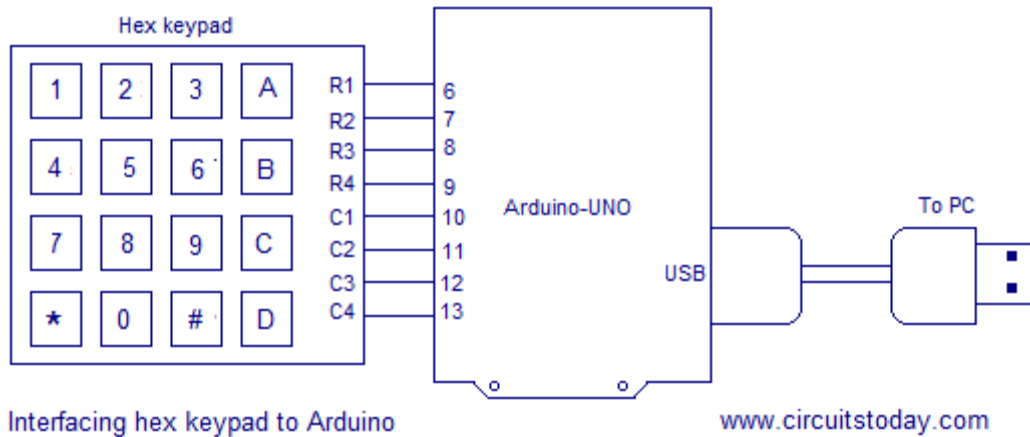


## **Task – 1 Familiarization with Arduino/Raspberry Pi/Node MCU and perform necessary software installation.**

### **Aim:**

To study about Arduino interface and Raspberry PI interface.

### **Arduino Interface:**



### **Standard Computer Interface:**

#### **Wired:**

1. USB
2. Serial Port
3. Parallel Port
4. Firewire
5. Ethernet

#### **Wireless:**

1. Wi-Fi
2. Bluetooth
3. IDA

#### **Embedded Interfaces:**

1. SPI
2. UNI/O
3. I<sup>2</sup>C

### **RS-232-The Serial Port:**

RS-232 standard is commonly used in computer serial ports. A serial port complying with the RS-232 standard was once a standard feature of many types of computers. Personal computers used them for connections not only to modems, but also to printers, mice, data storage and other peripheral devices.

RS-232, when compared to later interfaces such as RS-445 and Ethernet, has lower transmission speed, short maximum cable length, large voltage swing, large standard connectors, no multipoint capability and limited multidrop capability. In modern personal computers, USB has displaced RS-232 from most of its peripheral interface roles. Many computers no longer come equipped with RS-232 ports and must use either an external USB-to-RS-232 converter or an internal expansion card with one or more serial ports to connect to RS-232 peripherals. Nevertheless, because of their simplicity and past ubiquity, RS-232 interfaces are still used—particularly in industrial machines, networking equipment, and scientific instruments where a short-range, point-to-point

equate.



### **Virtual COM Ports:**

### **Serial Port via USB:**

The digital serial unit does away with all RS-232 communications (and cables) and outputs only digital signals. This generates the same as the signals that one can get at the microcontroller, after decoding them at MAX232 chip. One can plug the signals directly to the microcontroller RX TX pins (connect digital serial Rx to  $\mu$ C TX and digital serial Rx to  $\mu$ C Rx to communicate correctly) and there is no need for MAX232. The disadvantage is that noise immunity is poor over long distance which the RS232 interface does provide.

**Example:** Thermometer.

In thermometer, the temperature sensor is connected to an analog signal input on the Arduino. The PC uses this data to plot graphs and generate reports.

### **Raspberry Interface:**

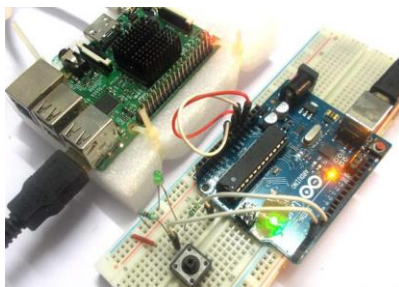
The RaspberryPi is a series of small single board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote teaching of basic computer science in

schools and in developing countries. All models feature a Broadcom system on a chip (SoC) with an integrated ARM compatible central processing unit (CPU) and on-chip graphics processing unit (GPU).

Processor speed ranges from 700 MHz to 1.4 GHz for the Pi 3 Model B+; on-board memory ranges from 256MB to 1GB RAM. Secure Digital(SD) cards in MicroSDHC form factor (SDHC on early models) are used to store the operating system and program memory. The boards have one to four USB ports. For video output, HDMI and composite video are supported, with a standard 3.5 mm tip-ring-sleeve jack for audio output. Lower-level output is provided by several GPIO pins, which support communication protocols like I<sup>2</sup>C. B-models have an 8P8C Ethernet port and the Pi 3 and Pi Zero W have on-board Wi-Fi 802.11n and Bluetooth.



### **Interfacing Arduino with Raspberry Pi:**



### **Interfacing Arduino IDE with ESP8266**

Step 1: Installing Arduino IDE Software. ...

Step 2: Arduino IDE Icon. ...

Step 3: Opening Arduino IDE. ...

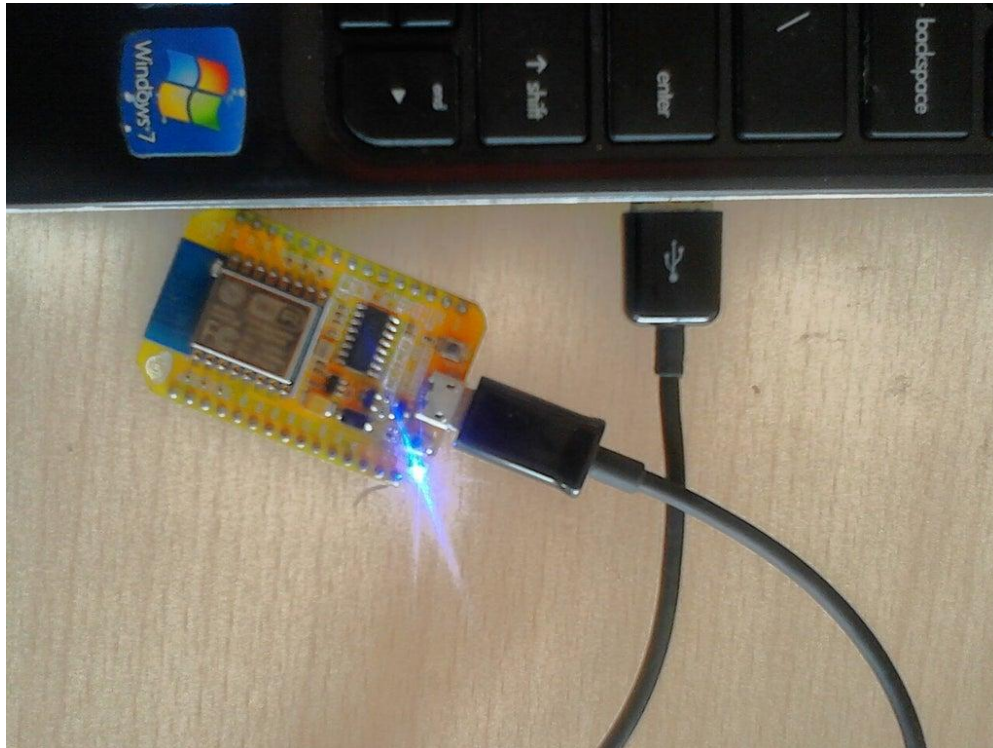
Step 4: Preferences. ...

Step 5: Adding ESP8266 Board Manager. ...

Step 6: Selecting Board. ...

Step 7: ESP8266 Board Package. ...

Step 8: Selecting ESP8266 Arduino Board.



**Result:**

Thus, the study of Arduino Raspberry Pi and ESP8266 is interface was completed successfully.