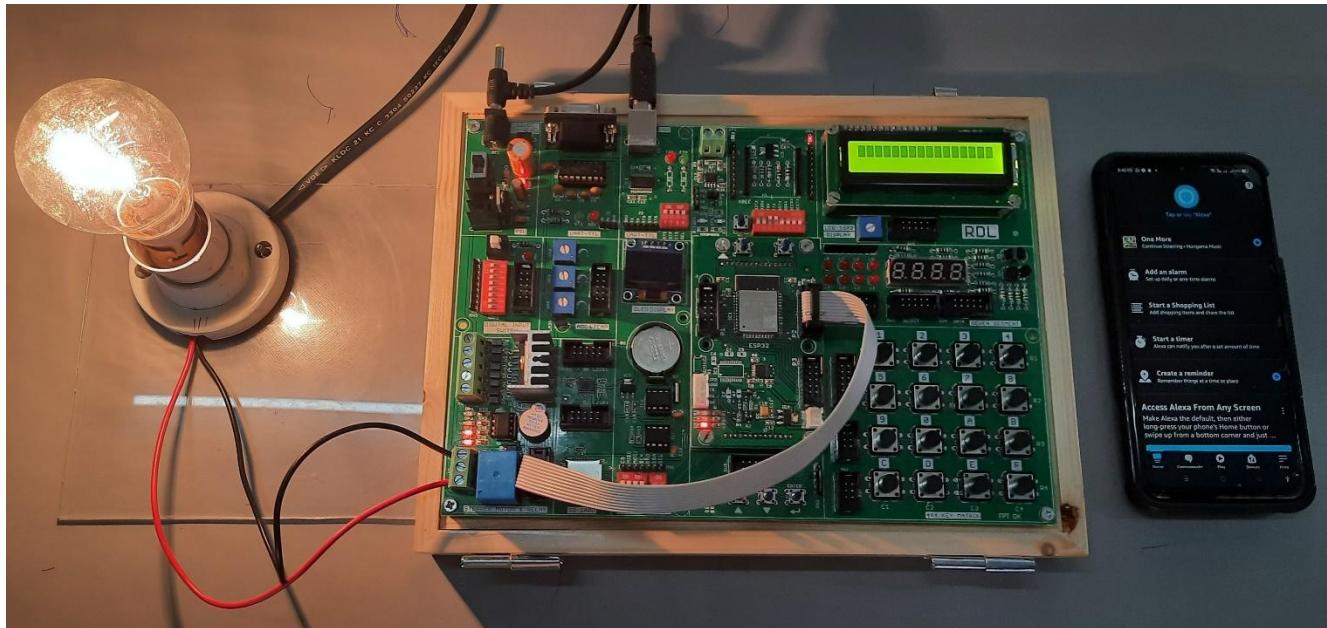




VOICE CONTROLLED APPLIANCES USING ALEXA AND ESP32 CONTROLLER



DOCUMENT VERSION: 1.0

- Switch off the supply voltage of this product as well as of attached devices before connecting or disconnecting them.
- Always use insulated tools while working.
- Do not touch any components of the board in open hand during power ON



Table of Contents

Contents

1.	INTRODUCTION	3
2.	LEARNING OBJECTIVE	3
3.	REQUIRED COMPONENTS	4
4.	REQUIRED CLOUD SERVICES	5
5.	BLOCK DIAGRAM	5
6.	PROCEDURE	6
6.1 :	Setting up Adafruit IO:	6
6.2 :	Setting up IFTTT:	12
6.3 :	Setting up ESP32 Development Kit:	20
6.4 :	Code:	20
6.5 :	Setting up Amazon Alexa:	22
7.	RESULT	23

1. INTRODUCTION

How to interface Amazon Alexa to control Bulb. By using this OFF).

For more information about available in the link below.

to the ESP32 Development Board power can be controlled (ON /

ESP32 Development Kit is



<https://www.researchdesignlab.com/projects/ESP32%20User%20Manual-V1.0.pdf>

2. LEARNING OBJECTIVE

- How to interface MQTT protocol and how to use it.
- Creating Applets, Trigger and connecting to Amazon Alexa Account in IFTTT.
- How to use Amazon Alexa in Appliances.
- Alexa recognizes the speech and sends command to the Appliances .

3. REQUIRED COMPONENTS

<u>ESP32 Development Board</u>	
<u>FRC Cable</u>	
<u>USB Cable</u>	
<u>Bulb</u>	
<u>Mobile Phone</u>	

4. REQUIRED CLOUD SERVICES

Adafruit IO :

To create manual setup to turn on and off the **Bulb**. **And it receives the data from IFTTT and sends the data to ESP32 Development Kit.** It is advantage is that it is an **Open Source**.

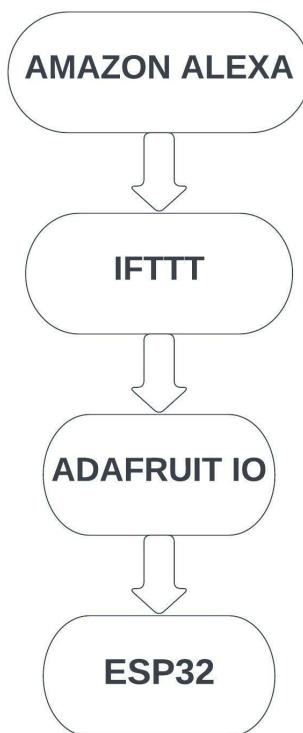
IFTTT :

To create the phrases and Feed data to Amazon Alexa. (**Note:** Only **5 Applets** are free to use. If you need more **Applets** you need to **Pay**)

Amazon Alexa :

To give voice commands to the **ESP32 Kit** to turn ON/OFF the **Bulb**. It is an **Open Source**.

5. BLOCK DIAGRAM

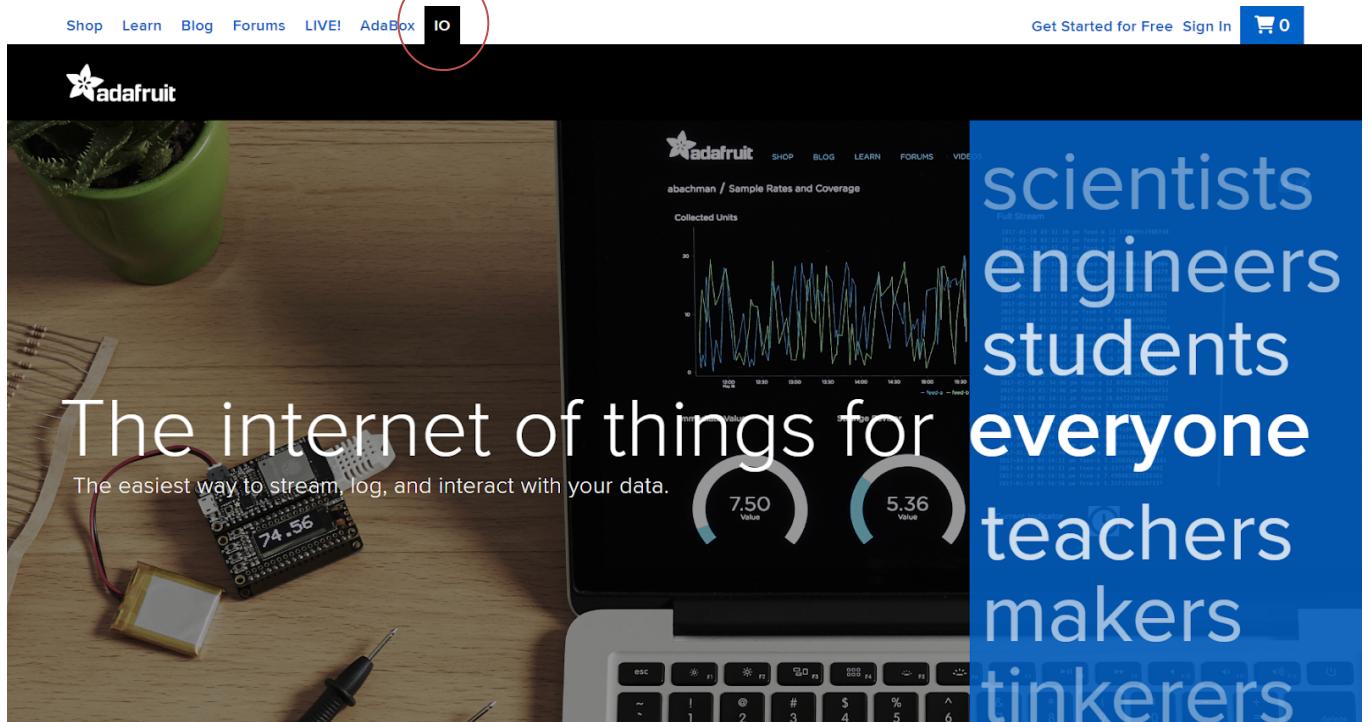


Working Block Diagram

6. PROCEDURE

6.1: Setting up Adafruit IO:

Open **Google Chrome** and Paste the URL ([Welcome to Adafruit IO](#)) given. Then click on **IO** Tab.



Scroll Down to Get Started For Free Account.

Our pricing is as simple as our API.

Try Adafruit IO for free. Unlock its full potential for \$10 per month.

Get Started FREE <small>forever</small> <ul style="list-style-type: none"> 30 data points per minute 30 days of data storage Actions every 15 minutes 5 dashboard limit 2 WipperSnapper device limit 5 group limit 10 feed limit 	Power Up \$10 or \$99 <small>per month per year</small> <ul style="list-style-type: none"> 60 data points per minute 60 days of data storage Actions every 5 seconds Unlimited dashboards Unlimited WipperSnapper devices Unlimited groups Unlimited feeds
--	---

[Sign Up Now](#)

Sign Up for creating a New Account .

SIGN UP

The best way to shop with Adafruit is to create an account which allows you to shop faster, track the status of your current orders, review your previous orders and take advantage of our other member benefits.

FIRST NAME

LAST NAME

EMAIL

✓

USERNAME

✓

Username is viewable to the public on the forums, Adafruit IO, and elsewhere.

PASSWORD

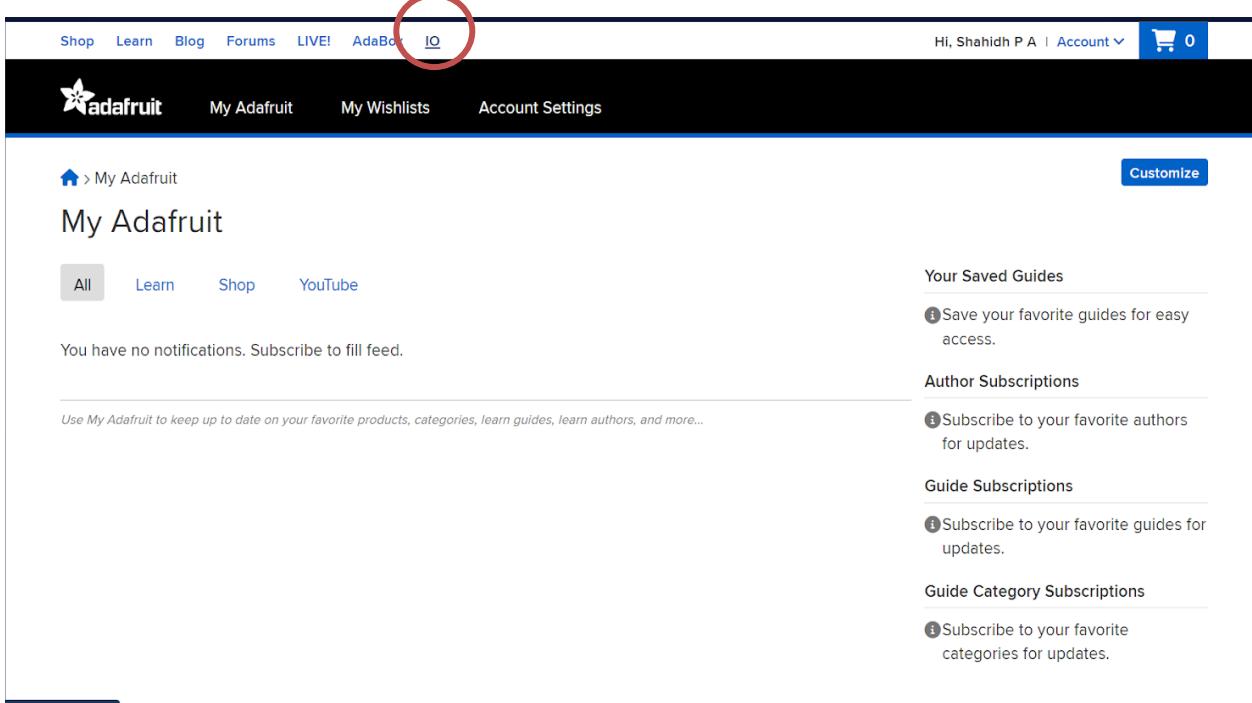
✓

CREATE ACCOUNT

HAVE AN ADAFRUIT ACCOUNT?

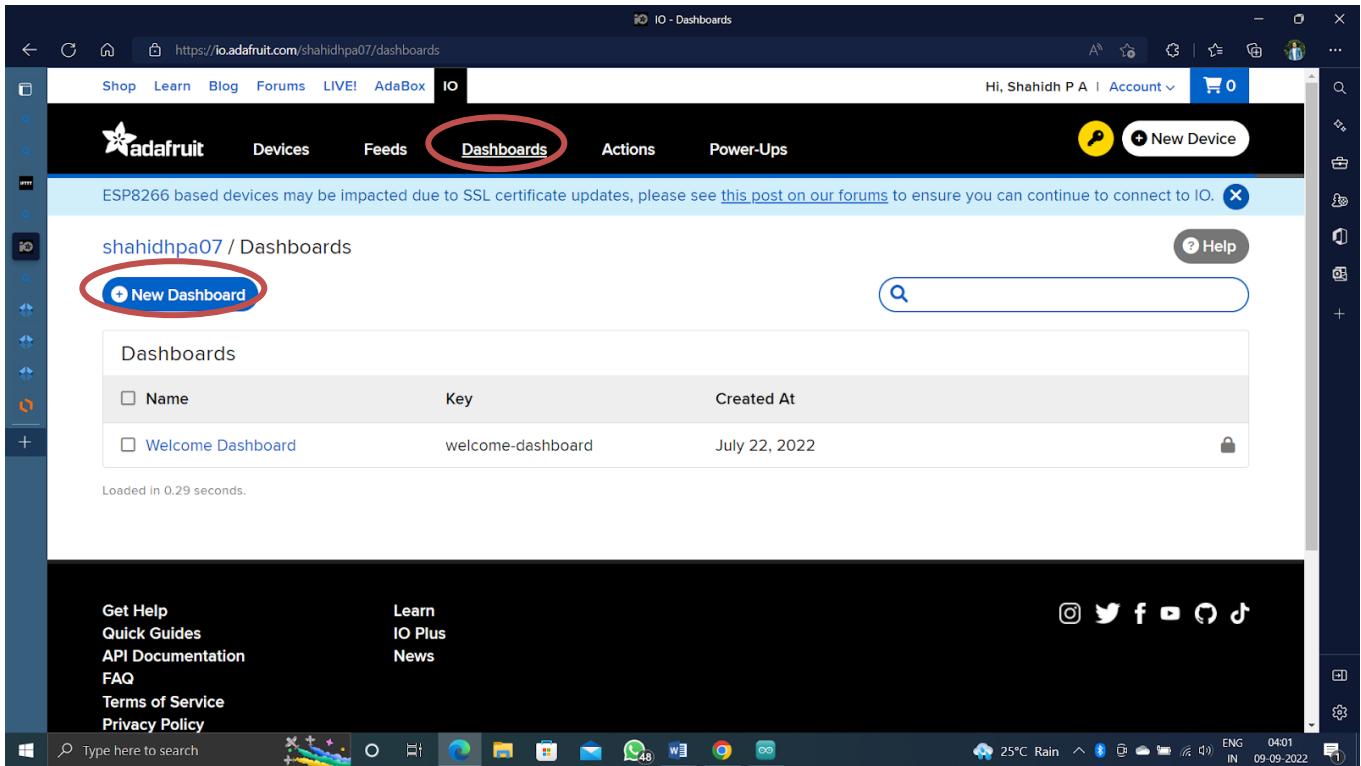
SIGN IN

After signing in this page will be displayed and go to **IO Tab**.



