

ASSIGNMENT NO: 03

Aim: Design and implement a real-time monitoring system using android phone (Blynk App.) such as 'soil parameter monitoring'.

Objectives:

1. To learn the interface of sensors and actuators using Arduino Uno/Raspberry Pi.
2. To learn and understand IoT platforms and their significance for real-time applications.

Theory:

Measuring soil moisture is important for agricultural applications to help farmers manage their irrigation systems more efficiently. Knowing the exact soil moisture conditions on their fields, not only are farmers able to generally use less water to grow a crop, but they are also able to increase yields and the quality of the crop by improved management of soil moisture during critical plant growth stages.

Soil moisture sensors measure the volumetric water content in the soil. Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighing of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other properties of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content.

How does Soil Moisture Sensor work?

The fork-shaped probe with two exposed conductors acts as a variable resistor (just like a potentiometer) whose resistance varies according to the water content in the soil. This resistance is inversely proportional to the soil moisture:

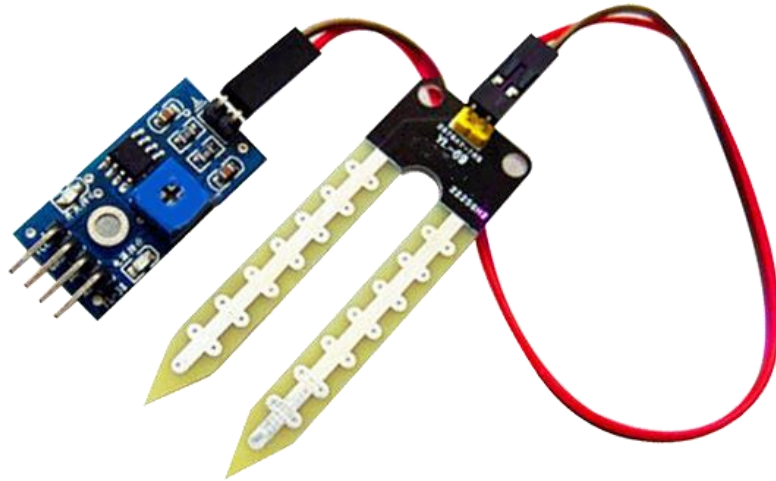
- More water in the soil means better conductivity and will result in a lower resistance.
- The less water in the soil means poor conductivity and will result in higher resistance.

The sensor produces an output voltage according to the resistance, which by measuring we can determine the moisture level.

Hardware Overview:

A typical soil moisture sensor has two components.

1. The Probe: The sensor contains a fork-shaped probe with two exposed conductors that goes into the soil or anywhere else where the water content is to be measured. It acts as a variable resistor whose resistance varies according to the soil moisture.
2. The Module: The sensor also contains an electronic module that connects the probe to the Arduino. The module produces an output voltage according to the resistance of the probe and is made available at an Analog Output (AO) pin. The same signal is fed to an LM393 High Precision Comparator to digitize it and is made available at a Digital Output (DO) pin.



What is Blynk App

Blynk is a Platform with iOS and Android apps to control Arduino, Raspberry Pi, and the likes over the Internet. It's a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets. It's really simple to set everything up and you'll start tinkering in less than 5 mins. Blynk is not tied to some specific board or shield. Instead, it's supporting hardware of your choice. Whether your Arduino or Raspberry Pi is linked to the Internet over Wi-Fi, Ethernet, or this new ESP8266 chip, Blynk will get you online and ready for the Internet Of Your Things.

Why do you use the Blynk app

There are many third-party IoT platforms but I think Blynk is the best since it is very user-friendly. Blynk is not an app that works only with a particular shield. Instead, it's been designed to support the boards and shields you are already using. And it works on iOS and Android.

