



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Discover. Learn. Empower.



UNIVERSITY INSTITUTE OF ENGINEERING **Department of Computer Science & Engineering**

Subject Name: Internet of things LAB

Subject Code: 20CSP-358

Submitted to:

Er. Pooja Bharti

Submitted by:

Name: Vinod

UID: 20BCS5428

Section: DM_607

Group: A



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INDEX

| Ex. No | List of Experiments | Conduct (MM: 12) | Viva (MM: 10) | Record (MM: 8) | Total (MM: 30) | Remarks/Signature |
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| 1.1 | | | | | | |
| 1.2 | | | | | | |
| 1.3 | | | | | | |
| 2.1 | | | | | | |
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| 3.1 | | | | | | |
| 3.2 | | | | | | |
| 3.3 | | | | | | |



Experiment1.1

Student Name: Vinod
Branch: CSE
Semester: 6
Subject Name: IOT LAB

UID:20BCS5428
Section/Group:DM_607(A)
Date of Performance:14-02-2023
Subject Code: 20CSP-358

1. Aim:

Familiarization with Arduino/Raspberry Pi hardware and perform necessary software installation.

2. Objective:

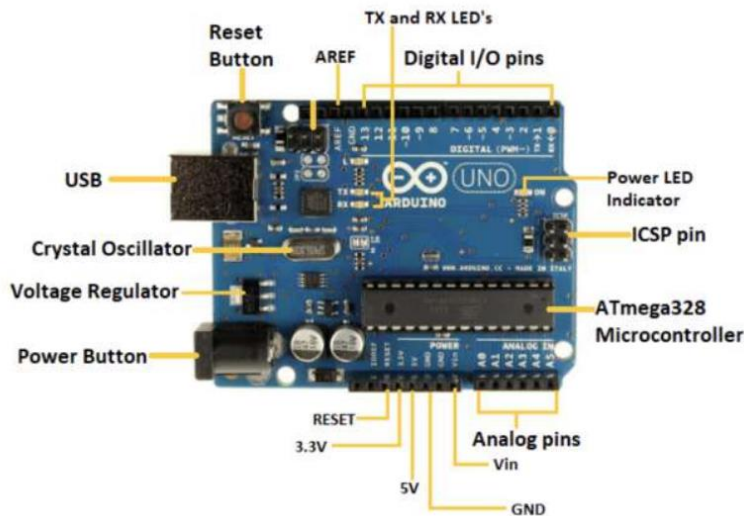
1. To study hardware and software related to IOT.
2. To understand the function of node MCU, Arduino Uno and Raspberry Pi.

3. Theory:

ARDUINO UNO:

An Arduino is actually a micro controller based kit. It is basically used in communications and in controlling or operating many devices. Arduino UNO board is the most popular board in the Arduino board family. In addition, it is the best board to get started with electronics and coding. Some boards look a bit different from the one given below, but most Arduino's have majority of these components in common. It consists of two memories- Program memory and the data memory.

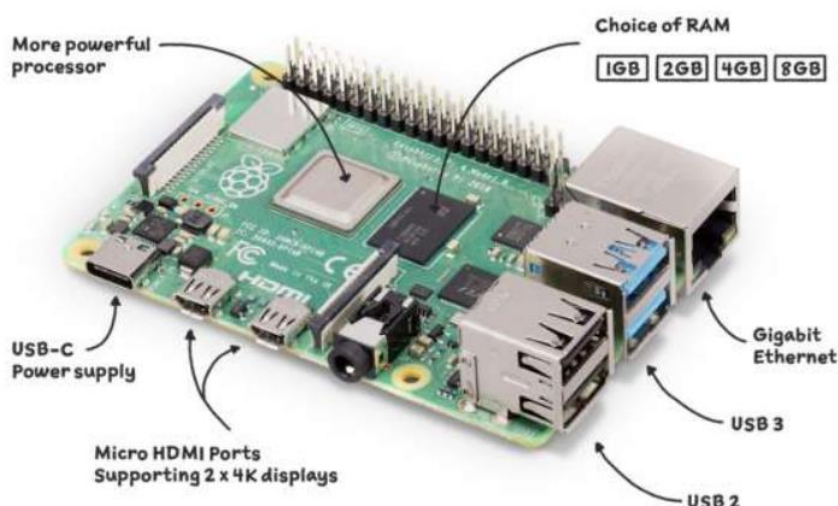
The code is stored in the flash program memory, whereas the data is stored in the data memory. Arduino Uno consists of 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.



Basic Arduino functions are:

1. `digitalRead(pin)`: Reads the digital value at the given pin.
2. `digitalWrite(pin, value)`: Writes the digital value to the given pin.
3. `pinMode(pin, mode)`: Sets the pin to input or output mode.
4. `analogRead(pin)`: Reads and returns the value.
5. `analogWrite(pin, value)`: Writes the value to that pin.
6. `serial.begin(baud rate)`: Sets the beginning of serial communication by setting the bit rate.

RASPBERRY PI 4 MODULE B



The Raspberry Pi is a very cheap computer that runs Linux, but it also provides a set of GPIO (general purpose input/output) pins that allow you to control electronic components for physical computing and explore the Internet of Things (IoT). Raspberry Pi was basically introduced in 2006.

It is particularly designed for educational use and intended for Python. A Raspberry Pi is of small size i.e., of a credit card sized single board computer, which is developed in the United Kingdom(U.K) by a foundation

called Raspberry Pi. There have been three generations of Raspberry Pi's: Pi 1, Pi 2, and Pi 3. The first generation of Raspberry (Pi 1) was released in the year 2012, that has two types of models namely model A and model B. Raspberry Pi can be plugged into a TV, computer monitor, and it uses a standard keyboard and mouse. It is user friendly as can be handled by all the age groups. It does everything you would expect a desktop computer to do like word-processing, browsing the internet spreadsheets, playing games to playing high definition videos. All models feature on a Broadcom system on a chip (SOC), which includes chip graphics processing unit GPU(a Video Core IV), an ARM compatible and CPU.

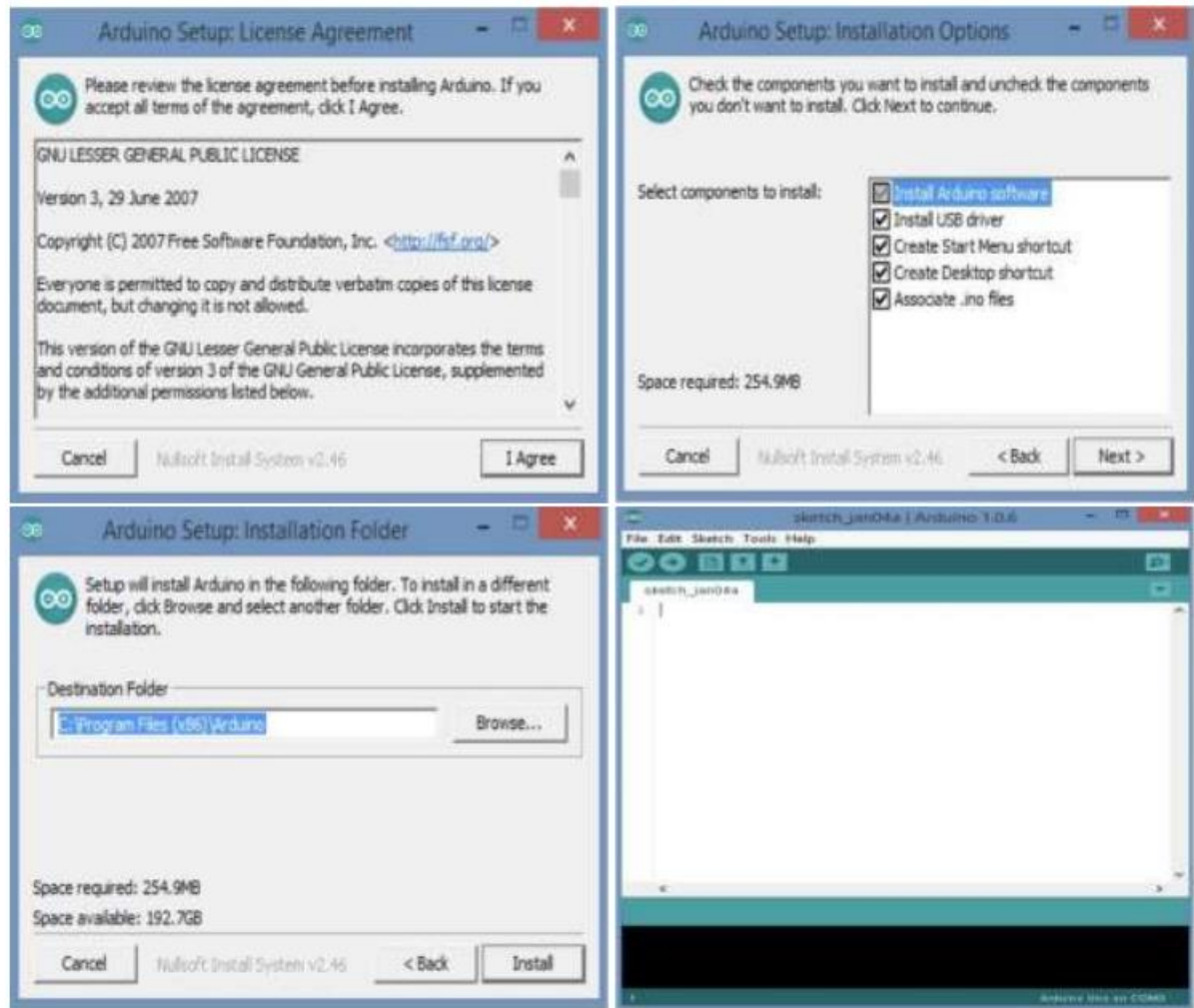
The CPU speed ranges from 700 MHz to 1.2 GHz for the Pi 3 and on board memory range from 256 MB to 1 GB RAM. An operating system is stored in the secured digital SD cards and program memory in either the MicroSDHC or SDHC sizes. Most boards have one to four USB slots, composite video output, HDMI and a 3.5 mm phone jack for audio. Some models have WiFi and Bluetooth. Several generations of Raspberry Pis have been released.

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+ or 1.5 GHz for the Pi 4; on-board memory ranges from 256 MB to 1 GB with up to 4 GB available on the Pi 4 random-access memory (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 five 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 a number of GPIO pins, which support common protocols like I²C. The B-models have an 8P8C Ethernet port and the Pi 3 and Pi Zero W have onboard Wi-Fi and Bluetooth.

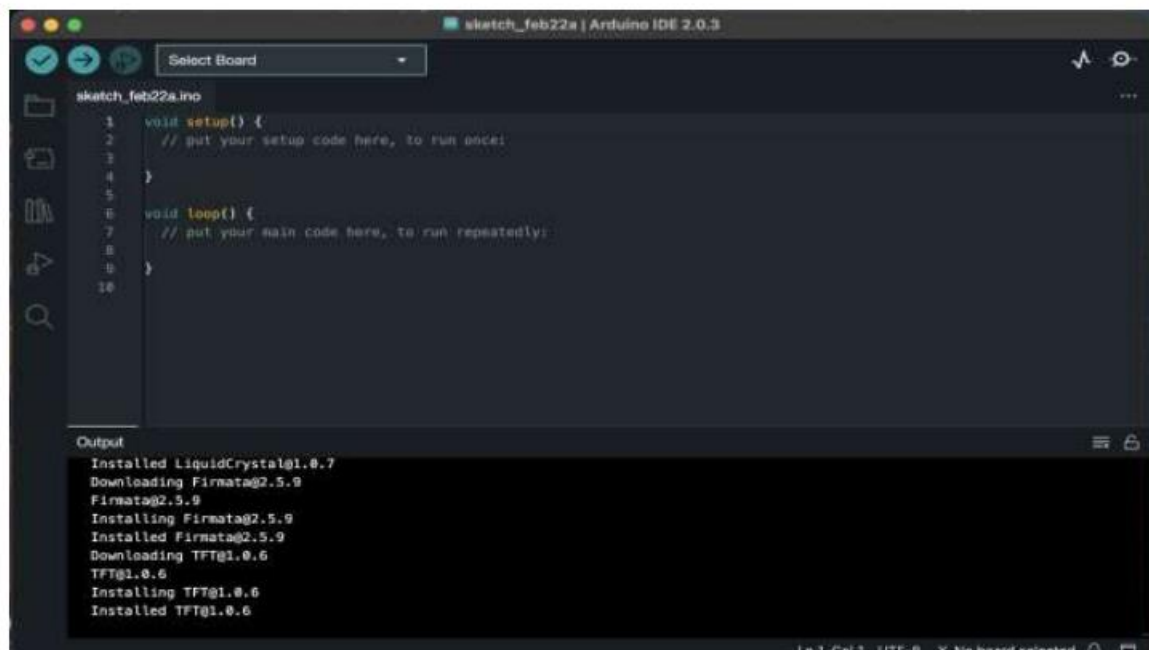
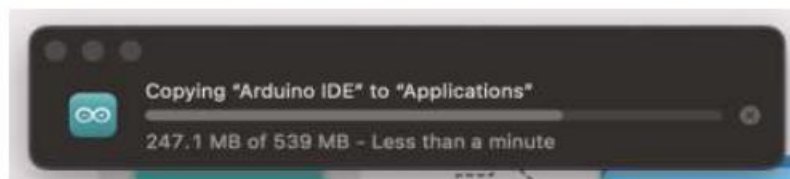
Steps to download Arduino IDE:

1. Visit <https://www.arduino.cc/en/software> to download the latest Arduino IDE version for your computer's operating system. There are versions for Windows, Mac, and Linux systems. At the download page, click on the "Windows Installer" option for the easiest installation.
2. Download the .exe file or .dmg file based on the operating system of your device.
3. Open the downloaded file.
4. In case of Mac drag and drop the Arduino IDE in Applications folder and in case of Windows double click on the installer to open the installation wizard.
5. Select the Arduino Board which you will be using for the IOT project.
6. And then load a sample code on that board for the testing purpose to make sure that everything is working properly.

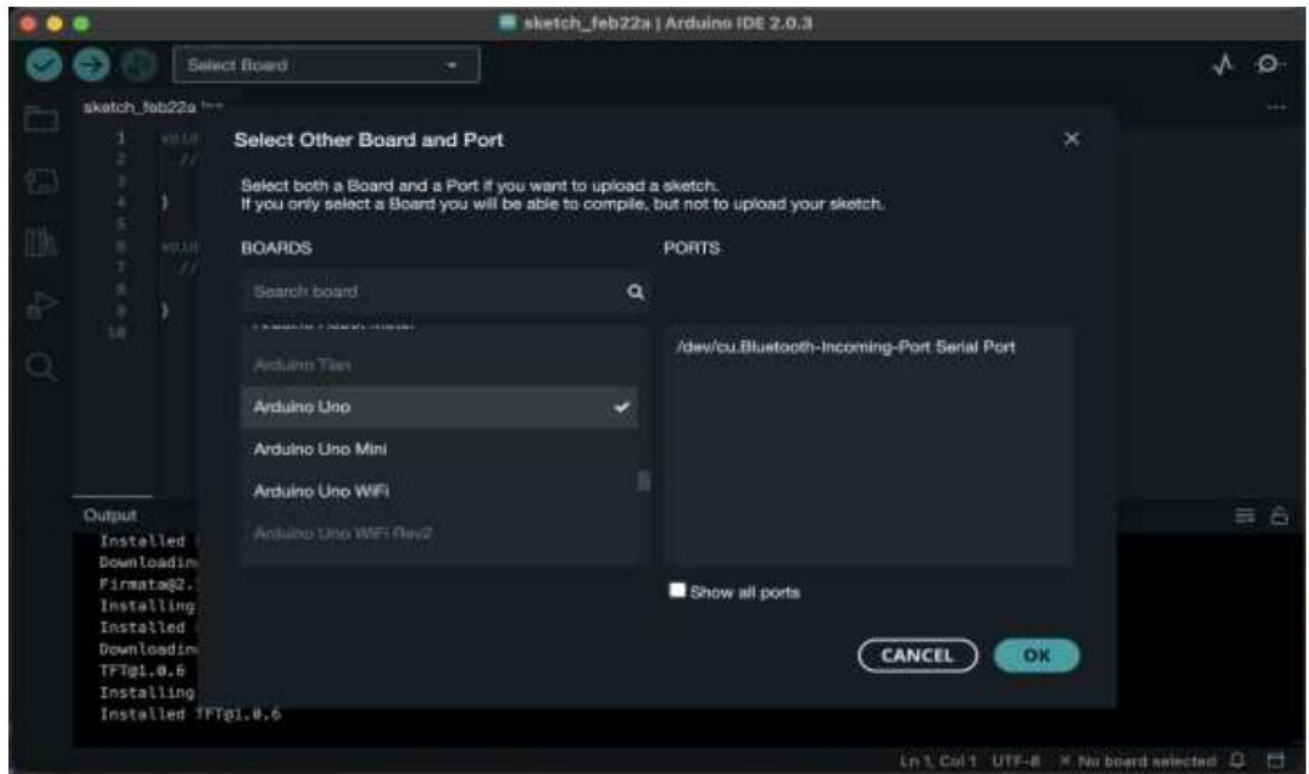
IN CASE OF WINDOWS FOLLOW THE FOLLOWING STEPS:



IN CASE OF MAC FOLLOW THE FOLLOWING STEPS:



SELECT BOARD:



LOAD EXAMPLE CODE ON BOARD:

