ASSIGNMENT NO: 04

Aim: Design and implement IoT system for one of the applications like: Traffic Application, Medical/ Health application, Social Application etc.

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:

A home automation system will monitor and/or control home attributes such as lighting, climate, entertainment systems, and appliances. It may also include home security such as access control and alarm systems. When connected with the Internet, home devices are an important constituent of the Internet of Things ("IoT").

A home automation system typically connects controlled devices to a central smart home hub (sometimes called a "gateway"). The user interface for control of the system uses either wall-mounted terminals, tablet or desktop computers, a mobile phone application, or a Web interface that may also be accessible off-site through the Internet.

Hardware Overview:

Relay module

A relay allows you to turn on or turn off a circuit using voltage and/or current much higher than what Arduino could handle. Relay provides complete isolation between the low-voltage circuit on Arduino side and the high-voltage side controlling the load. It gets activated using 5V from Arduino, which, in turn, controls electrical appliances like fans, lights and other electrical equipments.

5V Relay Pin Configuration

The pin configuration of the 5V relay is shown below. This relay includes 5-pins where each pin and its functionality are shown below.
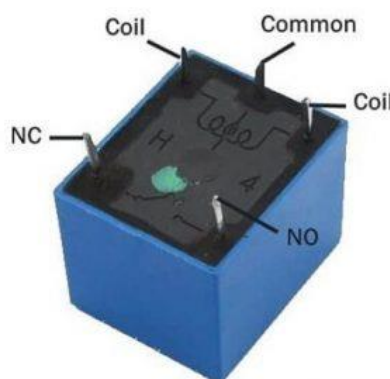
Pin1 (End 1): It is used to activate the relay; usually this pin one end is connected to 5Volts whereas another end is connected to the ground.

Pin2 (End 2): This pin is used to activate the Relay.

Pin3 (Common (COM)): This pin is connected to the main terminal of the Load to make it active.

Pin4 (Normally Closed (NC)): This second terminal of the load is connected to either NC/ NO pins. If this pin is connected to the load then it will be ON before the switch.

Pin5 (Normally Open (NO)): If the second terminal of the load is allied to the NO pin, then the load will be turned off before the switch.

5V Relay Module

The relay module with a single channel board is used to manage high voltage, current loads like solenoid valves, motor, AC load & lamps. This module is mainly designed to interface through different microcontrollers like PIC, Arduino, etc.

Normally Open (NO): This pin is normally open unless we provide a signal to the relay modules signal pin. So, the common contact pin smashes its link through the NC pin to make a connection through the NO pin

Common Contact: This pin is used to connect through the load that we desire to switch by using the module.

Normally Closed (NC): This NC pin is connected through the COM pin to form a closed circuit. However, this NC connection will break once the relay is switched through providing an active high/low signal toward the signal pin from a microcontroller.

Signal Pin: The signal pin is mainly used for controlling the relay. This pin works in two cases like active low otherwise active high. So, in active low case, the relay activates once we provide an active low signal toward the signal pin, whereas, in an active high case, the relay will trigger once we provide a high signal toward the signal pin.

5V VCC: This pin needs 5V DC to work. So 5V DC power supply is provided to this pin.

Ground: This pin connects the GND terminal of the power supply.

NodeMCU:

The ESP8266 based NodeMCU development board is an open source platform for developing WiFi based embedded systems and it is based on the popular ESP8266 WiFi Module, running the Lua based NodeMCU firmware. NodeMCU was born out of the desire to overcome the limitations associated with the first versions of the ESP8266 module which was not compatible with breadboards, it was difficult to power and even more difficult to program. The NodeMCU board is

easy to use, low cost and that quickly endeared it to the heart of makers and it is one of the most popular boards today.
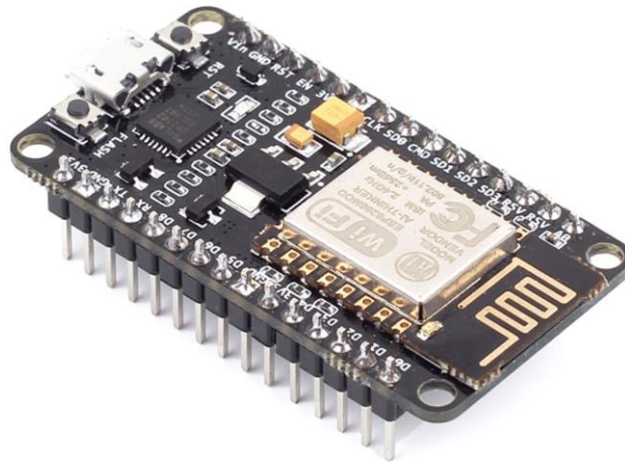
What is Blynk App

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.
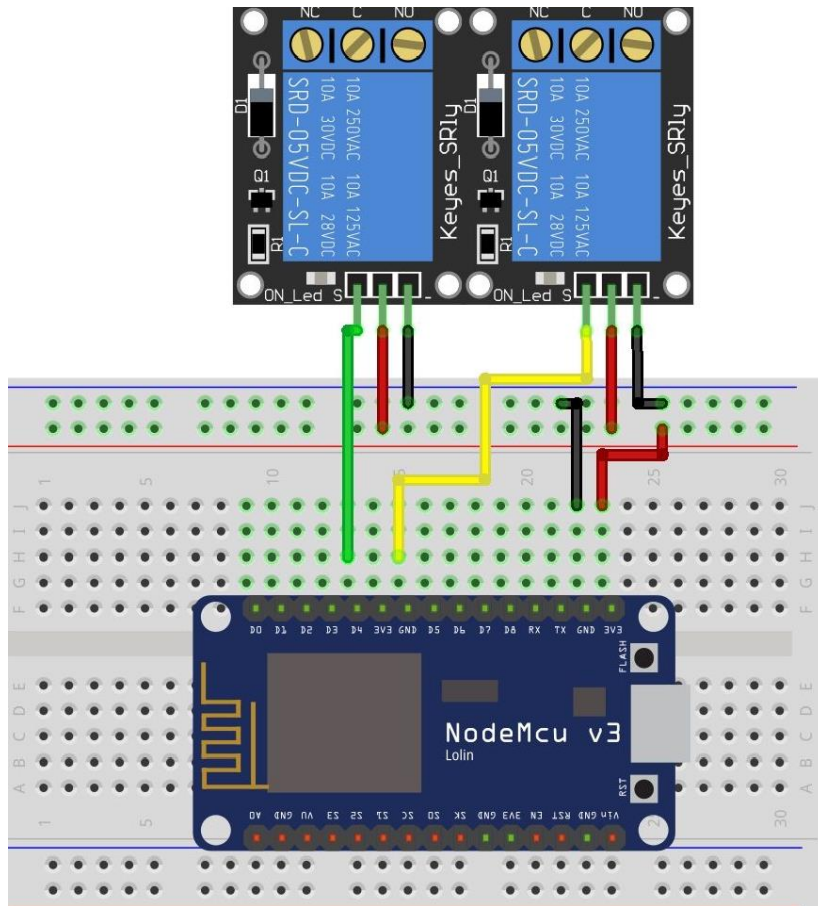
How it works

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

Circuit Diagram:

Conclusion: