MESH™ Guide

Computational Thinking is fun!

Basics

Dive into seventeen fun MESH recipes that explore basic programming concepts and computational thinking.

MESH™

Guide Computational Thinking Practice

Table of Contents

MESH™
Make, Experience, SHare

To see more details and videos for this project visit MESHprj on Instructables.
For technical support or questions, visit **meshprj.com**

MESH LED

Light Up & Firefly
Set the LED to light up or glow when it is triggered.

Blink
Set the LED to blink when it is triggered.

Off
Set the LED to turn off when it is triggered.

MESH Button

Press
Trigger an action when the button is pressed once.

Hold
Trigger an action when the button is held.

Double Press
Trigger an action when the button is pressed twice.

MESH Motion

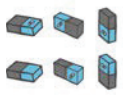
Detected
Trigger an action when motion is detected.

Undetected
Trigger an action when no motion is detected.

Check Motion
Use another action, like a click of MESH Button, to check for motion or for the absence of motion and then trigger another action.

MESH Move

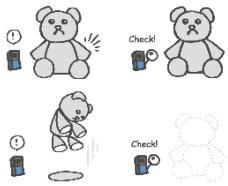
Shake, Flip, or Tap
Trigger an action when the tag is shaken, flipped, or tapped.



Orientation
Trigger an action when the tag is oriented with a certain side facing up. (Orientation is based on six settings: Front, Left, Top, Back, Right, Bottom.)

MESH Brightness

Detect change & check brightness
Trigger an action if there is a change in ambient light; or use another action, like a click of MESH Button, to check whether brightness is within a set range and then trigger another action.



Detect & check openness and closeness
Trigger an action if the tag is covered; or use an action, like a press of MESH Button, to check whether the tag is concealed from light to trigger another action.

MESH Temperature & Humidity

Detect change in temperature & humidity
Trigger an action when temperature or humidity reach a certain range.

Check temperature & humidity
Use another action, like a click of MESH Button, to check for temperature in a set range, and if temperature is within the set range then trigger another action.

MESH GPIO

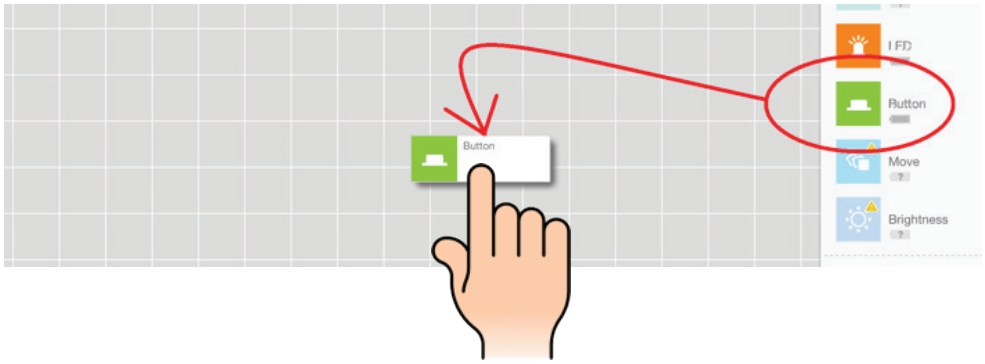
General Purpose Input Output (GPIO) Pins
Trigger an action in the MESH app when a signal is received in the following:

A. Digital In
B. Digital Out
C. Analog In
D. PWM Out
E. VOut Supply

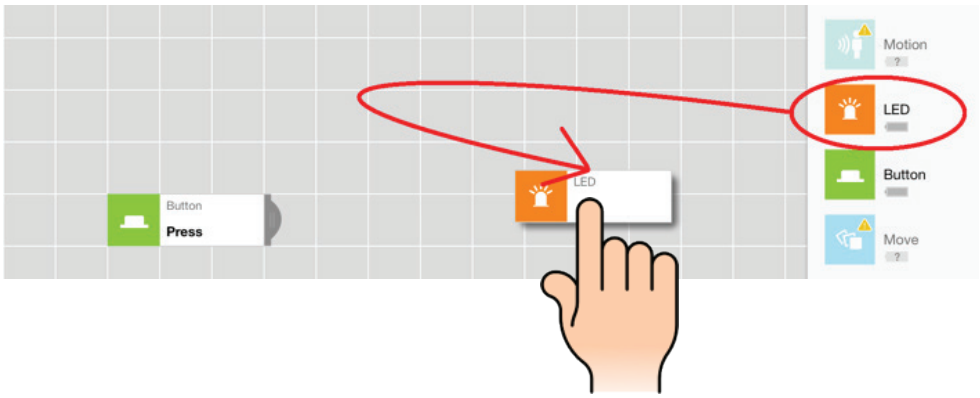
If the button is pressed...

...**then** the LED turns on.

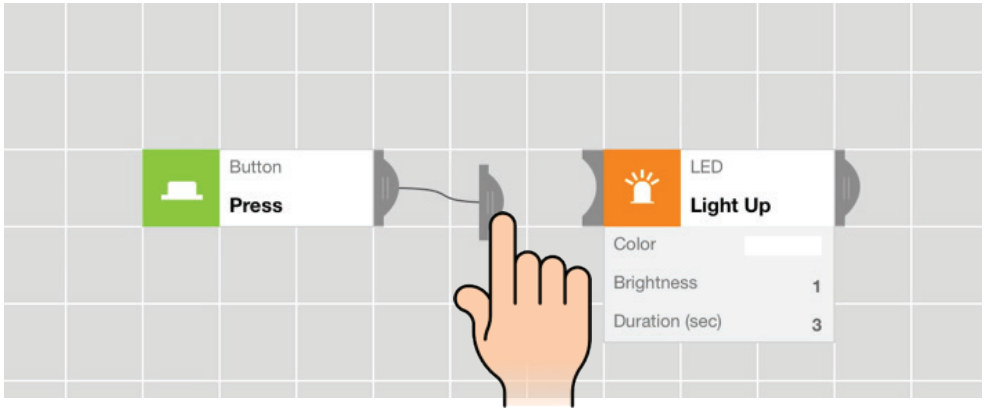
How to: Program the LED to turn on when the button is pressed.



1. Drag a Button block onto the canvas.



2. Drag an LED block onto the canvas.



3. Connect the Button block to the LED block.

Challenge 1: Program the following:

Challenge 1

"**If** you shake the Move block,
then the LED turns on."

Challenge 2

"**If** you press the Button,
then the LED lights up
and the Speaker rings a bell
at the same time."

Challenge 2: Program the following:

Challenge 3: Program the following:

Challenge 3

"If you press the Button
or shake the Move block,
then the LED turns on."

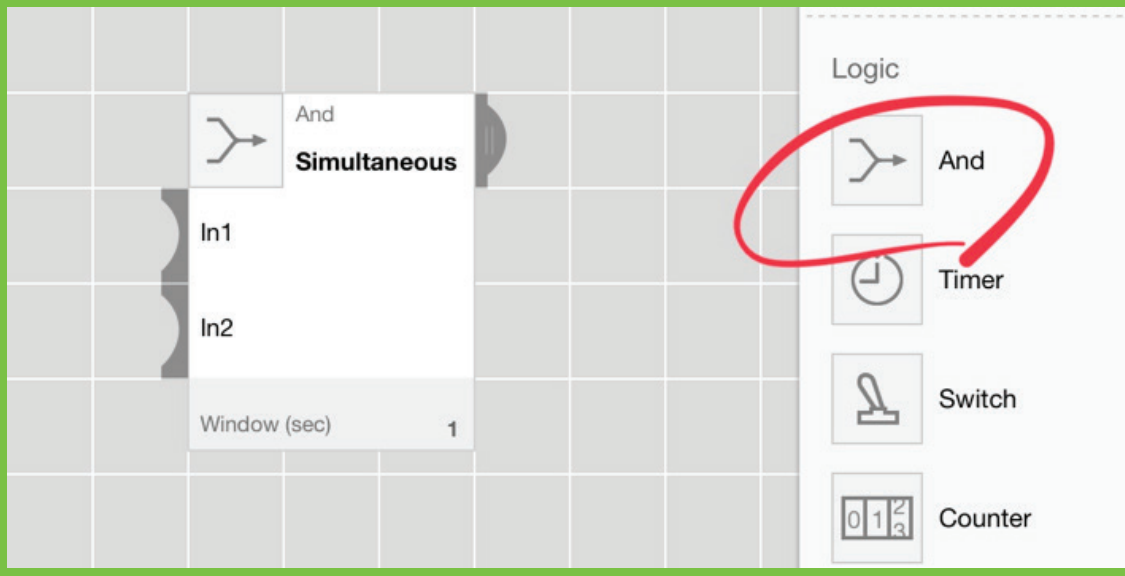
Challenge 4

"**If** you press the Button
and shake the Move Block
simultaneously,
then the LED lights up."

