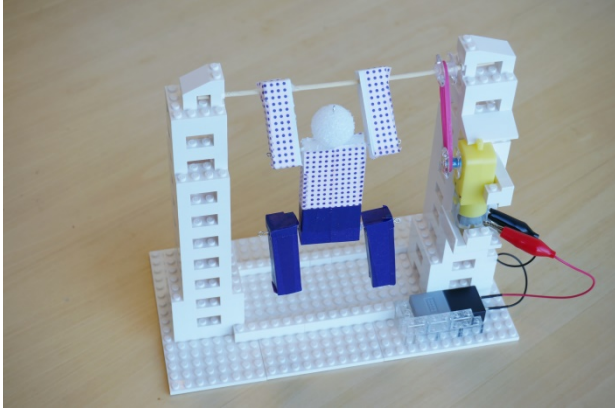


Connect wires on MESH app like this.

(Refer to Activity: Move a motor)

# Activity:

## Move a geared motor 3/3

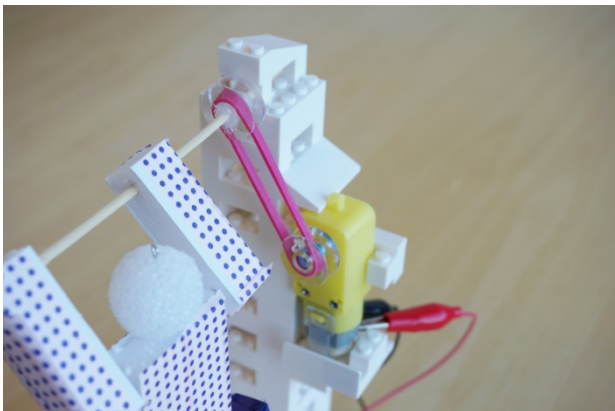


Try to make working buddy!



Materials:

LEGO, elastic band, pins, bamboo stick, masking tape, bobbin and styrene board.



Tips:

Use an elastic band and bobbins as a belt and pulleys to rotate a bamboo stick.

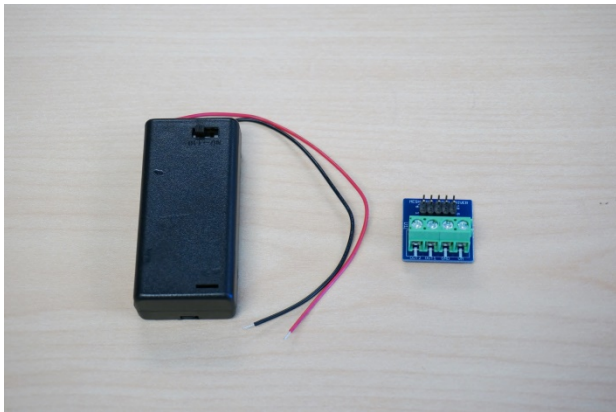
(For Motor Add-on and Infinite Kit)

# Activity:

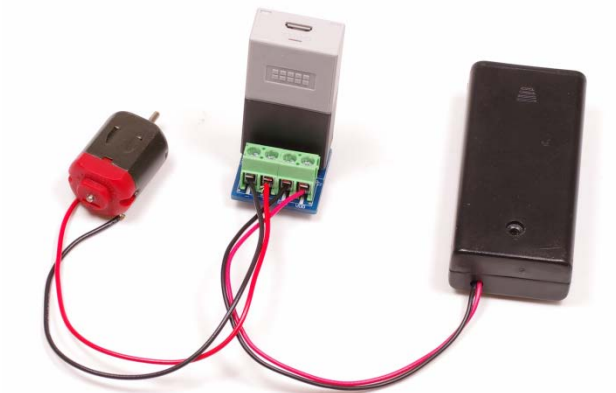
## Control a motor 1/2

### Goal:

Understand how to control a motor speed and rotation direction using MESH GPIO tag.



Prepare AA battery holder, motor driver for MESH GPIO, two AA batteries and MESH GPIO tag.



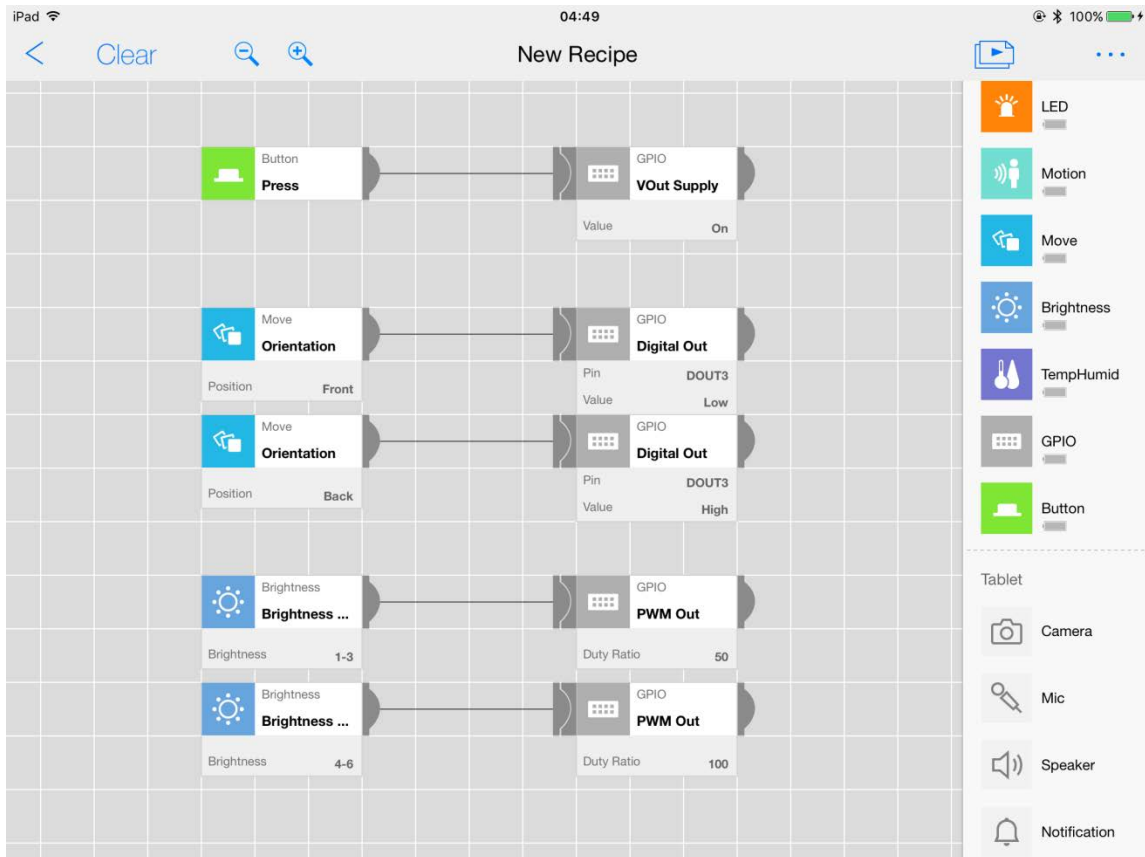
Connect like this.

VM: red cable of battery box  
GND: black cable of battery box  
OUT1, OUT2: cable of motor



# Activity:

## Control a motor 2/2



How to control motor with a Motor driver for GPIO and MESH GPIO tag?

1. Power on a motor driver.  
Set VOut Supply's Value "On".
2. Direction of motor rotation  
Set Digital Out's DOUT3 Pin  
Low : Clockwise  
High : Anticlockwise
3. Speed of motor rotation  
Set PWM Out's Value  
0: stop  
100: max speed

(For Infinite Kit)

# Activity:

## Make a game 1/4

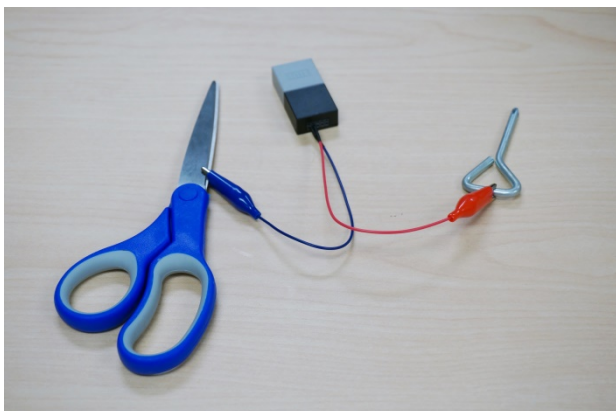
### Goal:

Understand how to make a switch using MESH GPIO tag.



Use Alligator clips and MESH GPIO tag.

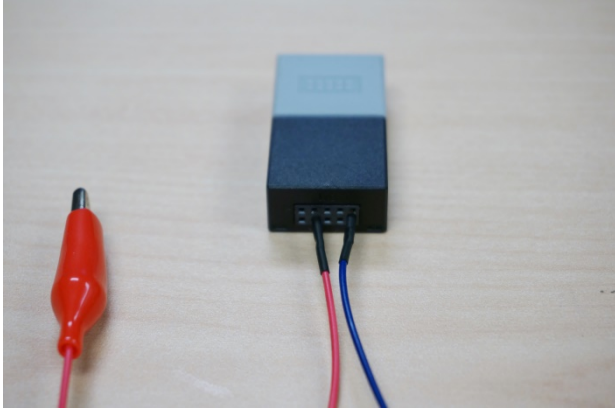
Prepare some metallic object like scissors and screw.



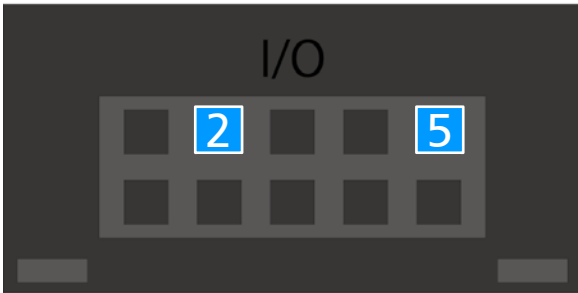
Clip metallic part of object using Alligator clip.

# Activity:

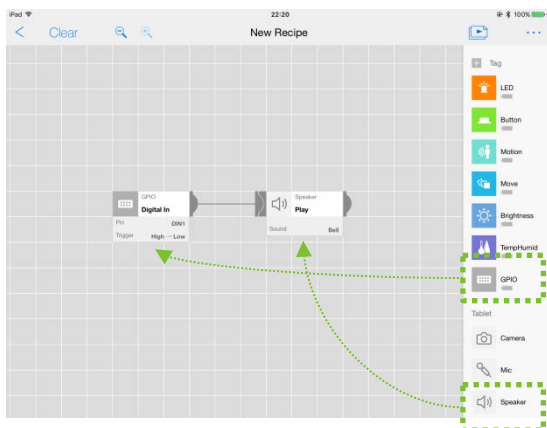
## Make a game 2/4



Plug other side of Alligator clip into MESH GPIO tag.



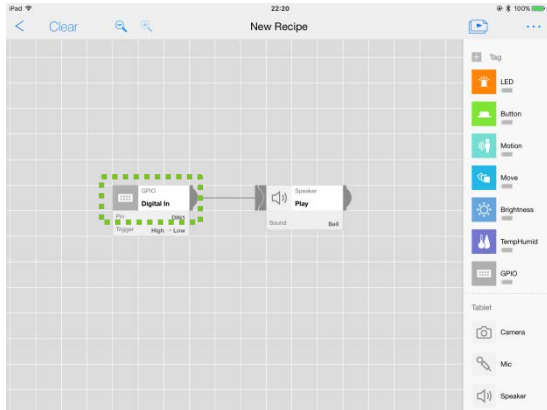
Plug pins into 2(Digital In) and 5 (GND)



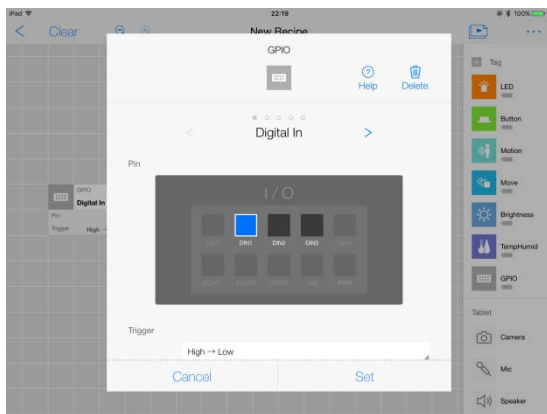
Drug and drop GPIO tag and Speaker tag, then connect them on MESH app like this.



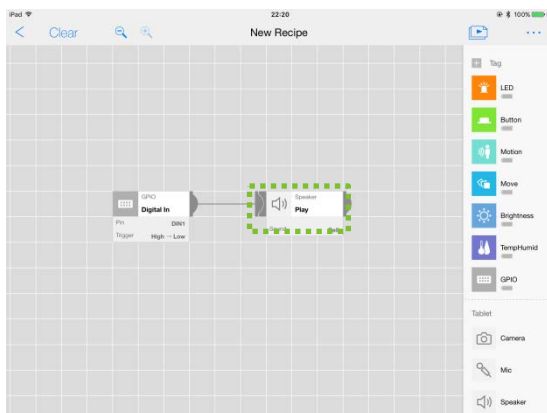
# Activity: Make a game 3/4



Tap GPIO on canvas.



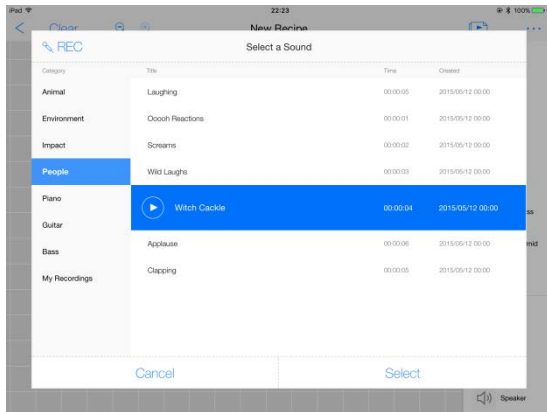
Set Trigger of Digital In to  
"High -> Low"



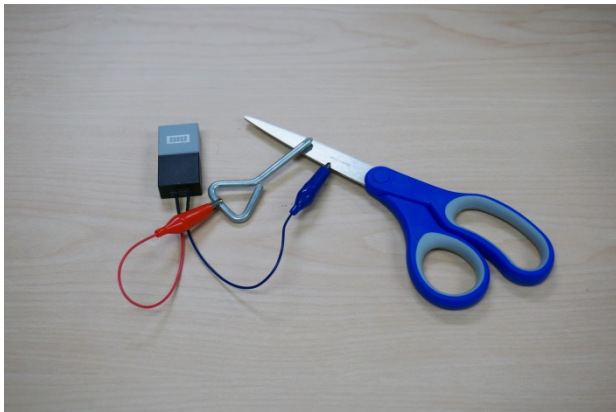
Tap Speaker on canvas.

# Activity:

## Make a game 4/4



Change sound as you like.



Test it! Let the screw touch scissor. You will hear sound from MESH app.



Let's create an irritating bar game!

