

MIT WORLD PEACE UNIVERSITY

**Internet of Things
Second Year B. Tech, Semester 2**

ARUDINO AND RASPBERRY PI

ASSIGNMENT 1

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1 Aim

To learn about Arduino UNO, and Raspberry Pi Model 3B in detail and their applications in IoT.

2 Objectives

- To learn about Arduino UNO and Raspberry Pi Model 3B.
- To learn about the applications of Arduino UNO and Raspberry Pi Model 3B in IoT.

3 Equipments Required

1. Raspberry Pi 3 Model
2. Arduino Uno
3. Breadboard
4. Jumper wires
5. LED
6. Resistor

4 Theory

4.1 Raspberry Pi Model 3B

Raspberry Pi Model 3B is a popular single-board computer developed by the Raspberry Pi Foundation. It is a successor to the Raspberry Pi 2 Model B and features a quad-core ARM Cortex-A53 CPU with 1GB of RAM. The board has a variety of input/output options, including HDMI, USB, Ethernet, and a 40-pin GPIO (General Purpose Input/Output) header.

It can run various operating systems, including Raspbian, Ubuntu, and Windows 10 IoT Core. Raspberry Pi 3B is used in a variety of projects, including home automation, robotics, and media centers.

4.2 Arduino Uno

On the other hand, Arduino Uno is a microcontroller board based on the ATmega328P microcontroller. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, and an ICSP header.

It can be powered using a USB cable or an external power source. Arduino Uno can be programmed using the Arduino IDE, which supports a variety of programming languages, including C and C++.

It is commonly used in various projects, including home automation, robotics, and IoT applications.

4.3 Difference between Raspberry Pi 3B and Arduino Uno

One of the main differences between Raspberry Pi 3B and Arduino Uno is their architecture. Raspberry Pi is a full-fledged computer that can run an operating system, while Arduino Uno is a microcontroller board that runs a single program.

This makes Raspberry Pi more suitable for projects that require more processing power, such as media centers or web servers. Arduino Uno, on the other hand, is more suitable for projects that require real-time control, such as robotics or home automation.

Another difference between the two is their input/output capabilities. Raspberry Pi 3B has a variety of input/output options, including HDMI, USB, Ethernet, and a 40-pin GPIO header, making it suitable for a wide range of projects. Arduino Uno, on the other hand, has a smaller number of input/output pins, making it suitable for simpler projects that require fewer inputs/outputs.

In terms of the Internet of Things (IoT), both Raspberry Pi 3B and Arduino Uno can be used to create IoT applications. Raspberry Pi 3B can be used as a web server, which can be accessed remotely over the Internet.

It can also be used to interface with various sensors and actuators, making it suitable for IoT applications. Arduino Uno, on the other hand, can be used to create standalone IoT devices that can communicate with other devices over the Internet.

It can also be used to interface with various sensors and actuators, making it suitable for a wide range of IoT applications.

5 Platform

Operating System: Arch Linux x86-64

IDEs or Text Editors Used: Arduino IDE, and Thonny on Pi

Compilers : g++ and gcc on linux for C++, Python 3.10 on Pi

6 Arduino Uno

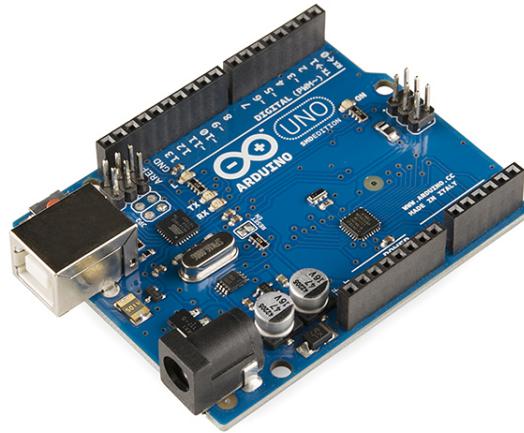


Figure 1: Tinkercad Circuit

7 Arduino Uno Pin Diagram

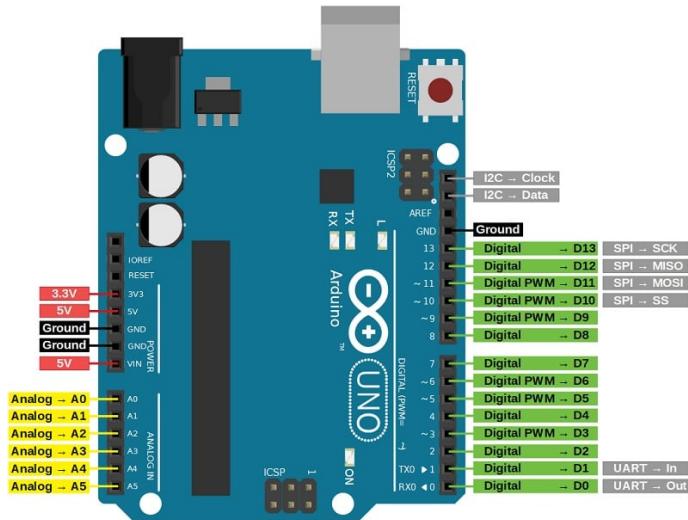


Figure 2: Arduino Uno Pin Diagram

8 Raspberry Pi 3B



Figure 3: Circuit Diagram

9 Raspberry Pi 3B Pin Diagram

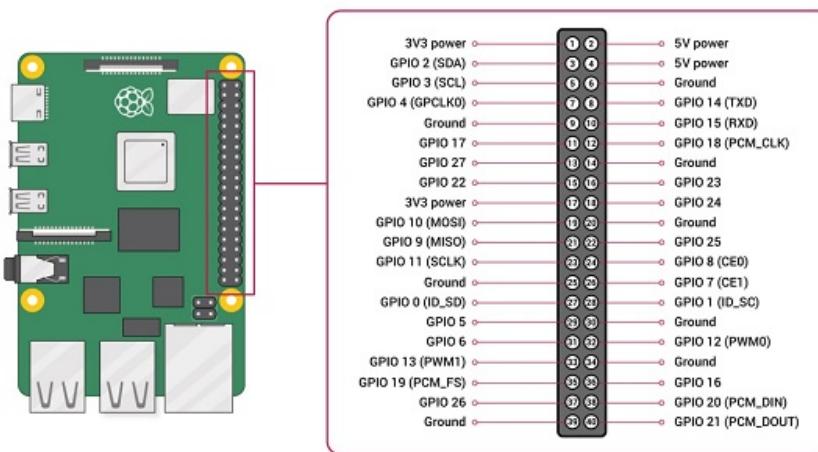


Figure 4: Circuit Diagram

10 Conclusion

Thus, we have successfully interfaced Temperature Sensor with Arduino Uno and displayed the output on the Serial Monitor.

11 FAQ

1. Arduino Uno R3 (Code: U1)

- Type: Microcontroller board
- Digital pins: 14
- Analog input pins: 6
- Operating voltage: 5V
- Input voltage (recommended): 7-12V
- Input voltage (limits): 6-20V
- Flash memory: 32 KB (ATmega328P microcontroller)
- SRAM: 2 KB (ATmega328P microcontroller)
- EEPROM: 1 KB (ATmega328P microcontroller)
- Clock speed: 16 MHz (ATmega328P microcontroller)

2. Raspberry Pi Model 3 B:

The Raspberry Pi has a total of 40 pins, including 26 GPIO (General Purpose Input/Output) pins, 3.3V and 5V power pins, and ground pins. The pinout diagram for the Raspberry Pi 3 B can be found on the official Raspberry Pi website.

- Pin 1: 3.3V
- Pin 2: 5V
- Pin 3: GPIO 2
- Pin 4: 5V
- Pin 5: GPIO 3
- Pin 6: Ground
- Pin 7: GPIO 4
- Pin 8: GPIO 14
- Pin 9: Ground
- Pin 10: GPIO 15
- Pin 11: GPIO 17
- Pin 12: GPIO 18
- Pin 13: GPIO 27
- Pin 14: Ground
- Pin 15: GPIO 22
- Pin 16: GPIO 23
- Pin 17: 3.3V
- Pin 18: GPIO 24
- Pin 19: GPIO 10
- Pin 20: Ground
- Pin 21: GPIO 9

- Pin 22: GPIO 25
- Pin 23: GPIO 11
- Pin 24: GPIO 8
- Pin 25: Ground
- Pin 26: GPIO 7
- Pin 27: ID SD
- Pin 28: ID SC
- Pin 29: GPIO 5
- Pin 30: Ground
- Pin 31: GPIO 6
- Pin 32: GPIO 12
- Pin 33: GPIO 13
- Pin 34: Ground
- Pin 35: GPIO 19
- Pin 36: GPIO 16
- Pin 37: GPIO 26
- Pin 38: GPIO 20
- Pin 39: Ground
- Pin 40: GPIO 21