The screenshot shows the Adafruit My Adafruit dashboard. At the top, there is a navigation bar with links: Shop, Learn, Blog, Forums, LIVE!, AdaBots, and IO. The IO link is circled in red. To the right of the navigation bar, it says "Hi, Shahidh P A | Account" and shows a shopping cart icon with "0". Below the navigation bar, there is a "Customize" button. The main content area is titled "My Adafruit". It has tabs for All, Learn, Shop, and YouTube. A message states "You have no notifications. Subscribe to fill feed.". A note below says "Use My Adafruit to keep up to date on your favorite products, categories, learn guides, learn authors, and more...". On the right side, there are several sections: "Your Saved Guides" (with a note about saving favorite guides), "Author Subscriptions" (with a note about subscribing to favorite authors), "Guide Subscriptions" (with a note about subscribing to favorite guides), and "Guide Category Subscriptions" (with a note about subscribing to favorite categories). At the bottom left, there is a link to "https://io.adafruit.com".

Next click on **Dashboards** and click on **New Dashboards**.



The screenshot shows the Adafruit IO web interface. At the top, there's a navigation bar with links for Shop, Learn, Blog, Forums, LIVE!, AdaBox, and IO. The IO icon is highlighted. On the right, it says "Hi, Shahidh P A | Account" and shows a cart with 0 items. Below the navigation is a dark header with the Adafruit logo, Devices, Feeds, Dashboards (which is circled in red), Actions, and Power-Ups. A message about SSL certificate updates is displayed. The main content area shows "shahidhpa07 / Dashboards" and a "New Dashboard" button (also circled in red). A table lists existing dashboards: "Welcome Dashboard" (welcome-dashboard, created July 22, 2022). The bottom of the screen shows a Windows taskbar with various icons and a system tray indicating 25°C Rain, ENG IN, and the date 09-09-2022.

Then Name and Describe the **Dashboard** and Create it.

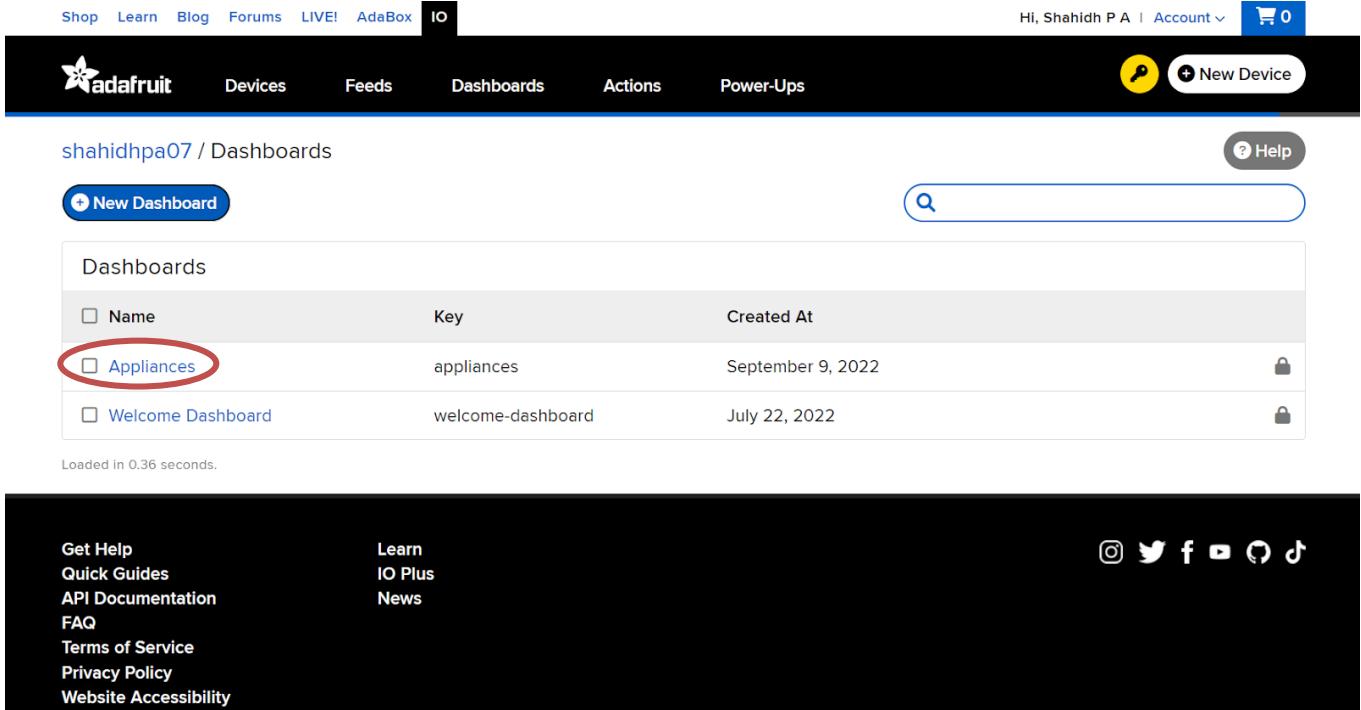
Create a new Dashboard

Name

Description

Cancel
Create

Now there is a **Dashboard** named as **Appliances**. Then click on the **Appliances Dashboard**.



The screenshot shows the Adafruit IO web interface. At the top, there is a navigation bar with links for Shop, Learn, Blog, Forums, LIVE!, AdaBox, and IO. On the right side of the top bar, it says "Hi, Shahidh P A | Account" and shows a shopping cart icon with "0". Below the top bar is a secondary navigation bar with links for Adafruit, Devices, Feeds, Dashboards, Actions, and Power-Ups. To the right of this bar are icons for a key and a plus sign, followed by "New Device". The main content area has a breadcrumb trail "shahidhpa07 / Dashboards". On the left, there is a button labeled "+ New Dashboard". In the center, there is a search bar with a magnifying glass icon. The main table lists dashboards with columns for Name, Key, and Created At. The "Appliances" row is highlighted with a red circle around its "Name" column. At the bottom of the page, there is a footer with links for Get Help, Quick Guides, API Documentation, FAQ, Terms of Service, Privacy Policy, and Website Accessibility. There are also links for Learn, IO Plus, and News. On the far right of the footer are social media icons for Instagram, Twitter, Facebook, YouTube, GitHub, and TikTok.

Name	Key	Created At
Appliances	appliances	September 9, 2022
Welcome Dashboard	welcome-dashboard	July 22, 2022

Loaded in 0.36 seconds.

Then go to the **Settings** button and create a **Create New Block**.



Dashboard Settings

Edit Layout

+ Create New Block

View Fullscreen

Dark Mode

Block Borders

Dashboard Privacy

Delete Dashboard

Get Help
Quick Guides
API Documentation
FAQ
Terms of Service
Privacy Policy
Website Accessibility

Learn
IO Plus
News

Select any **Block** (For example **Toggle**)

Create a new block



Click on the block you would like to add to your dashboard. You can always come back and switch the block type later if you change your mind.