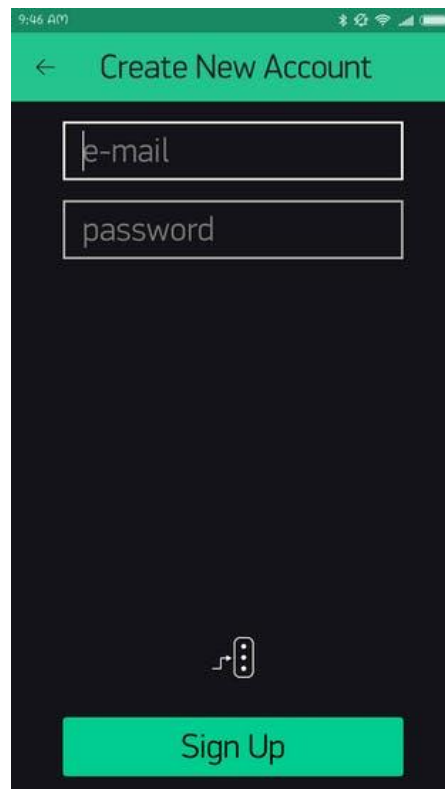
How it works

Blynk works over the Internet. So the only requirement is that your hardware can talk to the Internet. No matter what type of connection you choose - Ethernet, Wi-Fi, or maybe this new ESP8266 everyone is talking about – Blynk libraries and example sketches will get you online, connect to Blynk Server and pair up with your smartphone.

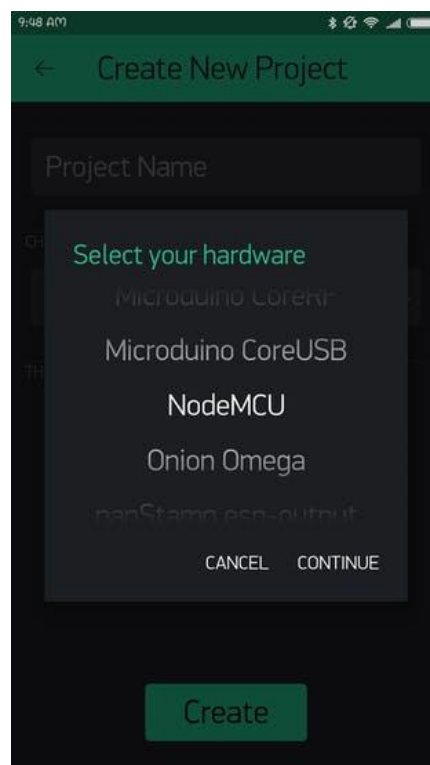
Where to get the app

1. Android Blynk App
2. iOS Blynk App

Or you can download it on Google Play. After you finish your download and install it, you can see this interface:



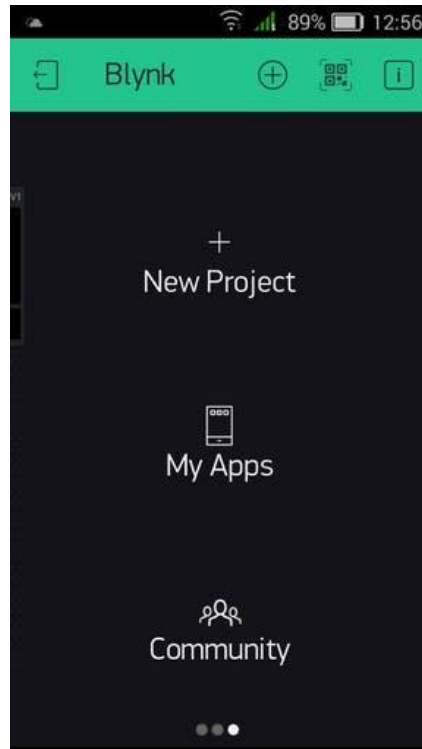
Now sign up and go to log in to your apps. Click the “Create New Project” in the app to create a new Blynk app. Give it any name. Blynk works with hundreds of hardware models and connection types. Select the Hardware type. After this, select the connection type. In this project, we have selected WiFi connectivity.



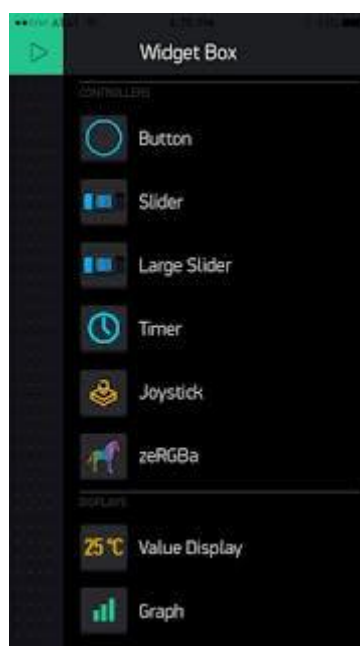
The Auth Token is very important you can get this your mail address.

Add Widgets in your Project

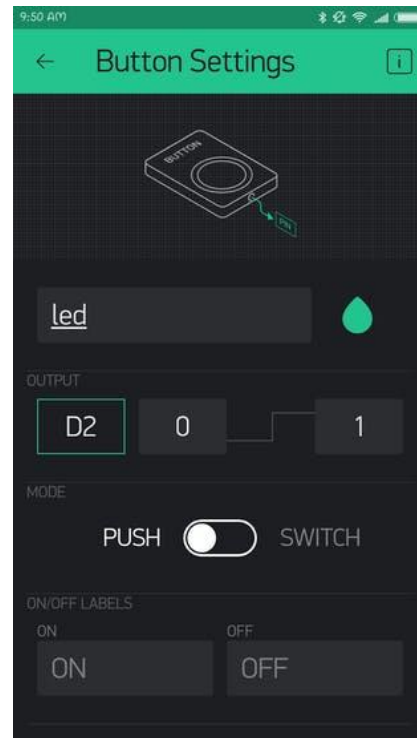
To open the widget box, click on the project window to open.



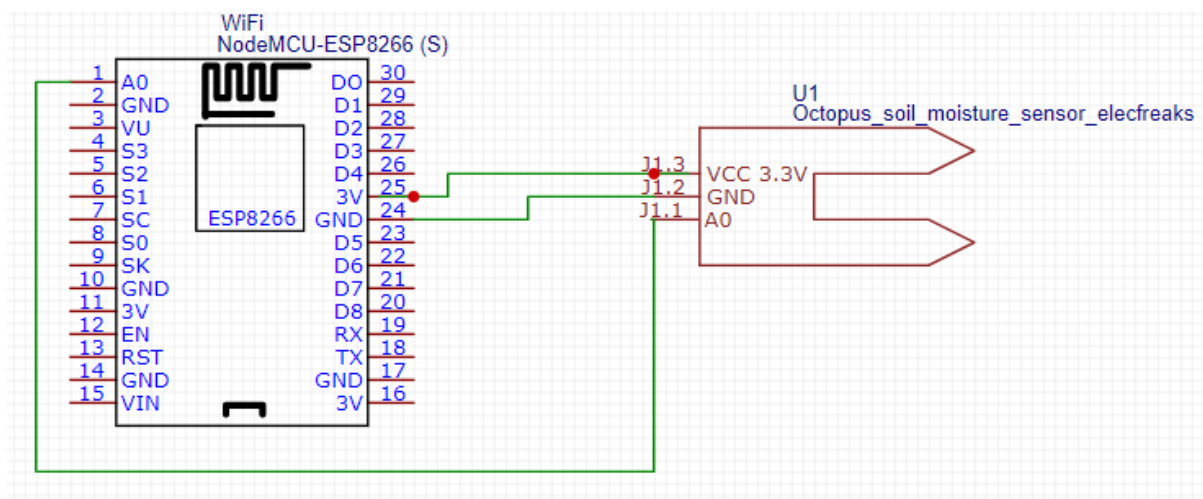
Now selecting a button to control Led connected with NodeMCU:



- Click on the Button.
- Give a name to Button say led.
- Under OUTPUT tab- Click the pin and select the pin to which led is connected to NodeMCU, here it is digital pin 2, hence select digital and underpin D2. And click continue.
- Under MODE tab- Select whether you want this button as "push button" or "Switch".



Circuit Diagram:



Conclusion: