

## Experiment- 01

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SECTION: 714/A  
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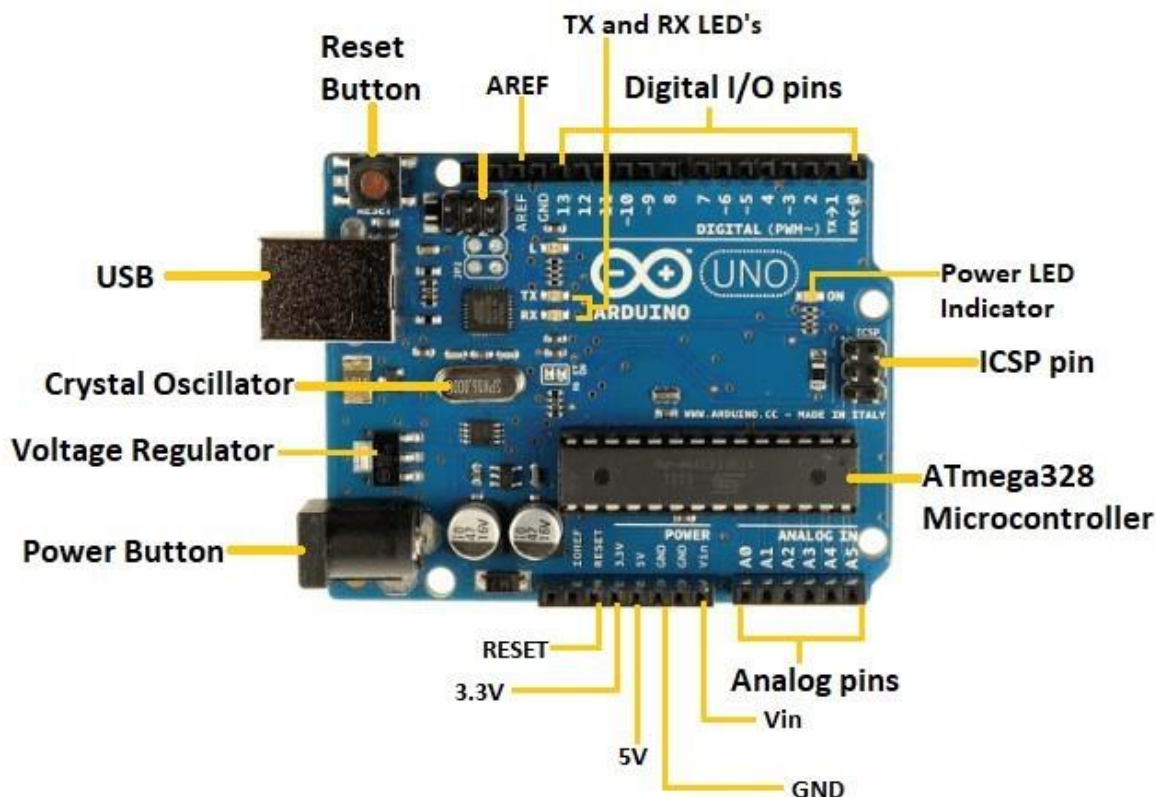
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DATE: 24/02/23  
SUBJECT: IOT LAB

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

### **Requirement Required:**

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

### **Arduino Board:**



### **Program an Arduino:**

The most important advantage with Arduino is the programs can be directly loaded to the device without requiring any hardware programmer to burn the program.

This is done because of the presence of the 0.5KB of Boot-loader which allows the program to be burned into the circuit.

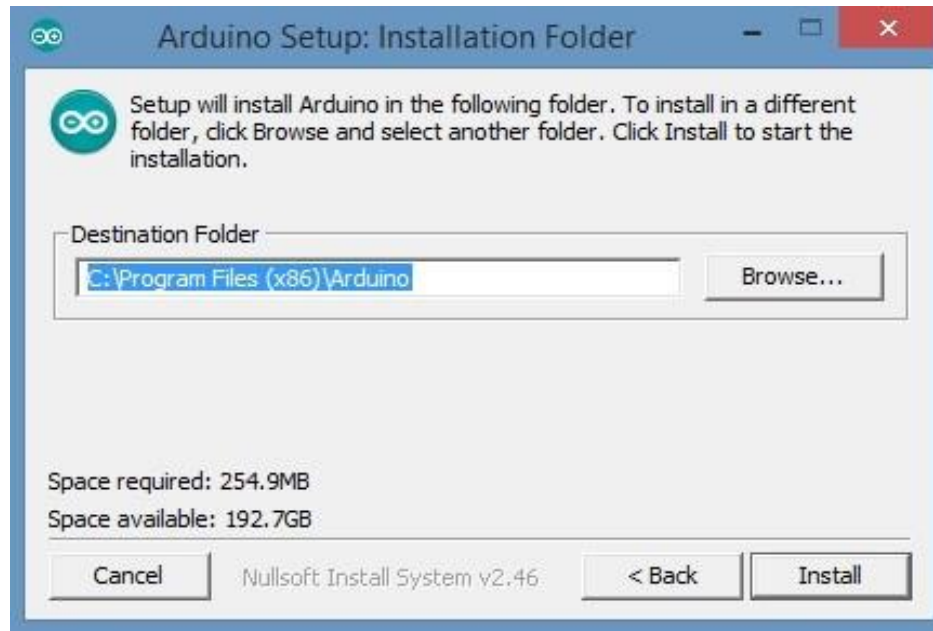
All we have to do is to download the Arduino software and writing the code.

The Arduino tool window consists of the toolbar with the buttons like verify, upload, new, open, save, serial monitor.

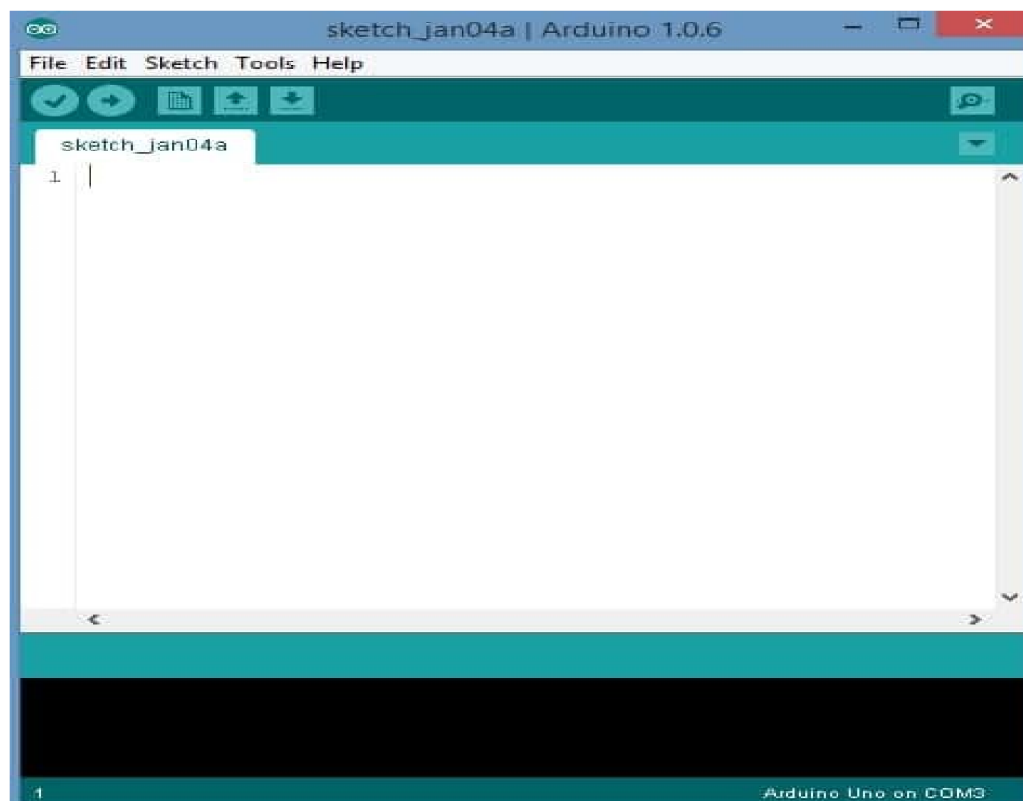
It also consists of a text editor to write the code, a message area which displays the feedback like showing the errors, the text console which displays the output and a series of menus like the File, Edit, Tools menu.