Toggle

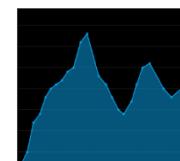
ON

RESET

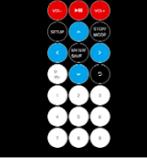


HELLO WORLD!

```
2015-09-11 15:53:01 - 99  
2015-09-11 15:53:02 - 98  
2015-09-11 15:53:03 - 97  
2015-09-11 15:53:04 - 96  
2015-09-11 15:53:05 - 95  
2015-09-11 15:53:06 - 94  
2015-09-11 15:53:07 - 93  
2015-09-11 15:53:08 - 92  
2015-09-11 15:53:09 - 91  
2015-09-11 15:53:10 - 90  
2015-09-11 15:53:11 - 89  
2015-09-11 15:53:12 - 88  
2015-09-11 15:53:13 - 87  
2015-09-11 15:53:14 - 86  
2015-09-11 15:53:15 - 85  
2015-09-11 15:53:16 - 84  
2015-09-11 15:53:17 - 83  
2015-09-11 15:53:18 - 82  
2015-09-11 15:53:19 - 81  
2015-09-11 15:53:20 - 80  
2015-09-11 15:53:21 - 79  
2015-09-11 15:53:22 - 78  
2015-09-11 15:53:23 - 77  
2015-09-11 15:53:24 - 76  
2015-09-11 15:53:25 - 75  
2015-09-11 15:53:26 - 74  
2015-09-11 15:53:27 - 73  
2015-09-11 15:53:28 - 72  
2015-09-11 15:53:29 - 71  
2015-09-11 15:53:30 - 70  
2015-09-11 15:53:31 - 69  
2015-09-11 15:53:32 - 68  
2015-09-11 15:53:33 - 67  
2015-09-11 15:53:34 - 66  
2015-09-11 15:53:35 - 65  
2015-09-11 15:53:36 - 64  
2015-09-11 15:53:37 - 63  
2015-09-11 15:53:38 - 62  
2015-09-11 15:53:39 - 61  
2015-09-11 15:53:40 - 60  
2015-09-11 15:53:41 - 59  
2015-09-11 15:53:42 - 58  
2015-09-11 15:53:43 - 57  
2015-09-11 15:53:44 - 56  
2015-09-11 15:53:45 - 55  
2015-09-11 15:53:46 - 54  
2015-09-11 15:53:47 - 53  
2015-09-11 15:53:48 - 52  
2015-09-11 15:53:49 - 51  
2015-09-11 15:53:50 - 50  
2015-09-11 15:53:51 - 49  
2015-09-11 15:53:52 - 48  
2015-09-11 15:53:53 - 47  
2015-09-11 15:53:54 - 46  
2015-09-11 15:53:55 - 45  
2015-09-11 15:53:56 - 44  
2015-09-11 15:53:57 - 43  
2015-09-11 15:53:58 - 42  
2015-09-11 15:53:59 - 41  
2015-09-11 15:53:00 - 40  
2015-09-11 15:53:01 - 39  
2015-09-11 15:53:02 - 38  
2015-09-11 15:53:03 - 37  
2015-09-11 15:53:04 - 36  
2015-09-11 15:53:05 - 35  
2015-09-11 15:53:06 - 34  
2015-09-11 15:53:07 - 33  
2015-09-11 15:53:08 - 32  
2015-09-11 15:53:09 - 31  
2015-09-11 15:53:10 - 30  
2015-09-11 15:53:11 - 29  
2015-09-11 15:53:12 - 28  
2015-09-11 15:53:13 - 27  
2015-09-11 15:53:14 - 26  
2015-09-11 15:53:15 - 25  
2015-09-11 15:53:16 - 24  
2015-09-11 15:53:17 - 23  
2015-09-11 15:53:18 - 22  
2015-09-11 15:53:19 - 21  
2015-09-11 15:53:20 - 20  
2015-09-11 15:53:21 - 19  
2015-09-11 15:53:22 - 18  
2015-09-11 15:53:23 - 17  
2015-09-11 15:53:24 - 16  
2015-09-11 15:53:25 - 15  
2015-09-11 15:53:26 - 14  
2015-09-11 15:53:27 - 13  
2015-09-11 15:53:28 - 12  
2015-09-11 15:53:29 - 11  
2015-09-11 15:53:30 - 10  
2015-09-11 15:53:31 - 9  
2015-09-11 15:53:32 - 8  
2015-09-11 15:53:33 - 7  
2015-09-11 15:53:34 - 6  
2015-09-11 15:53:35 - 5  
2015-09-11 15:53:36 - 4  
2015-09-11 15:53:37 - 3  
2015-09-11 15:53:38 - 2  
2015-09-11 15:53:39 - 1  
2015-09-11 15:53:40 - 0
```



#00ACEC

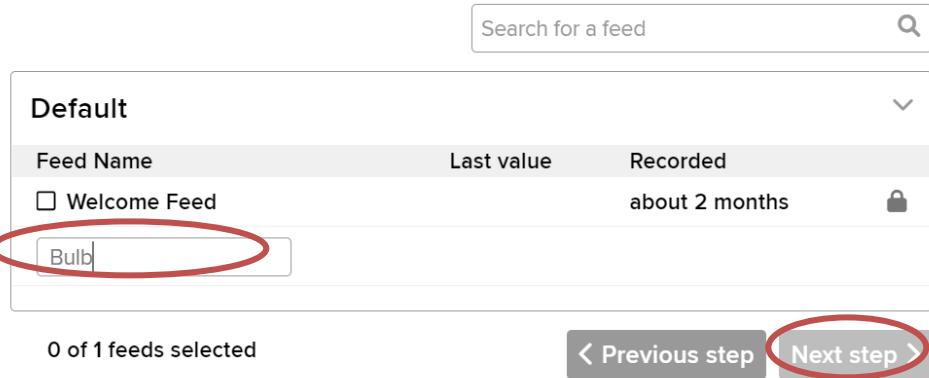


Next Enter New Feed Name. For Example **Bulb**. Then click on **Enter**. Then click on the Feed named **Bulb** and click on the **Next Step** as shown in the image below.

Connect a Feed

A toggle button is useful if you have an ON or OFF type of state. You can configure what values are sent on press and release.

Choose a single feed you would like to connect to this toggle. You can also create a new feed within a group.



Search for a feed

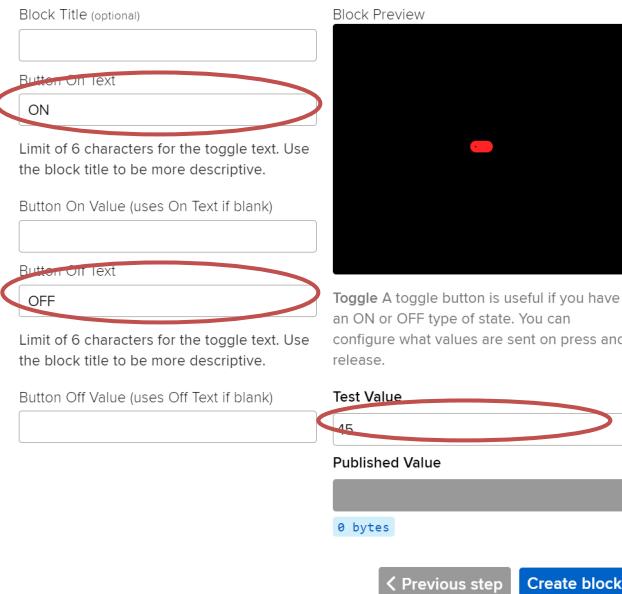
Feed Name	Last value	Recorded
<input type="checkbox"/> Welcome Feed		about 2 months 
Bulb		

Default

0 of 1 feeds selected

< Previous step **Next step >**

Change the **Button On Text** to **1** and **Button Off Text** to **0**. Change the **Test Value** as **0**. Then Create Block.



Block Title (optional)

Button On Text

ON

Limit of 6 characters for the toggle text. Use the block title to be more descriptive.

Button On Value (uses On Text if blank)

Button Off Text

OFF

Limit of 6 characters for the toggle text. Use the block title to be more descriptive.

Button Off Value (uses Off Text if blank)

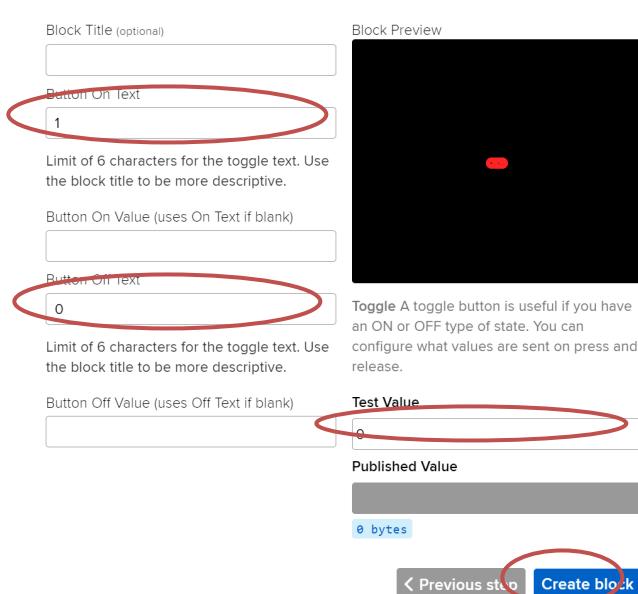
Test Value

45

Published Value

0 bytes

< Previous step **Create block**



Block Title (optional)

Block Preview

Block Title (optional)

Block Preview

Button On Text

1

Limit of 6 characters for the toggle text. Use the block title to be more descriptive.

Button On Value (uses On Text if blank)

Button Off Text

0

Limit of 6 characters for the toggle text. Use the block title to be more descriptive.

Button Off Value (uses Off Text if blank)

Test Value

0

Published Value

0 bytes

< Previous step **Create block**

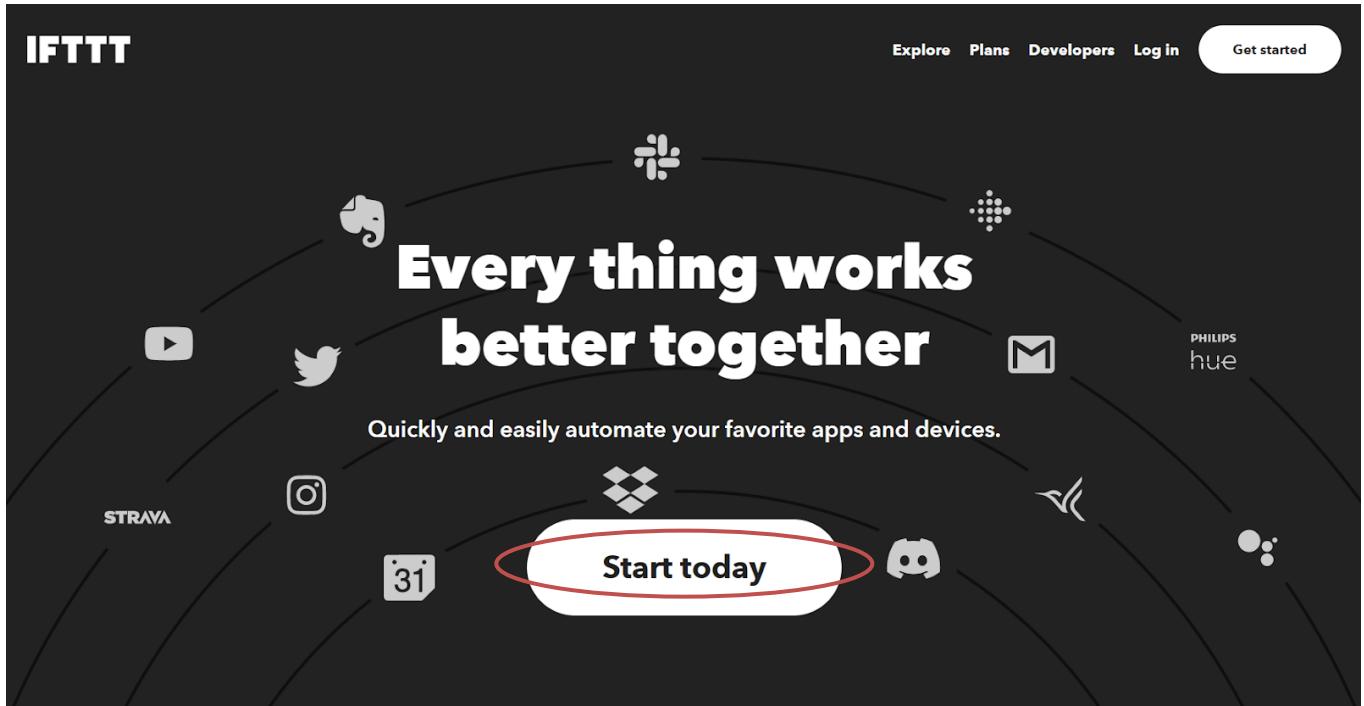
Similarly **Create New Block** for another **Toggle** if you need.



The procedures of **Adafruit IO** is completed.

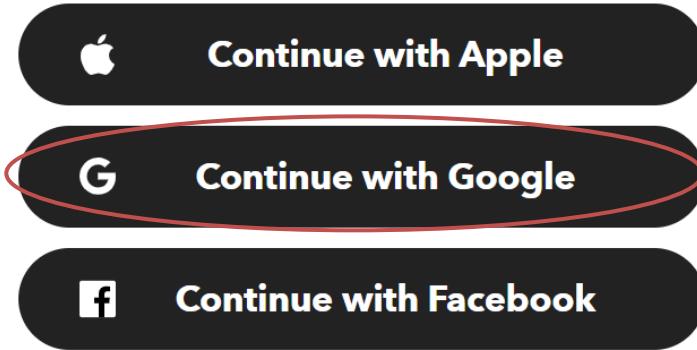
6.2: Setting up IFTTT:

Open the Google Chrome and paste the URL for IFTTT (<https://ifttt.com/>). Click on **Start today**.



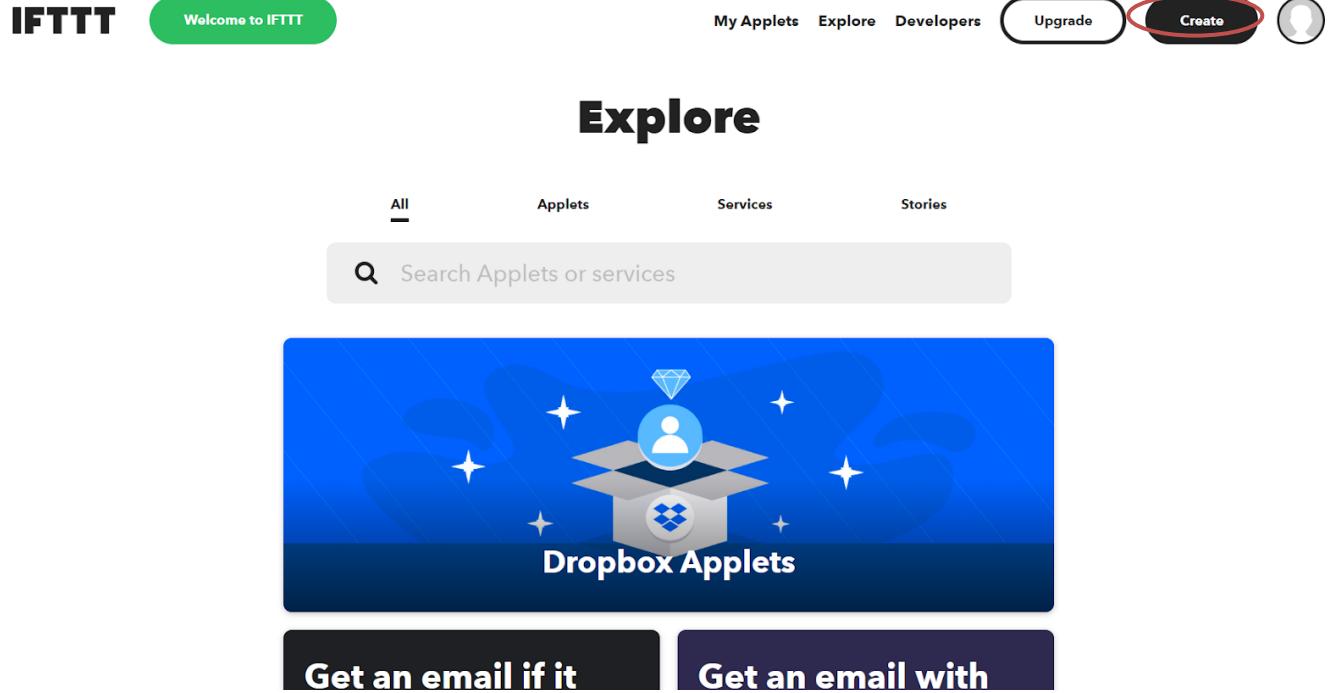
Then **Continue with Google** to create an account. Then sign in with credentials (Create Amazon Account if needed and sign in).

Get started with IFTTT



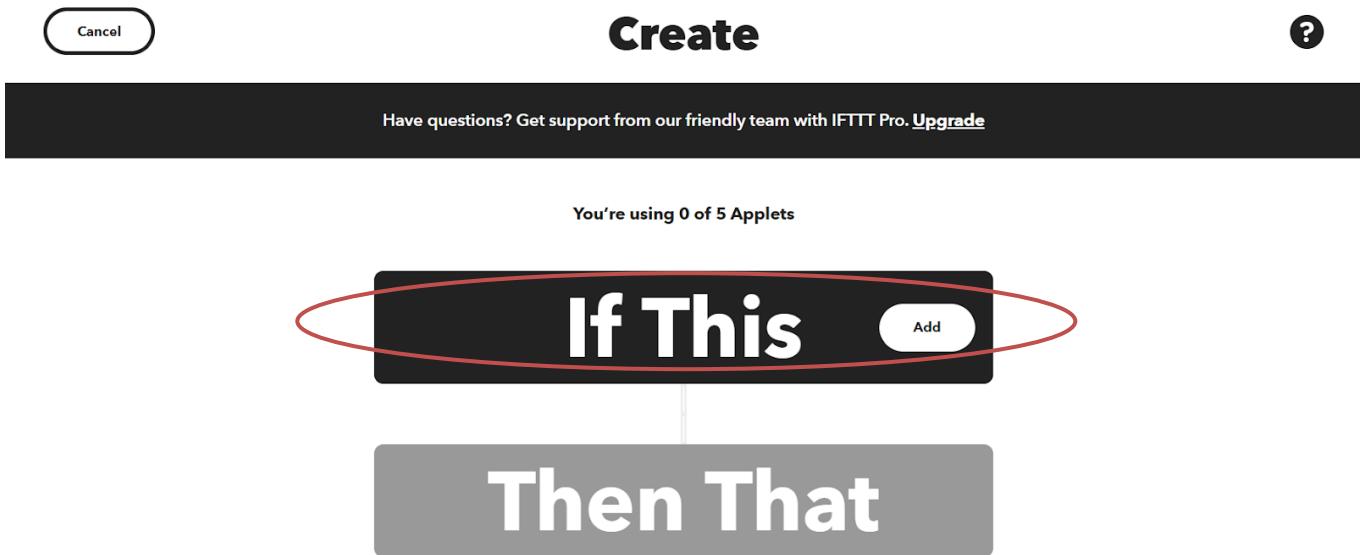
Or use your email to [sign up](#) or [log in](#)

Then the Home Page will open and then Click on **Create**.



The screenshot shows the IFTTT Explore page. At the top right, there are buttons for "Upgrade", "Create" (which is circled in red), and a profile icon. Below the header, there are tabs for "All", "Applets", "Services", and "Stories". A search bar with the placeholder "Search Applets or services" is centered. A large blue banner for "Dropbox Applets" is displayed, featuring a person icon inside a box with a diamond above it, and the text "Dropbox Applets". Below the banner are two buttons: "Get an email if it" and "Get an email with".

Click on **Add**.

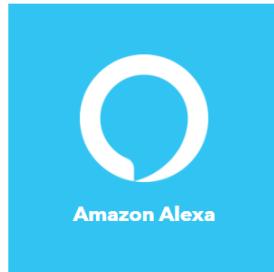


The screenshot shows the IFTTT Create page. At the top left is a "Cancel" button, and at the top right is a help icon. A black bar at the top contains the text "Have questions? Get support from our friendly team with IFTTT Pro. [Upgrade](#)". Below this, a message says "You're using 0 of 5 Applets". The main interface consists of two large buttons: a black "If This" button at the top and a grey "Then That" button below it. Both buttons have a red oval highlighting the "If This" button.

Then choose a service as **Amazon Alexa**.

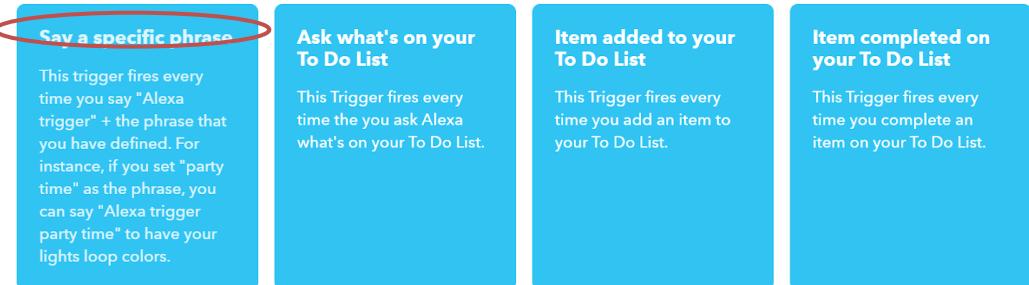
Choose a service

Q **Amazon Alexa**



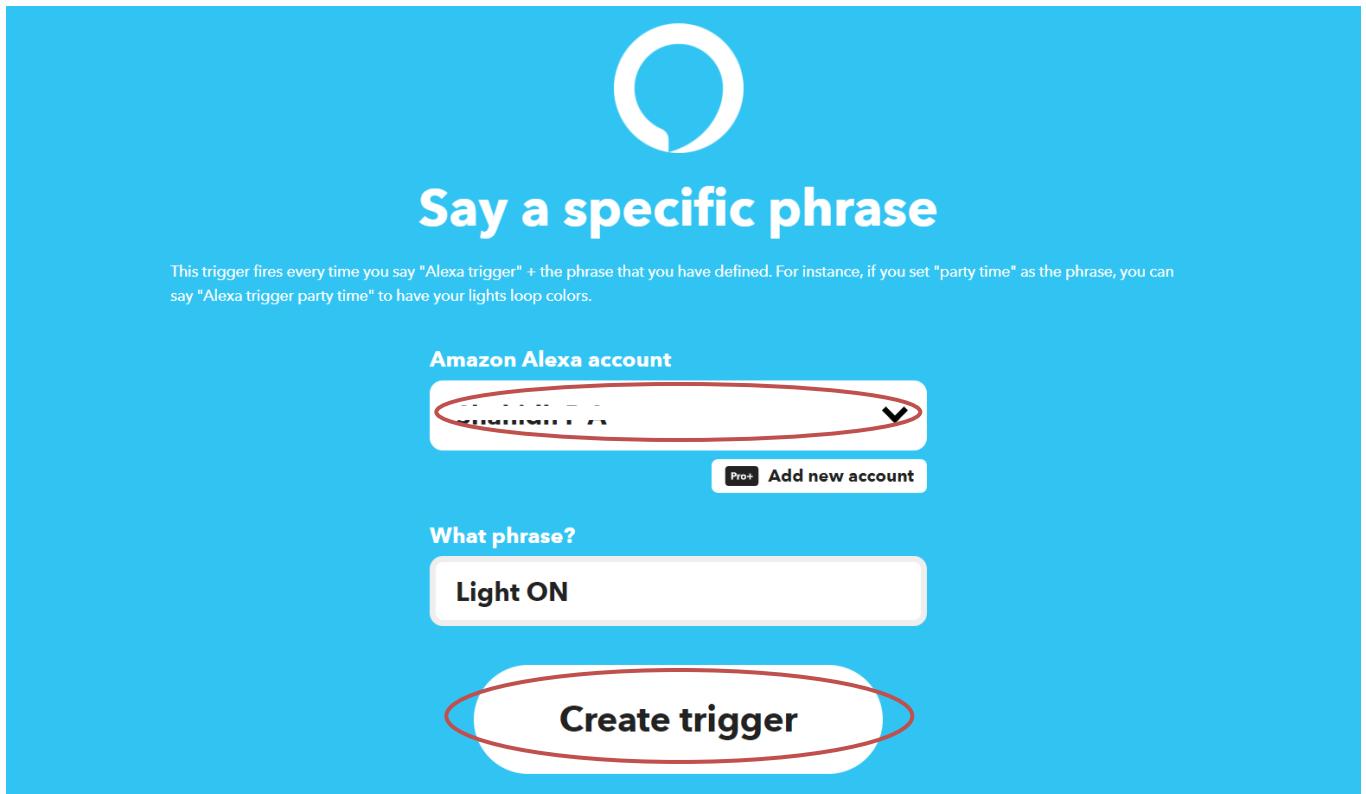
Choose a Trigger “Say a Specific Phrase”

Amazon Alexa

A screenshot of a mobile application interface showing trigger options for the Amazon Alexa service. A red circle highlights the first option, "Say a specific phrase".

Say a specific phrase	Ask what's on your To Do List	Item added to your To Do List	Item completed on your To Do List
This trigger fires every time you say "Alexa trigger" + the phrase that you have defined. For instance, if you set "party time" as the phrase, you can say "Alexa trigger party time" to have your lights loop colors.	This Trigger fires every time the you ask Alexa what's on your To Do List.	This Trigger fires every time you add an item to your To Do List.	This Trigger fires every time you complete an item on your To Do List.

Select the **Amazon Alexa Account** and name a phrase for the trigger and **Create Trigger**.



Click on **Add**

You're using 0 of 5 Applets

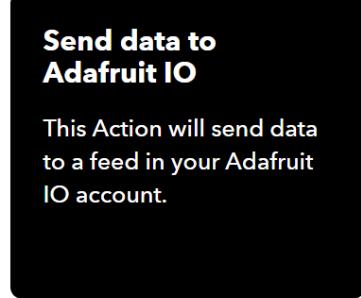
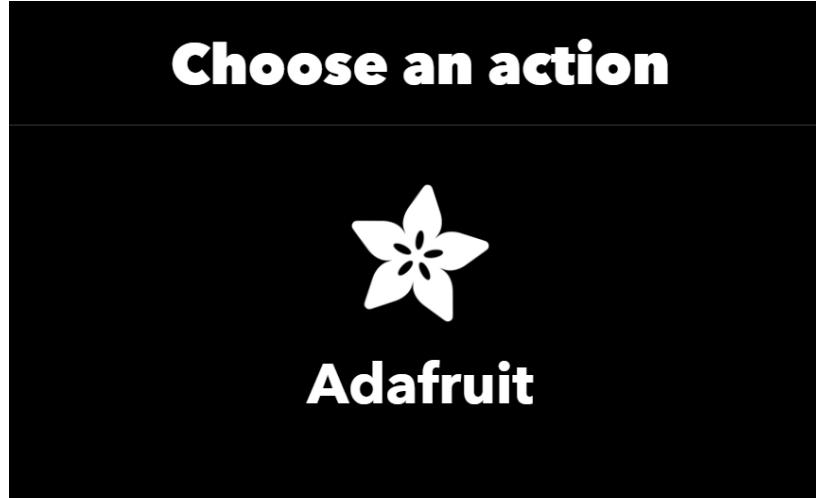


Choose a service as Adafruit.

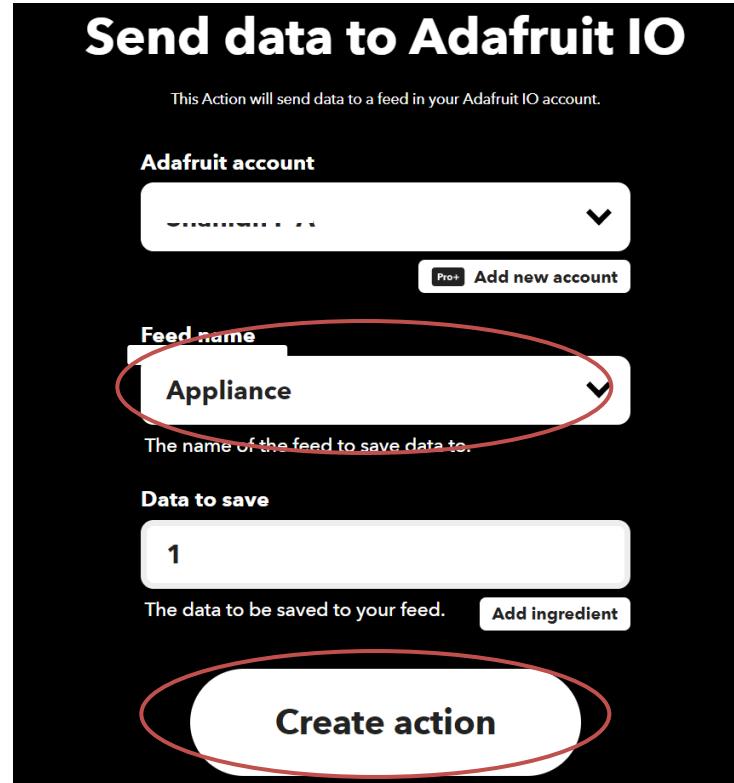
Choose a service



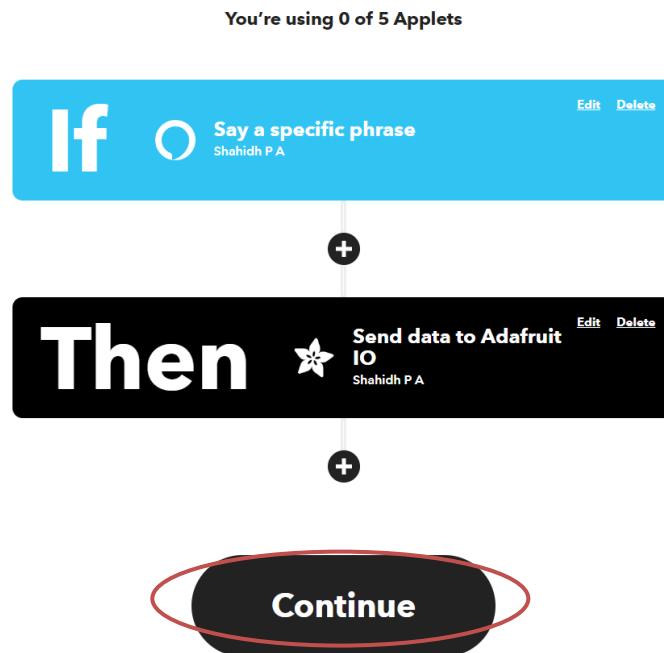
Select “Send data to Adafruit IO”



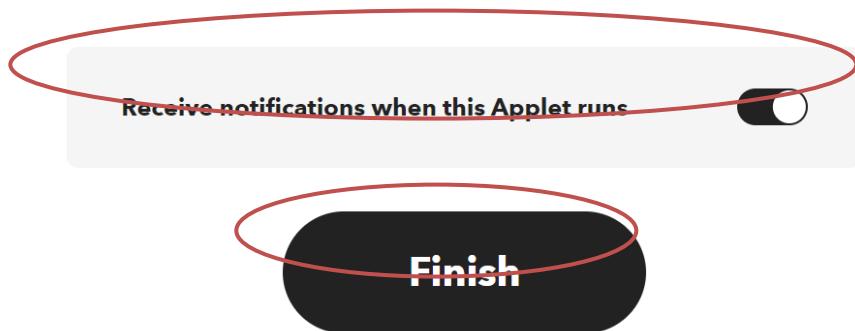
Select the **Adafruit Account**, then Select the **Feed Name** and **Data to save as 1**.



Then Click **Continue** button.



Turn on **Receive notification when this Applets runs**. Then click on **Finish** button.



Then Light ON will be connected.



Similarly create another trigger for **Light OFF** (Put **0** instead of **1** in **Data to save**). And see the results in **My Applets**.

My Applets



Filter

[All \(2 of 5\)](#) [Published](#) [Archive](#)[Get Pro to get 20 Applets](#)

If You say "Alexa trigger Light OFF", then Send data to Appliance feed

by shahidhpa07

Connected



1



If You say "Alexa trigger Light ON", then Send data to Appliance feed

by shahidhpa07

Connected

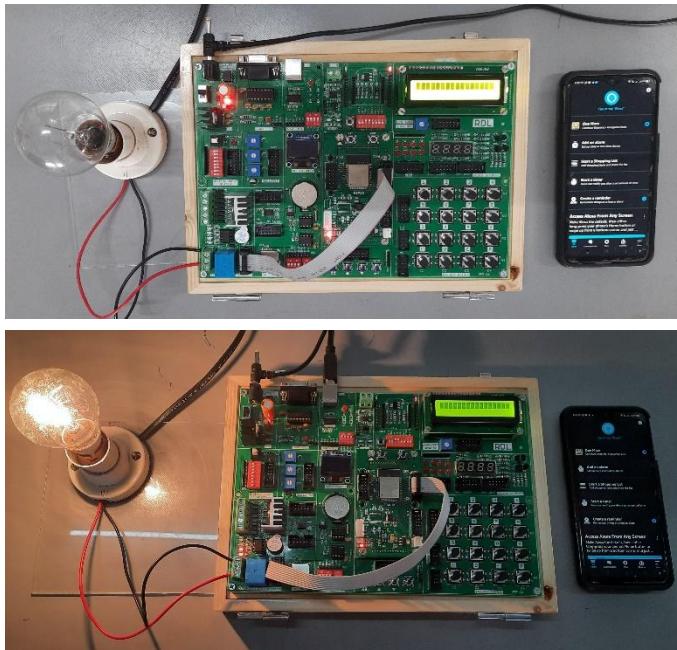


1



The procedure for IFTTT is completed. And then take the ESP32 Development board and connect Light to that board.

6.3: Setting up ESP32 Development Kit:



1. Connect Bulb for the Setup as shown above.
2. Connect the USB cable to the board.
3. Open Arduino IDE. Select DOIT ESP32 DEVKIT V1 in boards and select COM port.
4. Now write the program, verify and Upload it.
5. Now you can see the Blub blink on and off the ESP32 development board.

6.4: CODE

```
#include <WiFi.h>
#include <Adafruit_MQTT.h>
#include <Adafruit_MQTT_Client.h>

#define light      5

#define WLAN_SSID      "xxxxxxxxxx"          // Your SSID
#define WLAN_PASS      "xxxxxxxxxx"          // Your password

/***************** Adafruit.io Setup *****************/
#define AIO_SERVER      "io.adafruit.com" //Adafruit Server
#define AIO_SERVERPORT  1883
#define AIO_USERNAME    "xxxxxxxxxxxx"      // Username
```

```

#define AIO_KEY          "aioxxxxxxxxxxxxxxxxxxxxxx"    // Auth Key
/*AIO_USERNAME AND AIO_KEY will be getting from Adafruit IO by clicking on Key
Symbol.*/
//WIFI CLIENT
WiFiClient client;

Adafruit_MQTT_Client mqtt(&client, AIO_SERVER, AIO_SERVERPORT, AIO_USERNAME,
AIO_KEY);

Adafruit_MQTT_Subscribe Light1 = Adafruit_MQTT_Subscribe(&mqtt,
AIO_USERNAME"/feeds/Appliance"); // Feeds name should be same everywhere

void MQTT_connect();

void setup() {
  Serial.begin(115200);

  pinMode(light, OUTPUT);

  // Connect to WiFi access point.
  Serial.println(); Serial.println();
  Serial.print("Connecting to ");
  Serial.println(WLAN_SSID);

  WiFi.begin(WLAN_SSID, WLAN_PASS);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println();

  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());

  mqtt.subscribe(&Light1);
  mqtt.subscribe(&Light2);
}

void loop() {

  MQTT_connect();

  Adafruit_MQTT_Subscribe *subscription;
  while ((subscription = mqtt.readSubscription(20000))) {
    if (subscription == &Light1) {
      Serial.print(F("Got: "));
      Serial.println((char *)Light1.lastread);
      int Light1_State = atoi((char *)Light1.lastread);
      digitalWrite(light, Light1_State);
    }
  }
}

```

```

}

}

void MQTT_connect() {
    int8_t ret;

    if (mqtt.connected()) {
        return;
    }

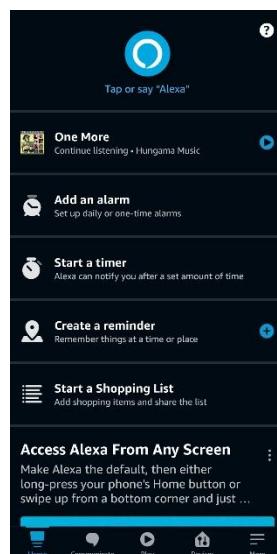
    Serial.print("Connecting to MQTT... ");
    uint8_t retries = 3;

    while ((ret = mqtt.connect()) != 0) {
        Serial.println(mqtt.connectErrorString(ret));
        Serial.println("Retrying MQTT connection in 5 seconds...");
        mqtt.disconnect();
        delay(5000);
        retries--;
        if (retries == 0) {
            while (1);
        }
    }
    Serial.println("MQTT Connected!");
}

```

6.5: Setting up Amazon Alexa:

Install Amazon Alexa Application on your mobile phone using the same credentials you are given previous. Tap or say “Alexa” for example “Alexa, Trigger Light ON”. One of the Bulb will turn on and repeat the same for the other Bulb as well.



7. RESULT

Click on Serial Monitor on Arduino IDE and set the Baud Rate to 115200.

Output Serial Monitor 

Message (Ctrl + Enter to send message to 'DOIT ESP32 DEVKIT V1' on 'COM4')

```
Connecting to realme5pro
.....
WiFi connected
IP address:
192.168.239.132
Connecting to MQTT.... MQTT Connected!
Got: 1
Got: 0
```

