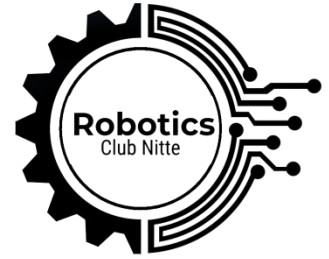# ROBOTICS CLUB NITTE

# HOME AUTOMATION SYSTEM MANUAL

Description:

The **Internet of Things (IoT)** refers to a system of interrelated, internet-connected objects that are able to collect and transfer data over a wireless network without human intervention.

Home Automation System is an example of IoT. Home automation is constructing automation for a domestic home. In this ecosystem, you can control your devices like light, fan, etc from your smart phone.
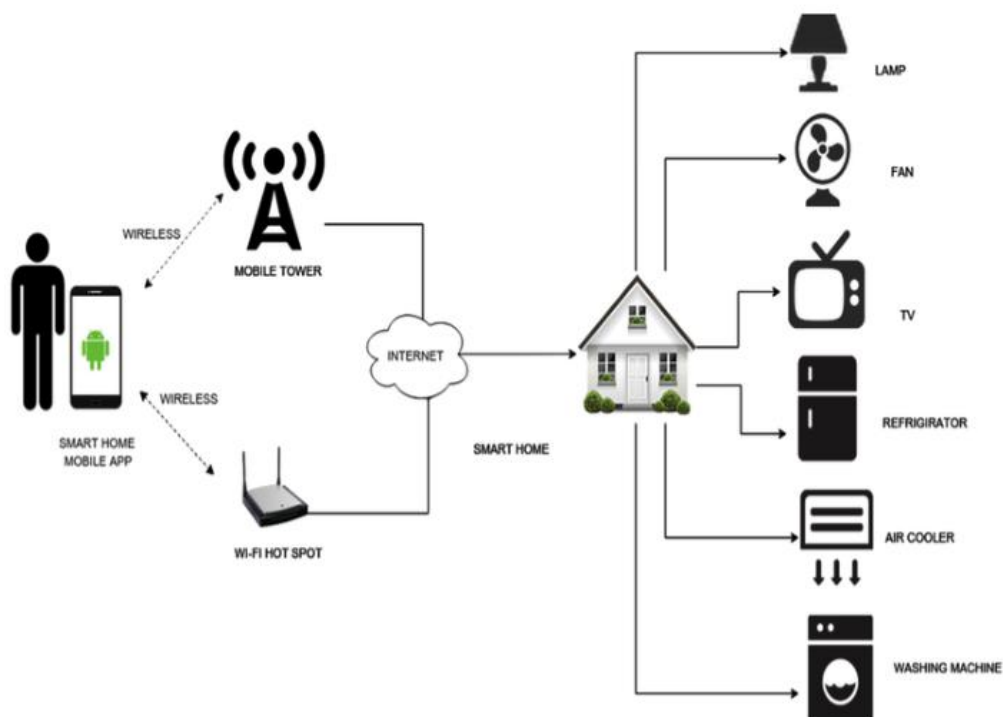
Aim:

In this IoT based project, We will be building a Home Automation System using 2 channel relay with NodeMCU (ESP8266-12E) Wifi Module and control 2 different Bulbs. We will be using an Android app having to send a signal to NodeMCU in order to control relay output.
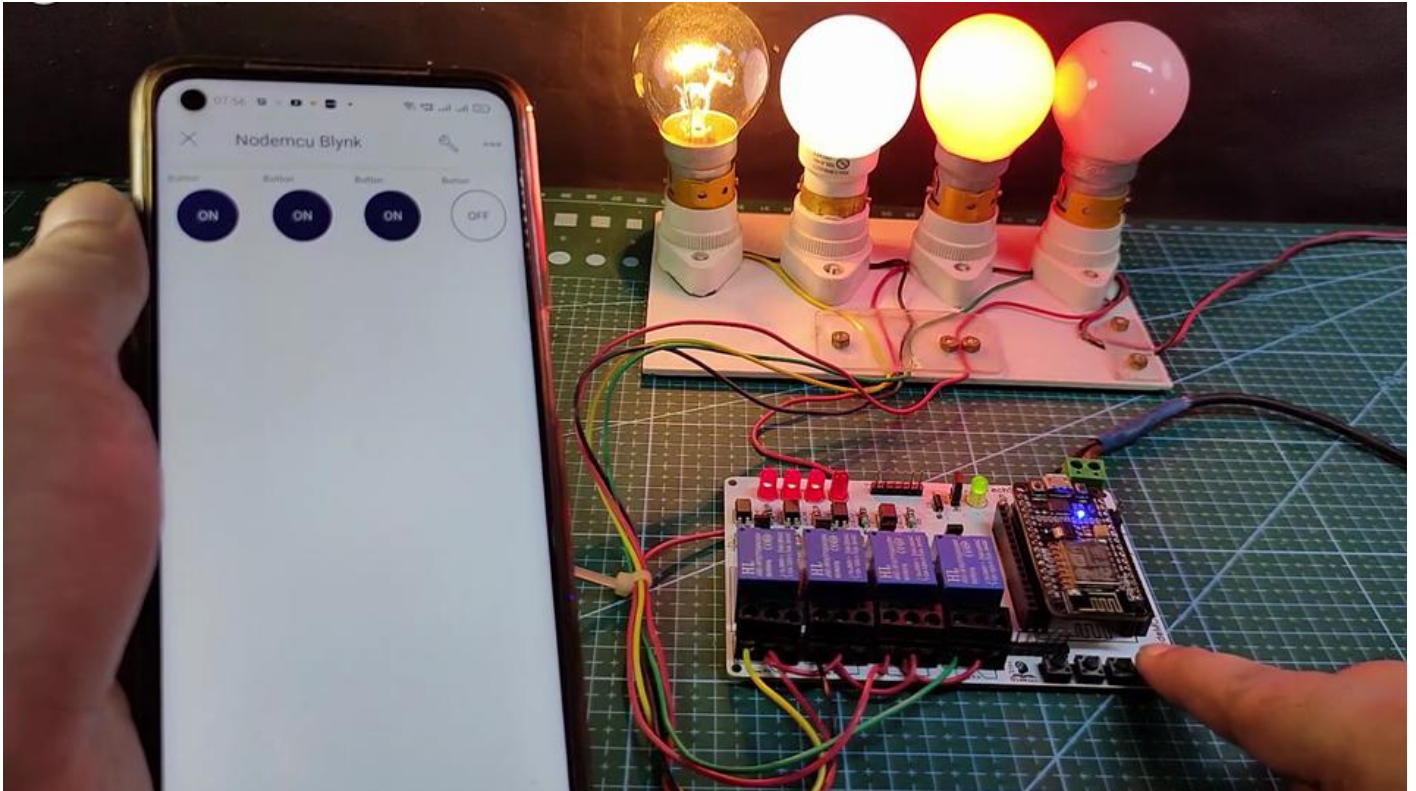

Components Required:

- NodeMCU (ESP8266-12E board) (x1)
- Relay Module (2-Channel) (x1)
- Bulb (x2)
- Bulb holder (x2)
- Female-to-Female Jumper wires (x2)
- Female-to-Male Jumper wires (x4)
- Thick Wires (x4)
- AC Source
- Smartphone/ Tablet

NODEMCU

What is a NODEMCU?

Node MCU is an open-source firmware and development kit that helps you to prototype or build IoT products. MCU stands for Micro Controller Unit - which really means it is a computer on a single chip. **ESP8266** is a MCU. The ESP8266 Integrates a Wi-Fi transceiver. This means it can not only connect to a Wi-Fi network and interact with the Internet, but it can also set up a network of its own, allowing other devices to connect directly to it. This makes the ESP8266 NodeMCU even more versatile.