## Steps to program an Arduino:

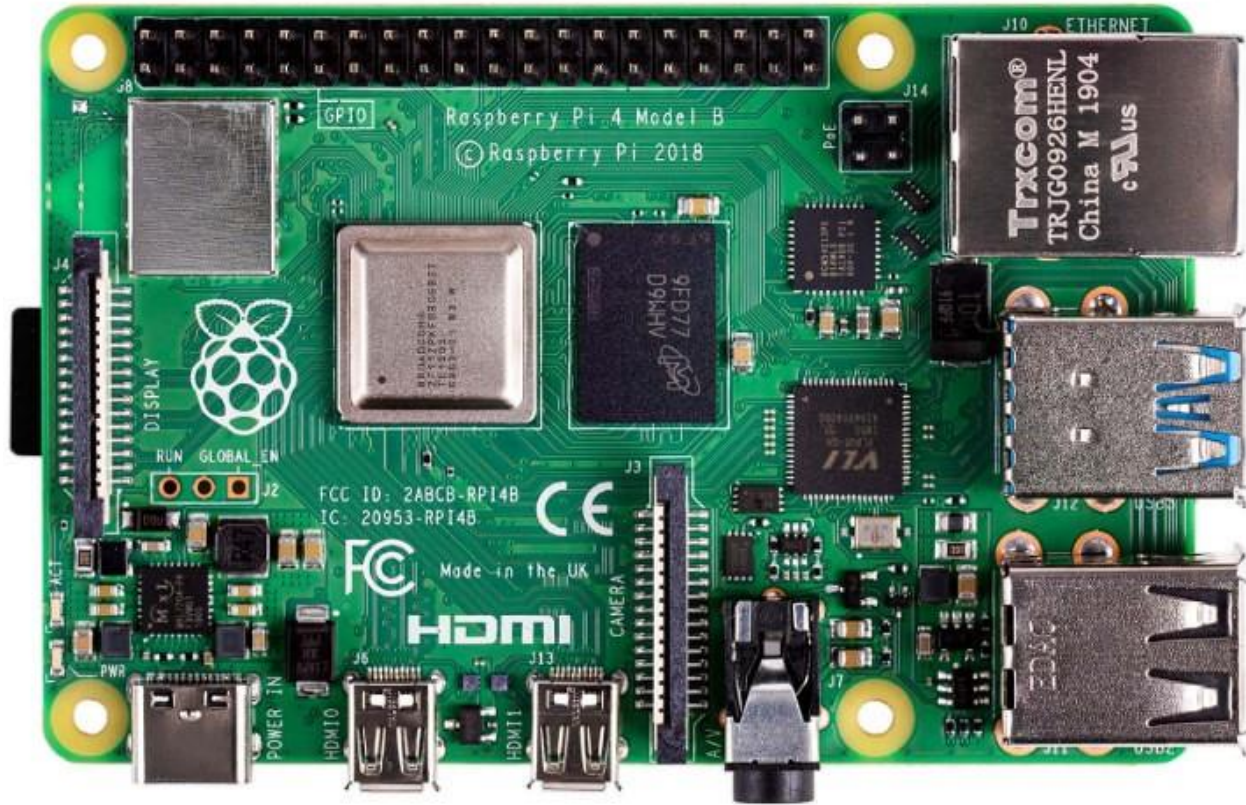
1. Programs written in Arduino are known as sketches. A basic sketch consists of 3 parts
    - a. Declaration of Variables
    - b. Initialisation: It is written in the setup () function.
    - c. Control code: It is written in the loop () function.
  2. The sketch is saved with .ino extension. Any operations like verifying, opening a sketch, saving a sketch can be done using the buttons on the toolbar or using the tool menu.
  3. The sketch should be stored in the sketchbook directory.
  4. Chose the proper board from the tools menu and the serial port numbers.
  5. Click on the upload button or chose upload from the tools menu. Thus the code is uploaded by the boot loader onto the micro controller.
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1. Visit <http://www.arduino.cc/en/main/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. Save the .exe file to your hard drive.
  3. Open the .exe file.
  4. Click the button to agree to the licensing agreement.
  5. Decide which components to install, then click "Next":
  6. Select which folder to install the program to, then click "Install":



7. Now find the Arduino shortcut on your Desktop and click on it. The IDE will open up and you'll see the code editor:



## RASPBERRY PI:



### Program in Raspberry Pi:

Open Mu by going to Raspberry Pi Icon → Programming → Mu.  
Click New in the menu bar to create an empty file.  
Click Save in the menu bar.  
Navigate to the /home/pi directory in the directory dropdown.  
Click the Create New Folder icon in the top-right corner.  
Name this new directory python-projects and hit Enter. Click  
Cancel to close.

### Downloading and Installing Raspberry Pi OS:

These steps should work on a using a Windows, Mac or Linux-based PC are as below:

1. Insert a microSD card / reader into your computer.
2. Download and install the [official Raspberry Pi Imager](#).
3. Click Choose OS.



4. Click Choose storage and pick the SD card you're using.

5. Click Write. The app will now take a few minutes to download the OS & write to your card.