(For Motor Kit and Infinite Kit)

# Activity:

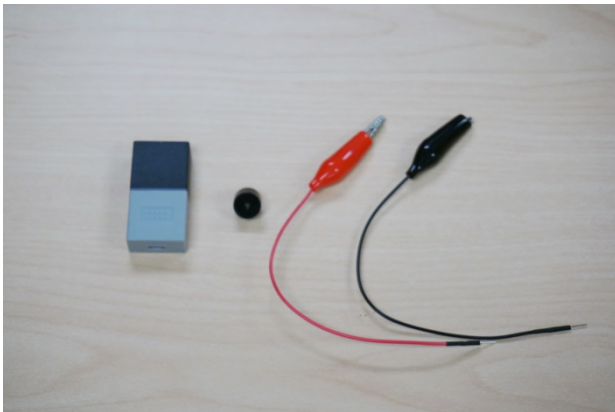
## Make an alarm system 1/3

### Goal:

Understand how to use electrical component like buzzer.



Prepare a Buzzer, Alligator clip and MESH GPIO tag.



Clip positive terminal (longer leg) of buzzer with red alligator clip.



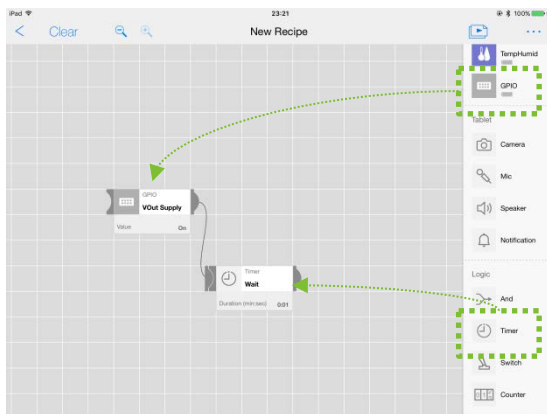
# Activity:

## Make an alarm system 2/3



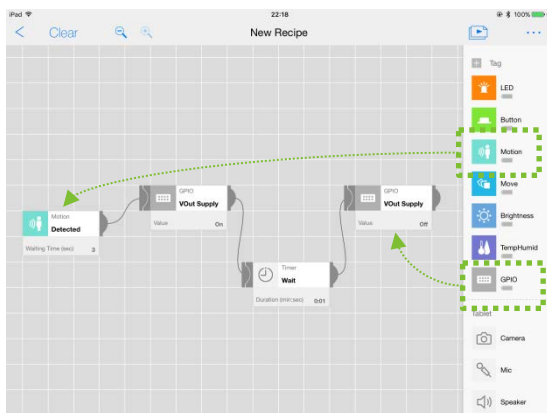
Clip negative terminal (shorter leg) of buzzer with red alligator clip. Please be careful not to short both clips.

Then, plug other side of red cable into Pin 1 and black cable into Pin 5 of MESH GPIO tag.



Drag and drop GPIO and Timer on MESH app.

Then, drag and drop one more GPIO and other tag which you have. (Use Motion in this example.)



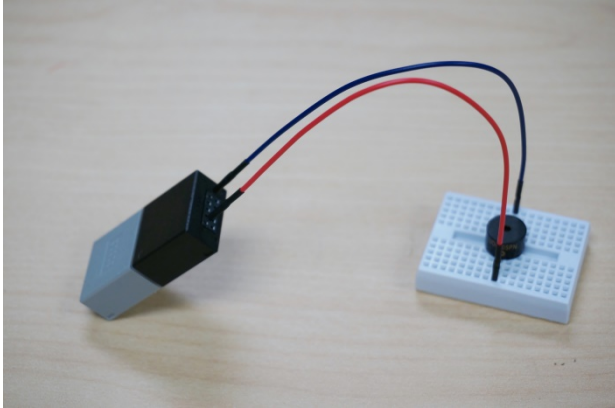
VOut Supply On, buzzer starts beeping.

VOut Supply Of, buzzer stops beeping

Let's test it! Someone comes near Motion sensor, buzzer beeps!

# Activity:

## Make an alarm system 3/3

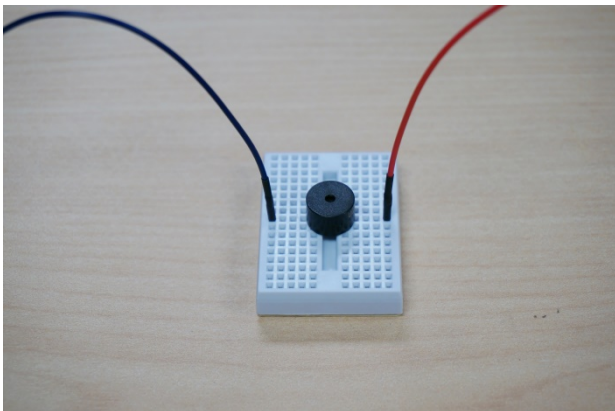


### Tips:

To avoid to short, you can use mini breadboard.



Plug a buzzer to a mini breadboard. Please remember which side is longer.



Plug red cable into same side of longer leg, and plug black cable into same side of shorter leg.

Then, plug red cable into pin 1 and plug black cable into pin 5 of MESH GPIO tag.



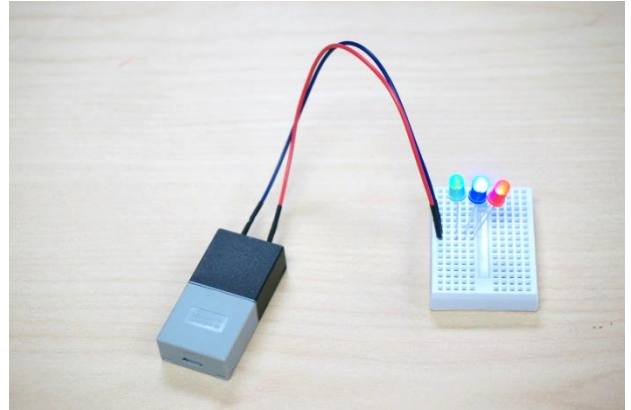
(For Motor Kit and Infinite Kit)

# Activity:

## Make a circuit with LED 1/3

### Goal:

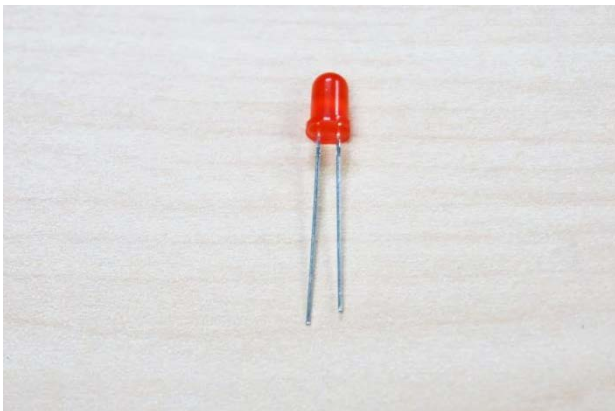
Understand first step of how to make an electrical circuit.



Prepare LEDs and MESH GPIO tag.

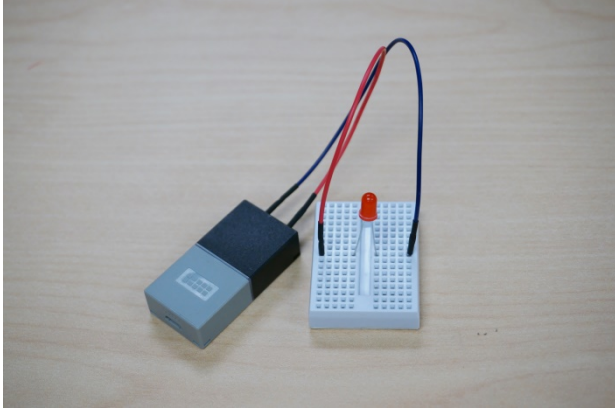


How to see LED's positive and negative.  
Longer leg is positive terminal.  
Shorter leg is negative terminal.

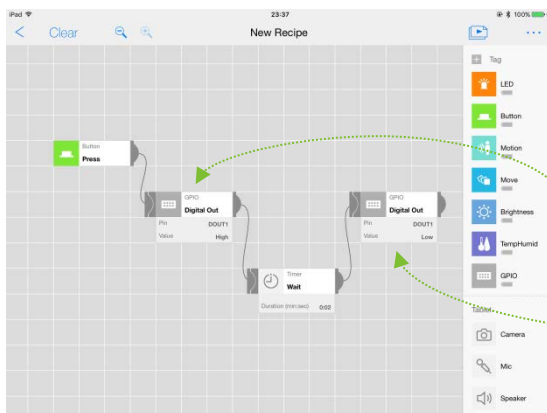
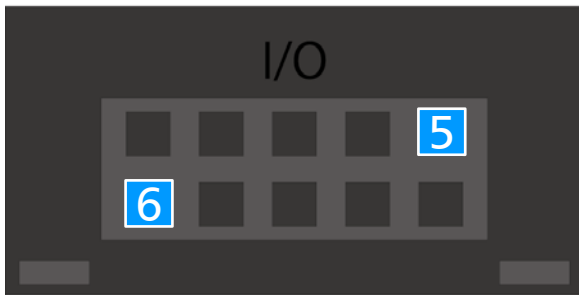


# Activity:

## Make a circuit with LED 2/3



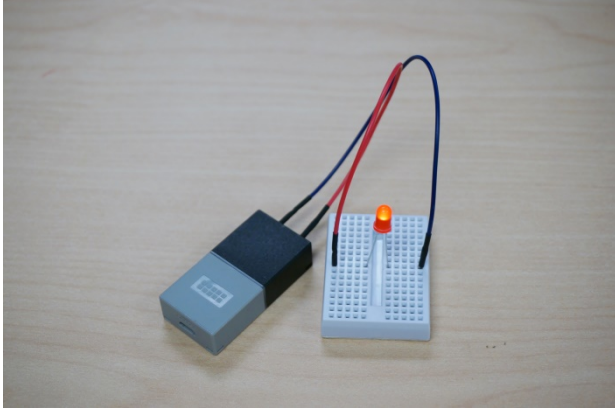
Plug red cable into Pin 6  
(Digital Out) of MESH GPIO and  
same side as longer leg of LED.  
Plug black cable into Pin 5  
(GND) of MESH GPIO and same  
side as shorter leg of LED.



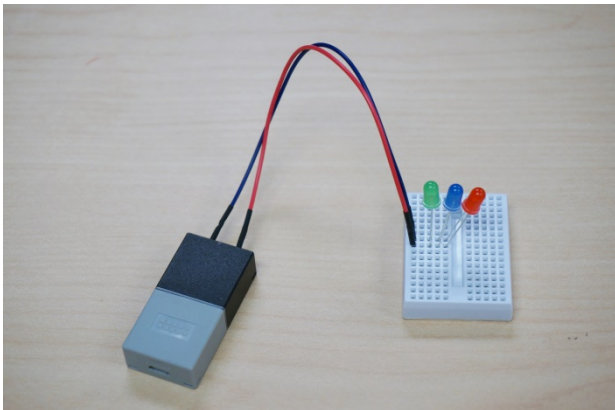
Drag and drop two GPIOs,  
Timer and other tag (Button in  
this example) on MESH app.  
Then, connect like this.  
Digital Out (DOUT1): High  
Digital Out (DOUT2): Low

# Activity:

## Make a circuit with LED 3/3



Test it! Press MESH Button tag, you will see LED lights up.



Challenge:  
Use 3 LEDs. Let's try!