Challenge 4: Program the following:

Hint: The word "simultaneously" indicates that this program requires logic.

To add logic to a program, choose a block from the Logic section of the dashboard.



Challenge 5: Program the following:

Challenge 5

"**If** you press the Button,
then the LED turns on and
then the Speaker plays a bell sound. "

Challenge 6

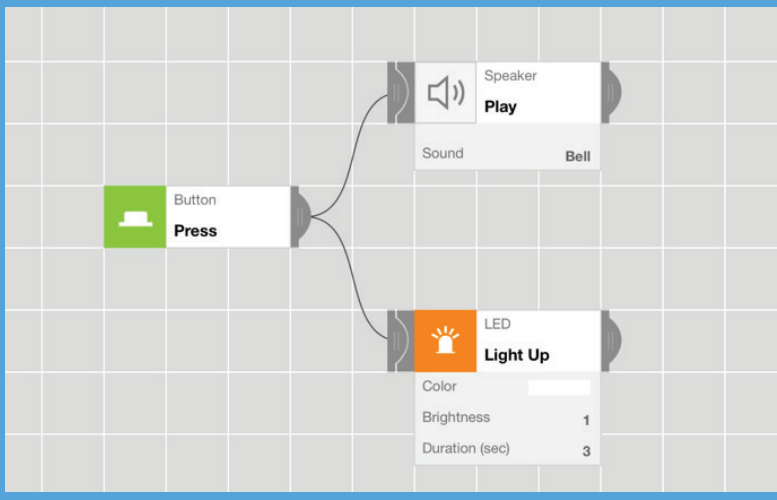
"**If** you press the Button
and shake the Move Block
simultaneously,
then the Speaker plays a bell sound
and **then** the LED turns on."

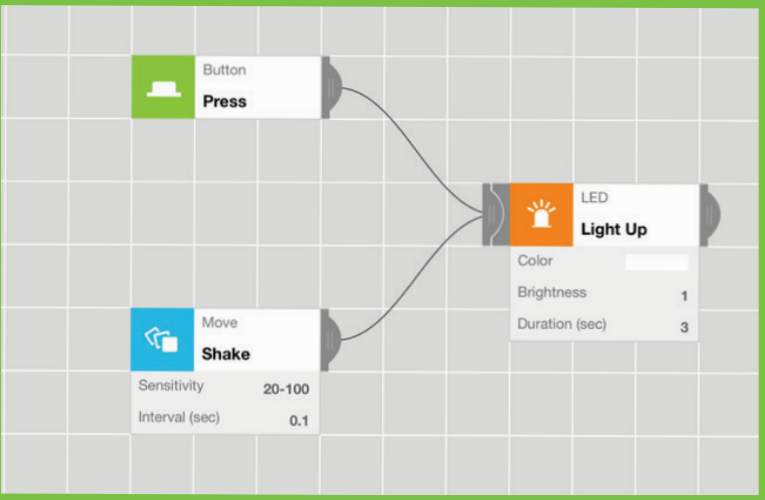
Challenge 6: Program the following:

Challenge 7

Modify the design of the program on the right to the following:

"**If** you press the Button,
then the LED turns on and
then the Speaker plays the bell sound."





Challenge 8

Modify the design of the program on the left to the following:

"**If** the Button is pressed,
and the Motion Block is shaken
simultaneously,
then the LED turns on."

Key Word:

"Sequence"

Important point is not "creating the program," but "creating the program that works."

The correct program can only work if the correct sequence is made.

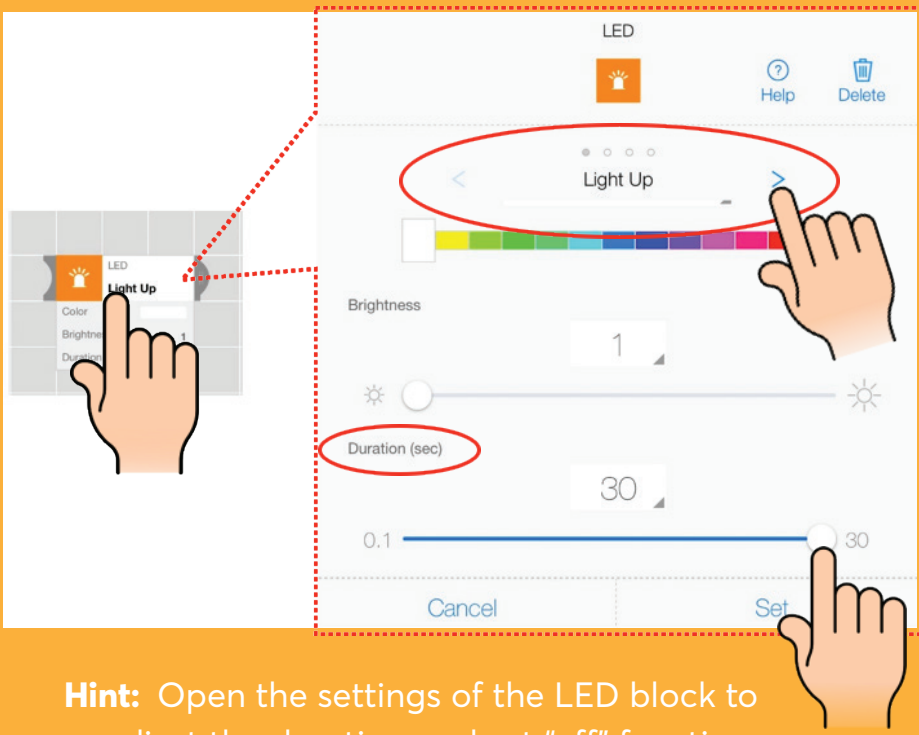
Challenge 9

"**If** you press the Button,
then the LED lights up
or
if you shake the Move Block,
then the Speaker plays a bell sound."

Challenge 9: Program the following:

Challenge 10

"**If** you press the Button,
then the LED turns on
or
if you shake the Move Block,
then the LED turns off."

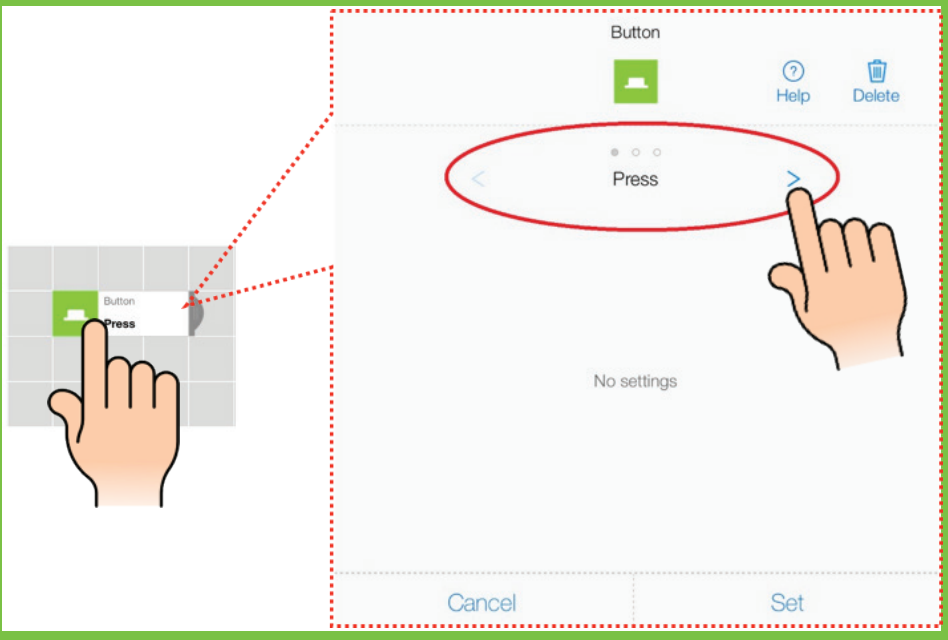


Hint: Open the settings of the LED block to adjust the duration and set "off" function.

Challenge 11

"**If** you press the Button,
then the Speaker plays a bell sound
and **then**, the LED lights up,
or
if you shake the Move block,
then the LED turns off and
then the Speaker plays
a different sound."

Challenge 11: Program the following:



Challenge 12

"**If** you press the Button once,
then the LED lights up,
or
if you double press the Button,
then the LED blinks,
or
if you hold the Button,
then the LED turns off"

Challenge 13

"**If** you press the Button
and shake the Move Block
simultaneously,
then the LED lights up,
or
if you double press the Button
or Flip the Move Block
then the LED turns off."

Challenge 13: Program the following:

Key Word:

"Decomposition"

A program that appears complex actually
just consists of simple sequences
like the ones you've created in the previous drills.

Remember, all programs (even complex ones)
are built using a combination of small, simple parts.

Advertisement
Smart Light Bulb

When you walk in the room,
the light turns on
and when you walk out the room,
the light turns off.

With a Smart Light, you'll never forget to turn off the light of your room and save energy and money!

Challenge 14 - Recreate the smart light bulb!

Step 1.
Reflect on the design of the smart light bulb.

Please fill the blanks with the name of the MESH Block. Imagine the smart light bulb is the MESH LED block.

"In a room, attach the _____ Block to the door. **If** the _____ Block detects the motion of a person entering into the room, **then** the LED Block turns on, and **if** the _____ Block detects the motion of a person leaving the room, **then** the LED Block turns off."

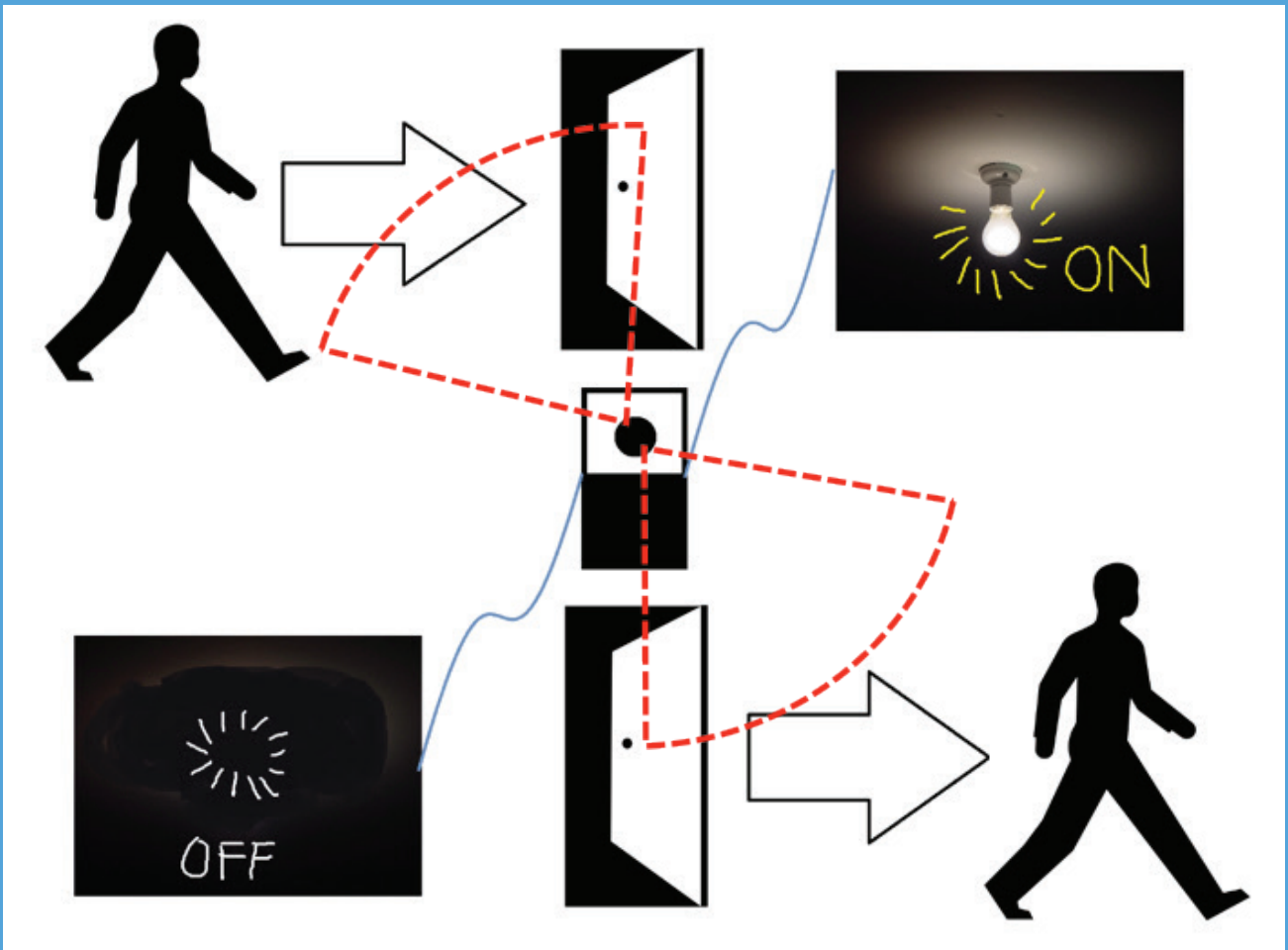
(See hint on next page.)

Step 2.
Program the sequences of the smart light bulb in the MESH app.

Hints:
- Review the description of the smart bulb you created in Step 1. In the description, you described the functionality of the smart light bulb.

- You may need to use multiple setting on the MESH blocks. Check out all the setting of the blocks you're using by tapping the block when it's on the canvas.

Challenge 14 - Hint!



Advertisement
Super Smart Light Bulb

When the sun rises in the morning,
the light turns on
and when the sun sets in the evening,
the light turns off.

Smartest light bulb ever!

Challenge 15 - Recreate the smart light bulb!

Step 1.
Reflect on the design of
the smart light bulb.

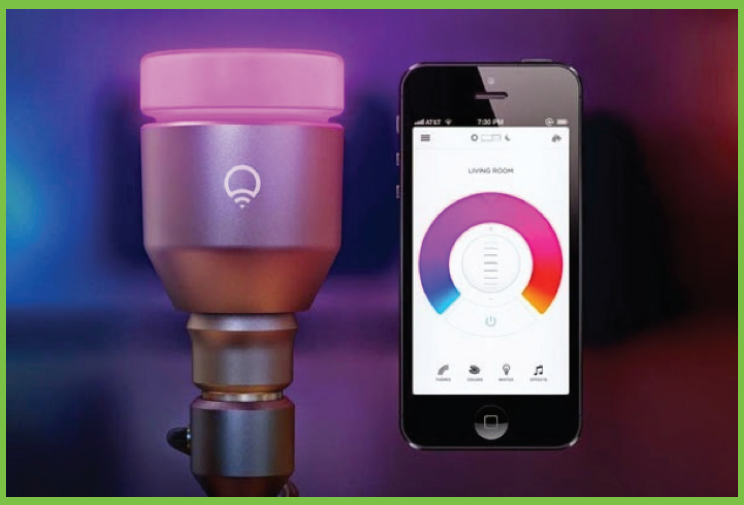
Please fill the blanks with the name of the MESH Block. Imagine the smart light bulb is the MESH LED block.

"In a room, place the _____ Block on a window sill. **If** the _____ Block detects that the room is getting brighter, **then** the LED Block turns off, and **if** the _____ Block detects the that room is getting darker, **then** the LED Block turns on."

Step 2.
Program the sequences of the smart light bulb in the MESH app.

Hints:

No hints this time.
You can do it!



Advertisement

Colorful Smart Light Bulb

This light bulb can change colors.
It uses a mobile app to control
the color of the light bulb.

Challenge 16 - Recreate the color control for the smart light bulb!

Step 1.
Reflect on the design of the smart light bulb.
Imagine the LED block is the smart light bulb.

Step 2.
Create a remote control to control the
color of the light bulb in the MESH app.

Which MESH block can you use?
What functions of the MESH block could be used?

Advanced Challenge

Smart Security Camera

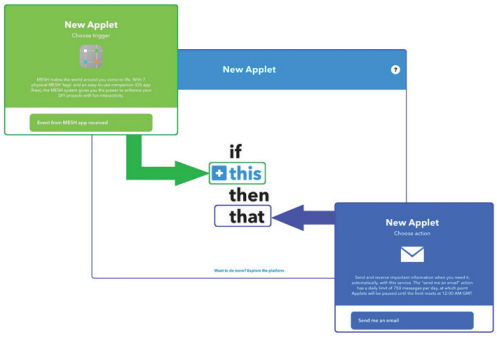
When someone walks in the room,
then the camera takes a picture of the person,
And sends you an e-mail:
"Someone has entered the room!"

Challenge 17 - Recreate the smart security camera!

Program the sequences of the smart security camera in the MESH app.
Imagine the camera on your device is the security camera.

Hints:
- Use the Camera Block and "IFTTT" block in the MESH app.

What is IFTTT?
- IFTTT is an acronym for "If This Then That"
- It's an Internet of Things platform that connects Internet services and gadgets to one another.
- IFTTT uses "applets" to create customized connections between Internet services and gadgets.
- IFTTT requires a free account.



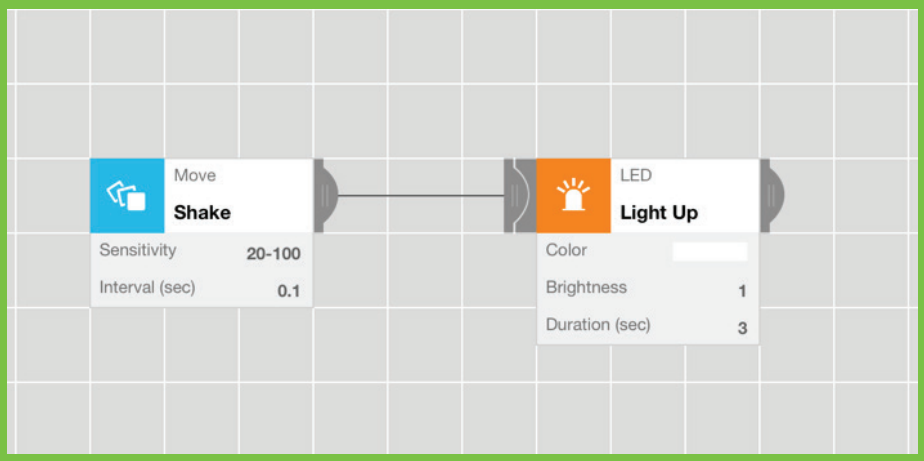
Key Word:

"Internet of Things"

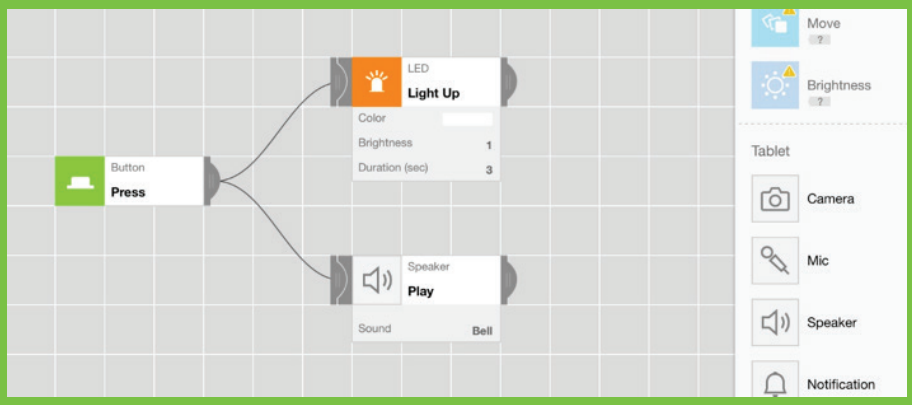
The Internet of Things ("IoT") is an emerging technology and most easily understood as physical objects, such as cars or refrigerators, connected to the Internet to send and receive data.

This connection between physical objects and the Internet allows us to automate actions (e.g., a refrigerator that will send a text message when you've run out of eggs) and collect data (e.g., the refrigerator could track how often you purchase milk).

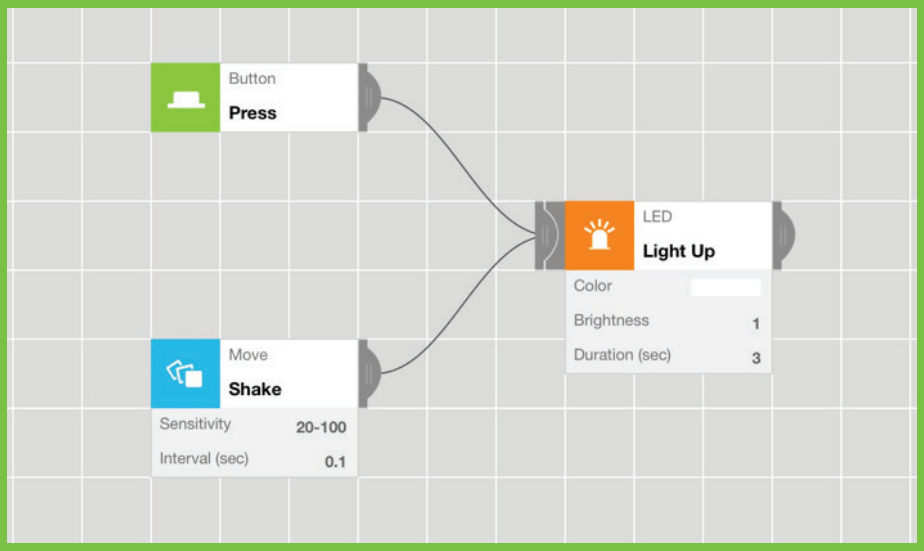
Challenge 1



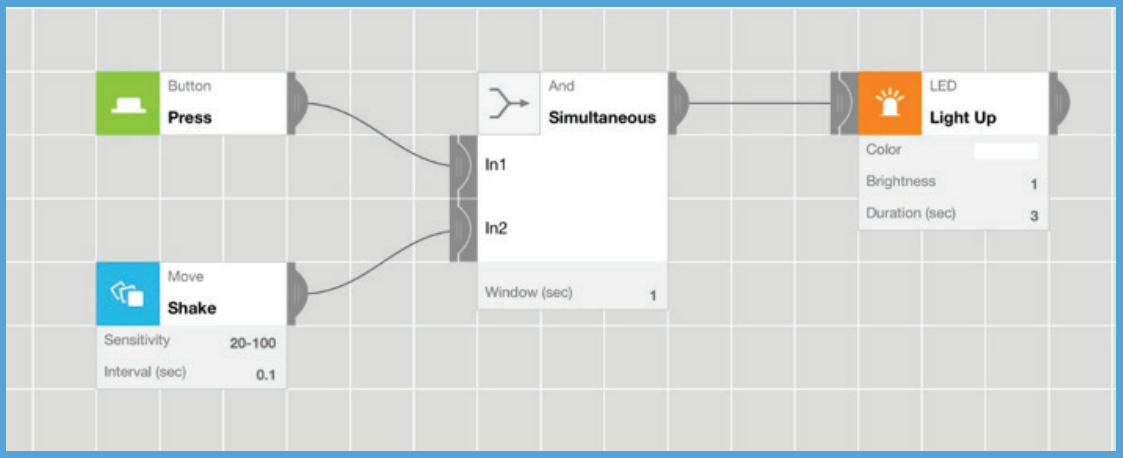
Challenge 2



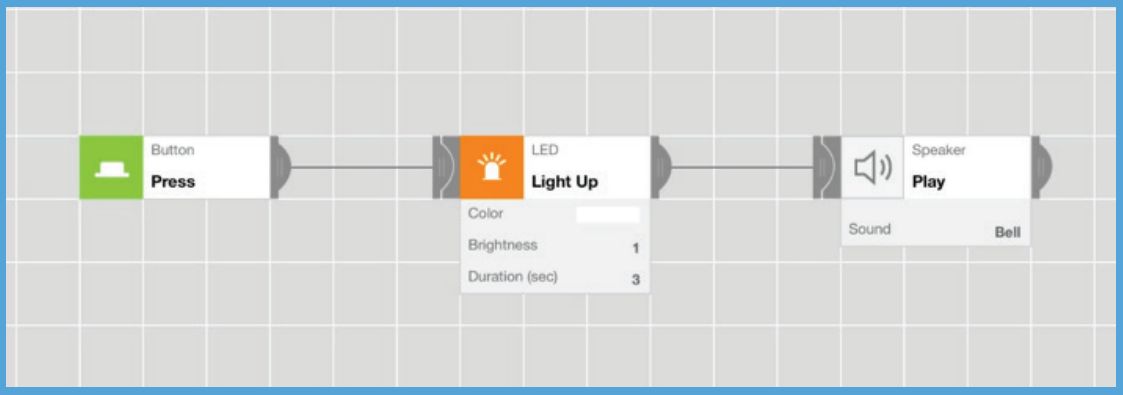
Challenge 3



Challenge 4

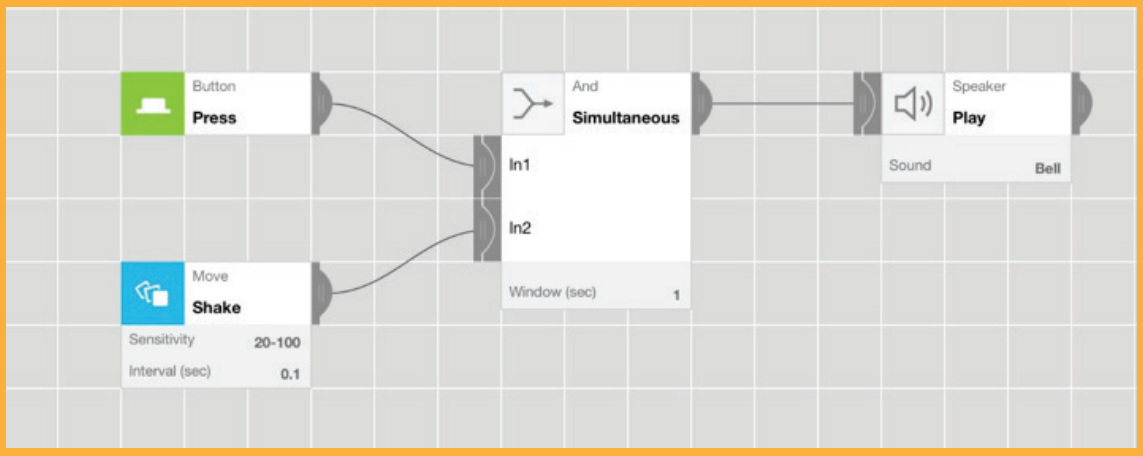


Challenge 5

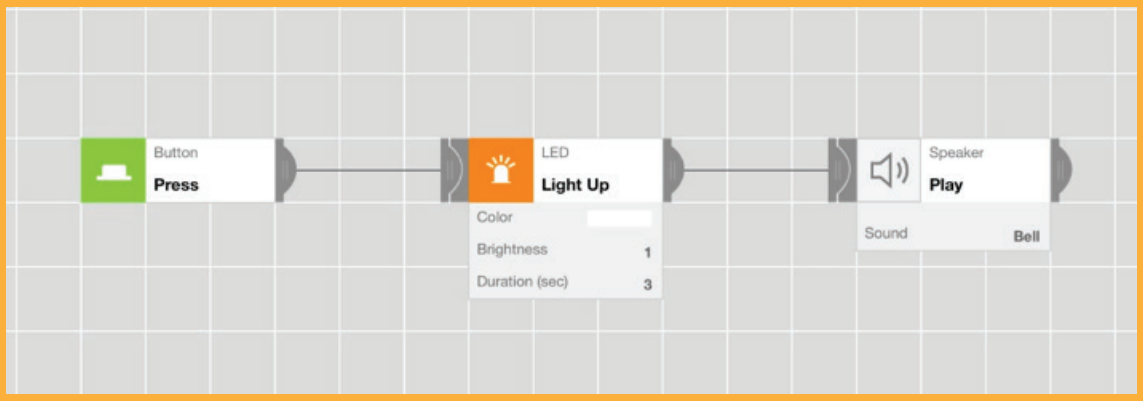


Challenge 6

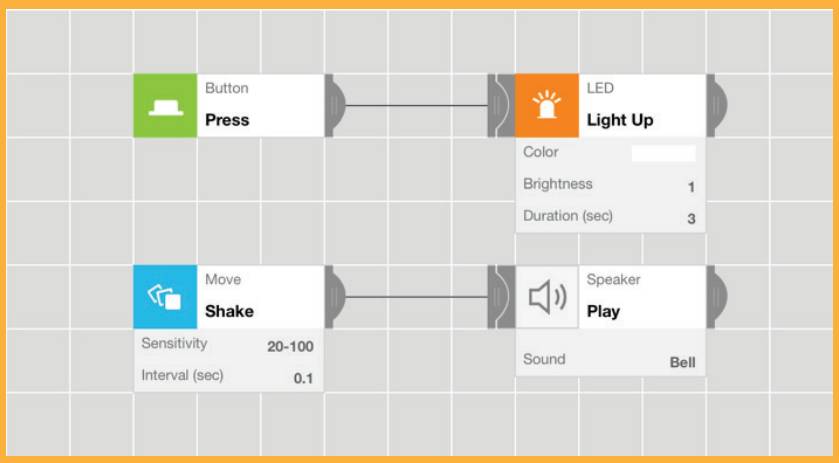
Challenge 7



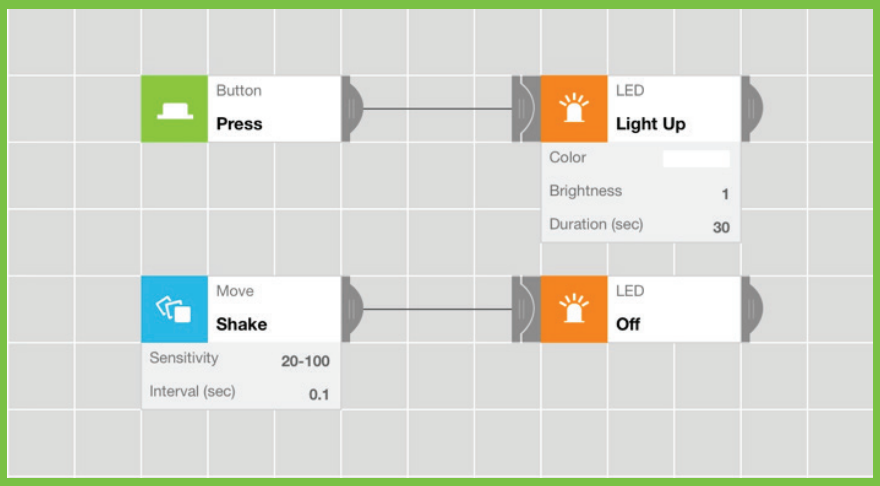
Challenge 8



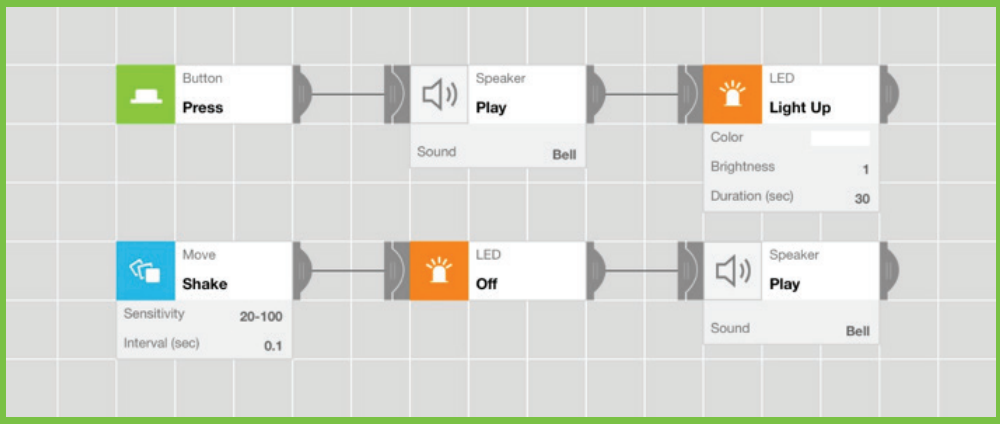
Challenge 9



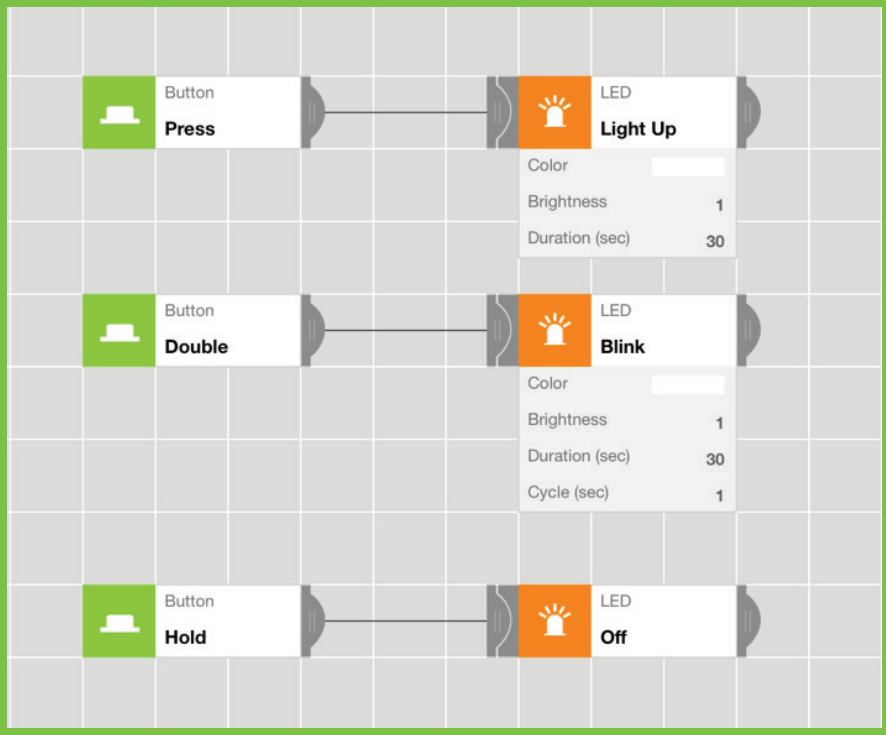
Challenge 10



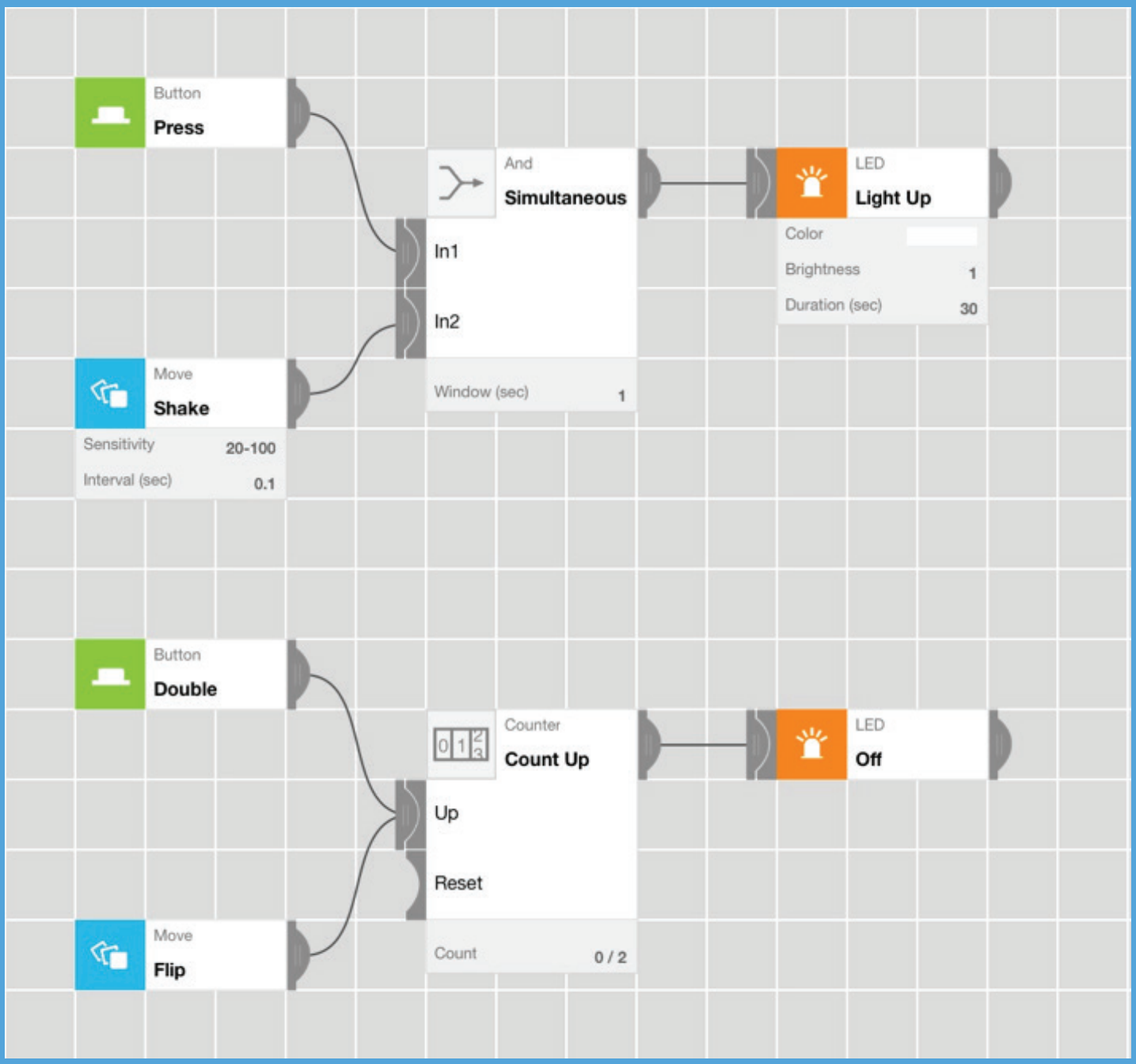
Challenge 11



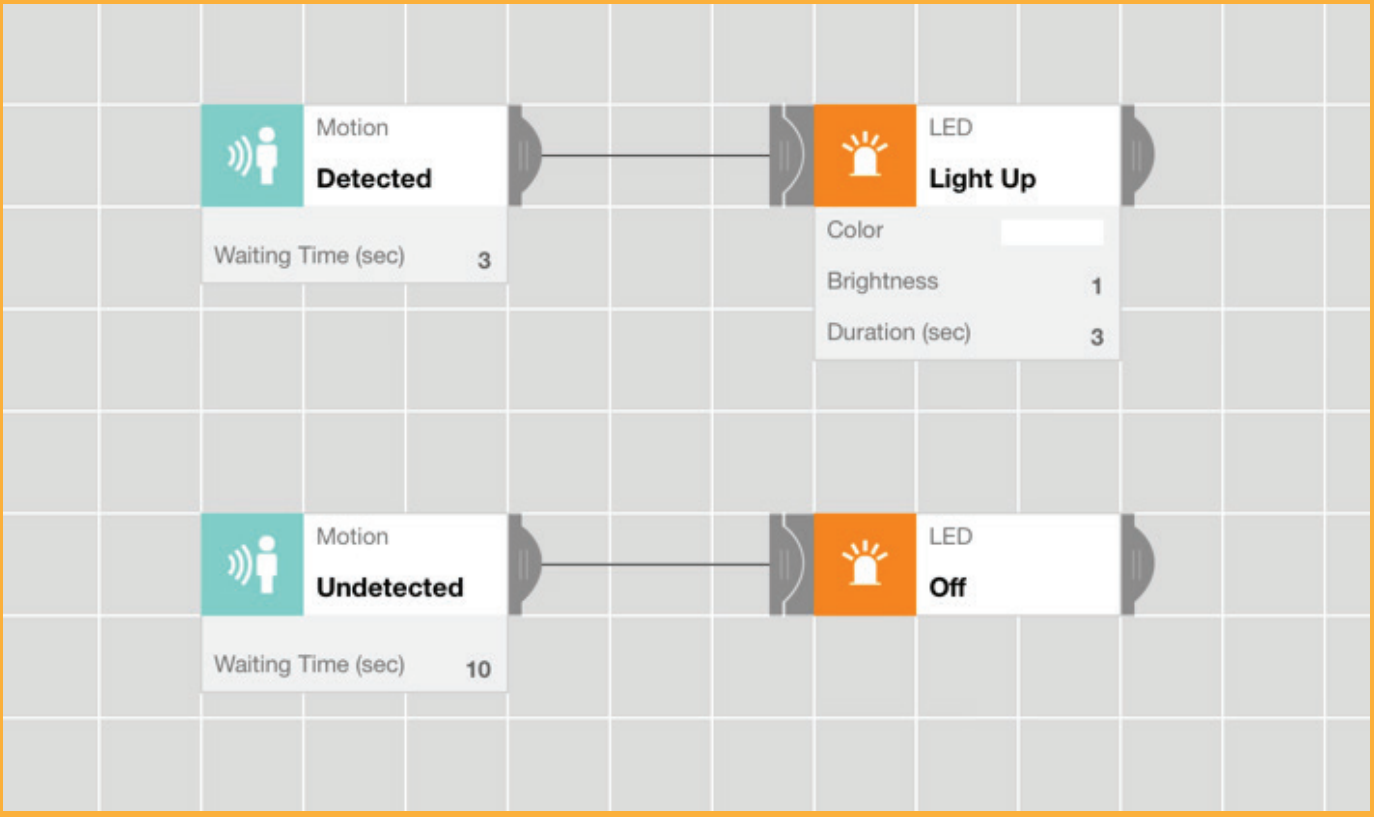
Challenge 12



Challenge 13

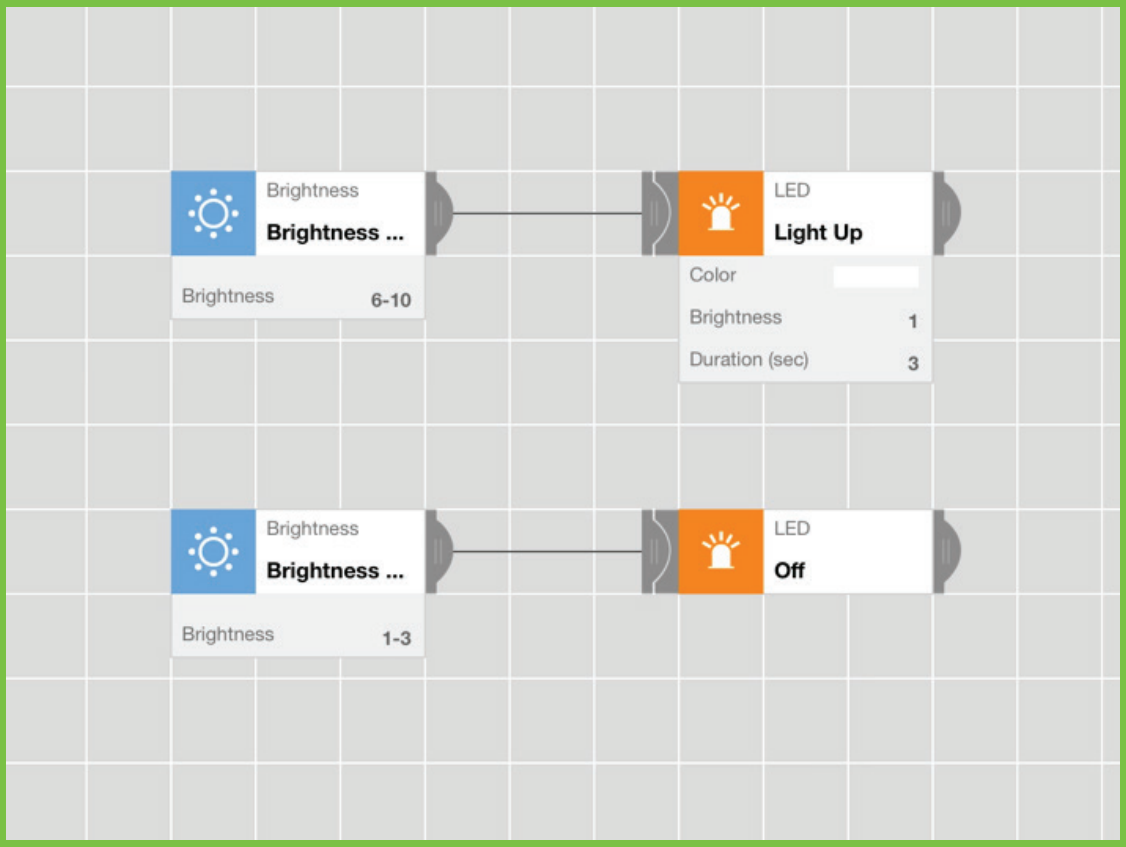


Challenge 14

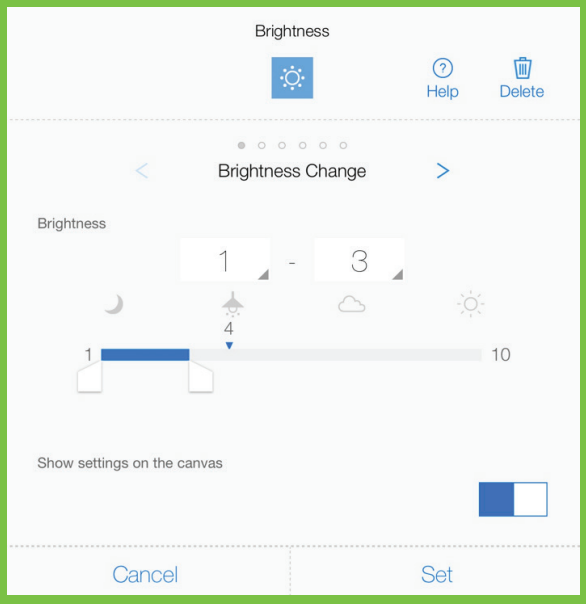


This is only an example. There are many ways to design the smart light bulb so there can be multiple answers.

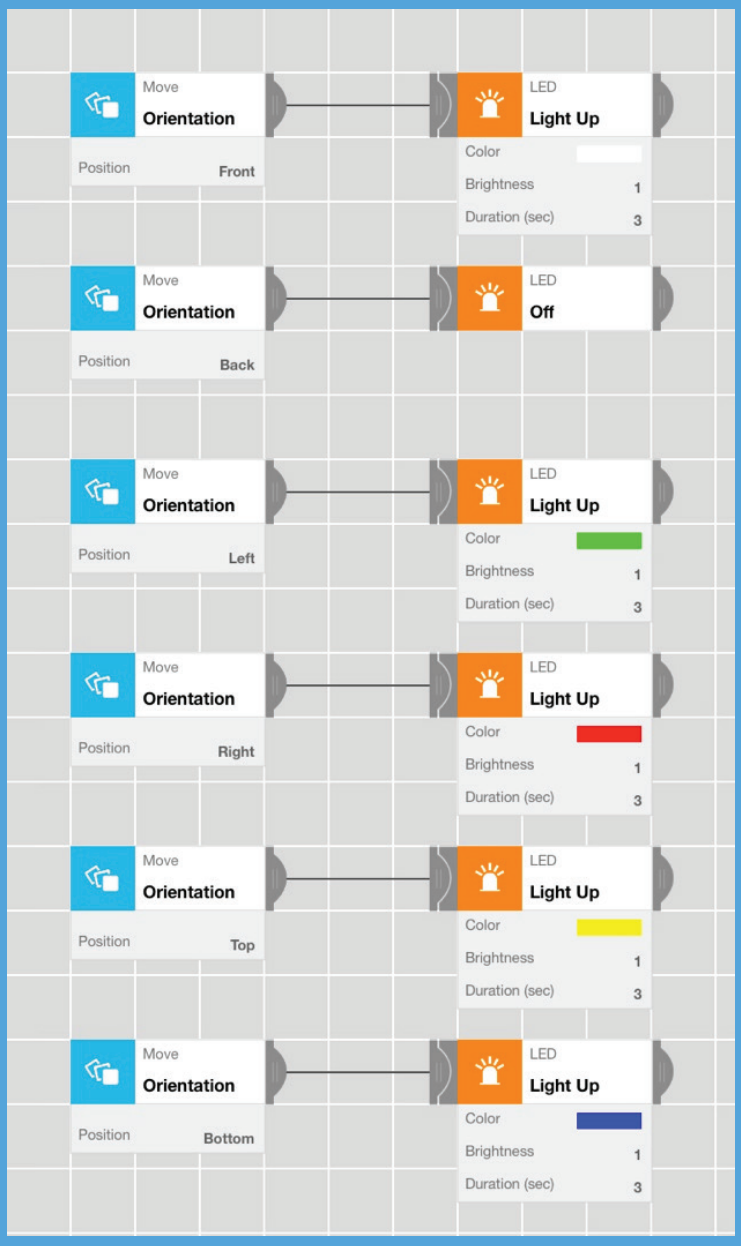
Challenge 15

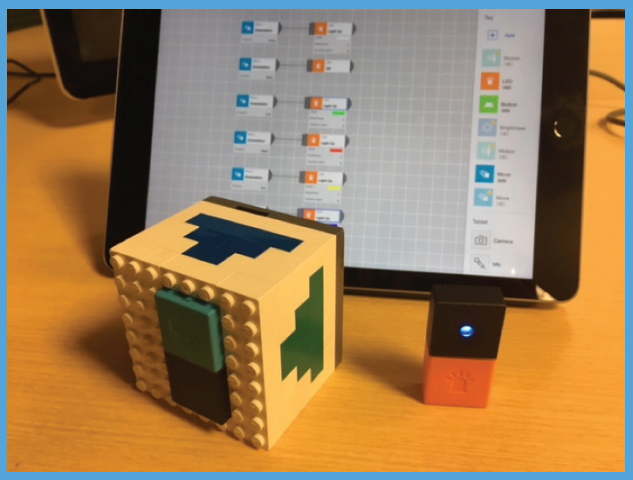


Check out the functionality settings of the Brightness block.



Challenge 16

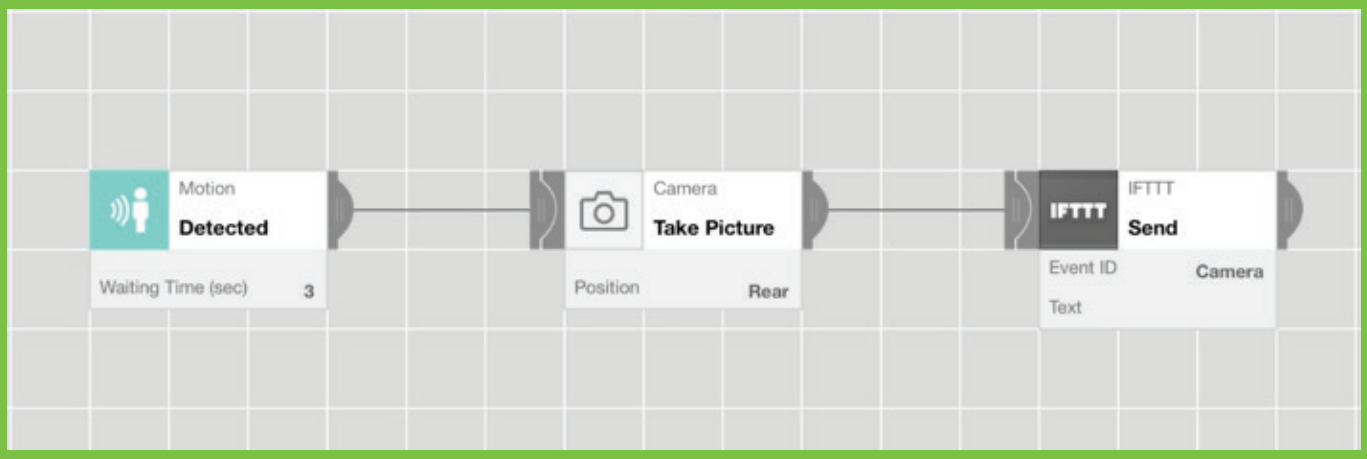




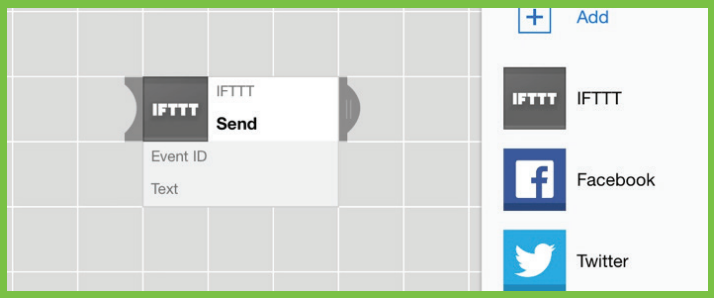
This cube remote changes the color of the LED light depending on which side is facing up.

The cube remote uses *MESH Move* block to detect the *orientation* of the cube and trigger the corresponding color.

Challenge 17

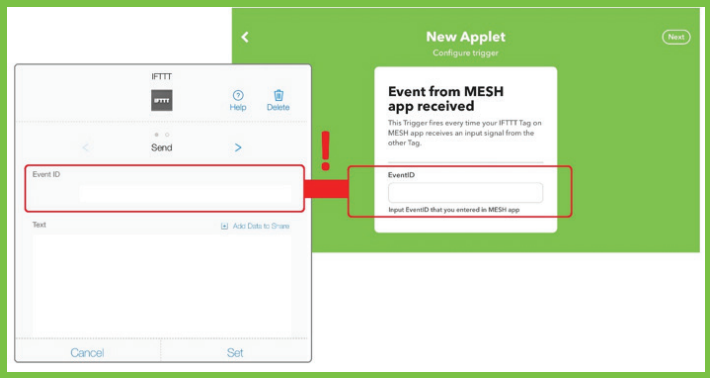


Use an IFTTT block in the "+" expansion area of the dashboard in the app.



Event ID on IFTTT
You can create any Event ID for this program.

We recommend using "Camera-Email" for the Event ID because it is descriptive and you will receive an email to your IFTTT-registered email address.



MESH™

We hope you enjoyed exploring computational thinking skills!

Discover more MESH blocks and save 5% at meshprj.com with promo code:

MESHguide01