Pin Diagram NODEMCU :

**To know more about pins: https://rebrand.ly/dh6kwjo**
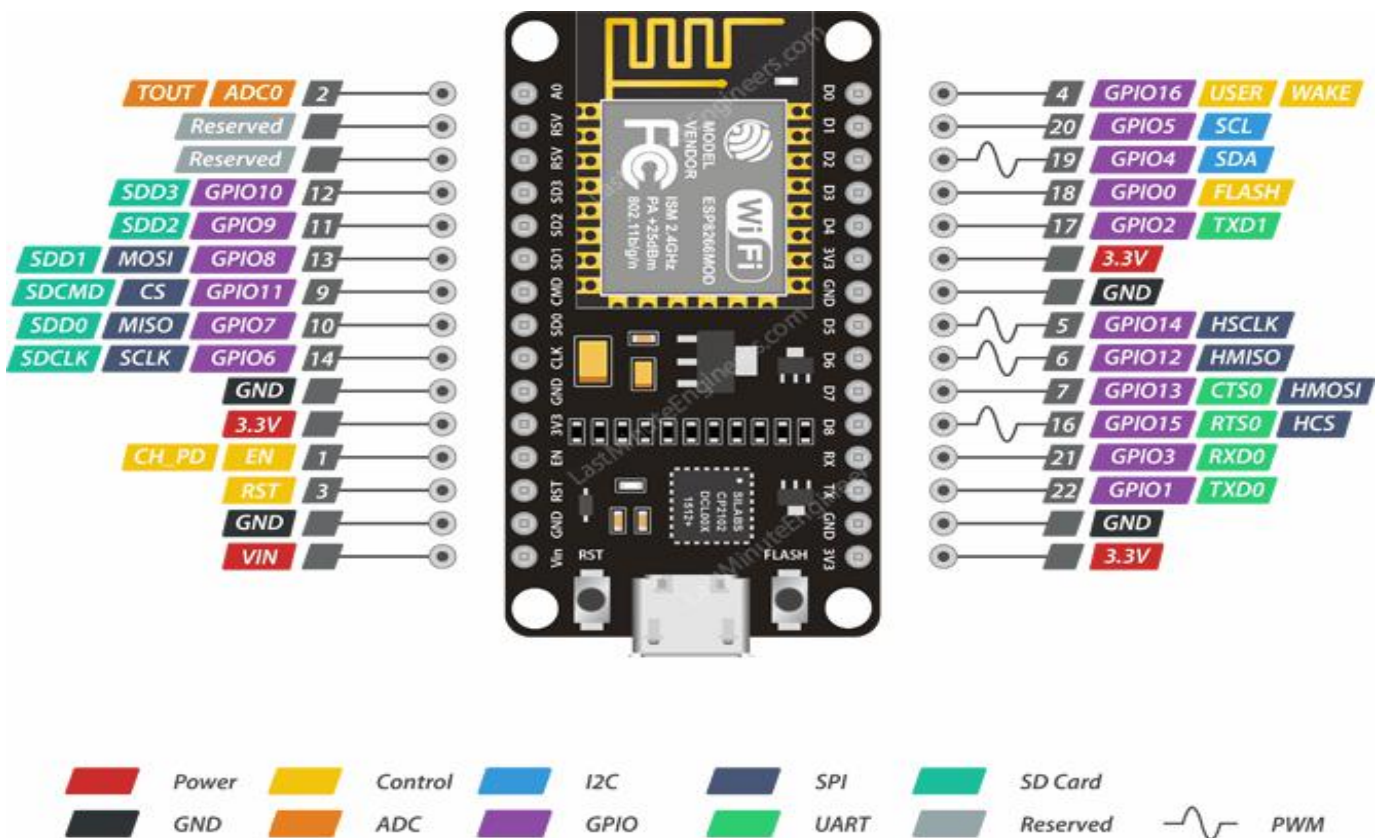
What is a RELAY?

A relay is an electromagnetic switch operated by a relatively small current that can control much larger current. For this project, we are going to use two channel relay module. This module is designed for switching two high powered devices from your NodeMCU. It has two relays rated up to 10A per channel at 250VAC or 30VDC.

Relay Basics

Typically the relay has 5 pins, three of them are high voltage terminals (NC, COM, and NO) that connect to the device you want to control.
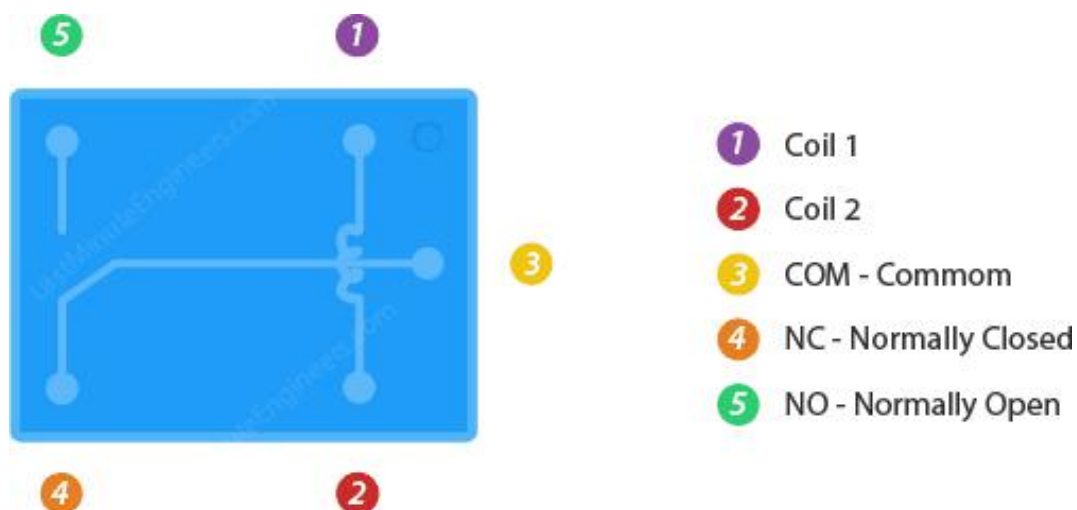
The mains electricity enters the relay at the common (COM) terminal. While use of NC & NO terminals depends upon whether you want to turn the device ON or OFF.

Between the remaining two pins (coil1 and coil2), there is a coil that acts like an electromagnet.
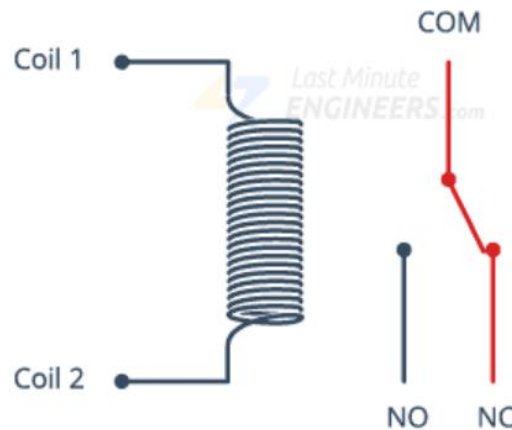
When current flows through the coil, the electromagnet becomes charged and moves the internal contacts of the switch. At that time the normally open (NO) terminal connects to the common (COM), and the normally closed (NC) terminal becomes disconnected.

When current stops flowing through the coil, the internal contact returns to its initial state i.e. the normally closed (NC) terminal connects to the common (COM), and the normally open (NO) terminal reopens.
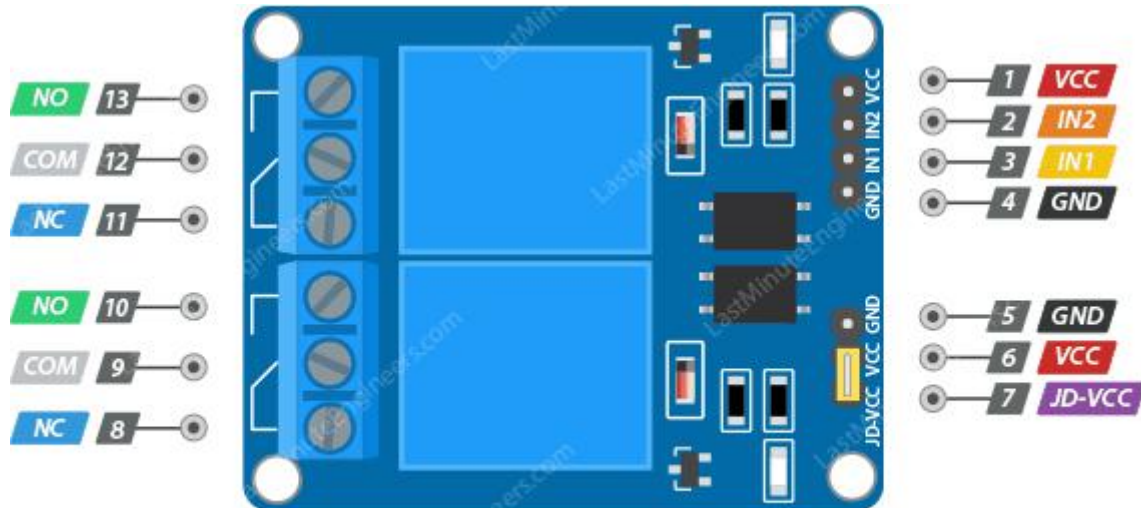
This is known as a single pole, double throw switch (SPDT).

5V Relay Module

Two Channel Relay Module Pinout

Let's have a look at the pinout of two channel relay module.

Control Pins:

VCC pin supplies power to the built-in optocoupler and optionally to the electromagnet of the relay (if you keep the jumper in place)

GND is the common Ground connection.

IN1 & IN2 pins are used to control the relay. These are active low pins, meaning the relay will be activated when you pull the pin LOW and it will become inactive when you pull the pin HIGH.

Power Supply Selection Pins:

JD-VCC supplies power to the electromagnet of the relay. When the jumper is in place, it takes power from the Arduino's 5V line. Without the jumper cap, you have to connect it to an independent power source.

VCC With the jumper cap on, this pin is shorted to the JD-VCC pin. If you remove the jumper, keep this pin unconnected.

GND is the common Ground connection.

Output Terminals:

COM pin is connected to the signal you are planning to switch.

NC pin is connected to the COM pin by default, unless you send a signal from the Arduino to the relay module to break the connection.
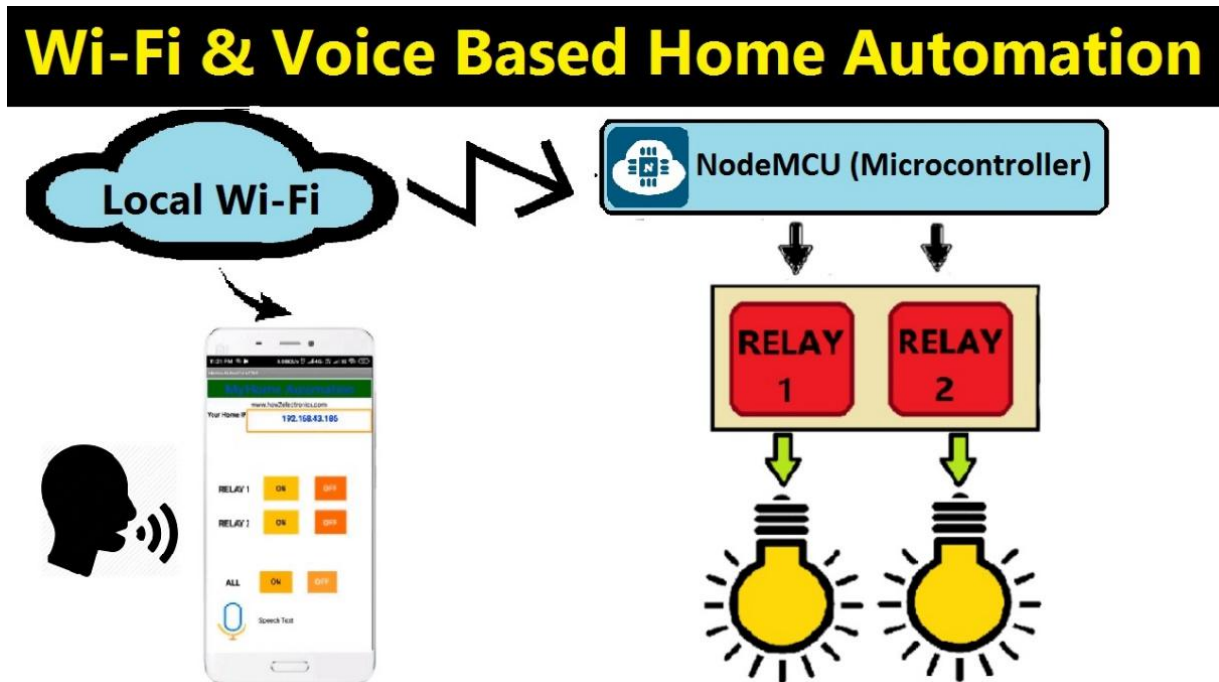
NO pin is open by default, unless you send a signal from the Arduino to the relay module to make the connection.

Project Block Diagram:

Here is a block diagram for this project "Wifi & Voice Controlled Home Automation Using ESP8266". It is simple and easy to understand.
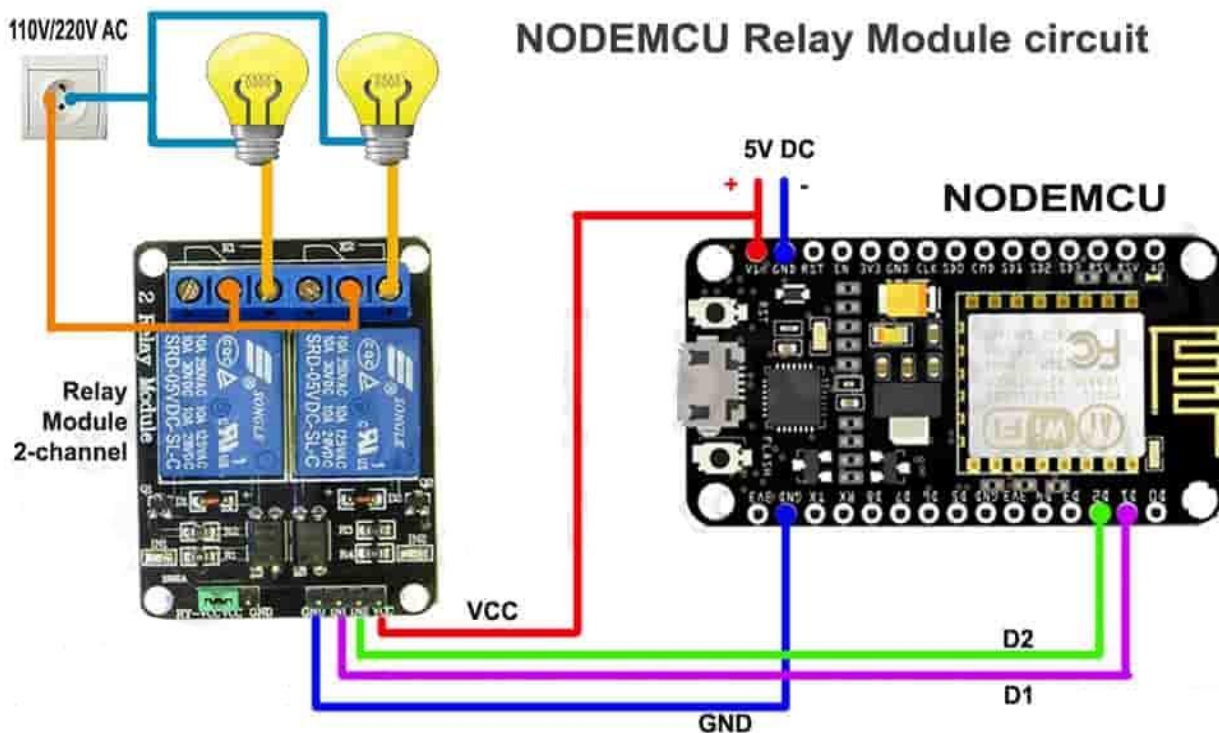
Project Overview

PROCEDURE:

1. Connect nodemcu to your pc using USB B data transfer cable
2. Use Arduino IDE software to upload code to the nodemcu.
     Upload "**IP address.ino**" code file to find the ip address.
3. Once code is uploaded, check the IP address of nodemcu on arduino ide serial monitor
4. Now upload the "**Automation.ino**" file to nodemcu
5. Rig up the connections as shown in the above circuit diagram
6. Enter the IP Address of Nodemcu into the app
7. Control the light bulb via the app

Drive Link for the Codes and App:

https://rebrand.ly/d0zuxrl