

Lab 01 - IOT Platforms, Setup Raspberry pi and Arduino

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Performance of Experiment	Journal Submission	Total Marks	Remarks	Instructor Sign

Aim: Study of IoT architecture, development platforms such as Raspberry Pi / Arduino Uno etc. To perform OS installations used to build IoT applications.

Journal content- Theory and frequently asked questions and Experiment

1. Introduction to IOT and its applications
2. Features of Raspberry pi and Arduino
3. Explain Tinker CAD
4. Sketch of your experiment (for ex LED with Arduino in TinkerCAD)
5. Program for LED Blinking. (Program header should carry your Roll no and Name for identity)
6. Conclusion

1. Introduction to IOT and its applications

Internet of things (IOT) describes the network of physical objects “things” that are embedded with sensors , software and other technologies for the purpose of connecting and exchanging data with other devices and system over the internet. IOT is all about connecting machines to internet to transmit the data.

Well-known examples of **IoT** devices include smart speakers like Amazon **Alexa** or Google Home, smartwatches like the Apple Watch, internet-connected baby monitors, video doorbells, and even toys.

Applications of IOT :-

- 1.Wearables
- 2.Health Care
- 3.Smart Cities
- 4.Industrial Automation

2. Features of Raspberry pi and Arduino

Raspberry pi :-

The Raspberry pi is a single computer board with credit card size, that can be used for many tasks that your computer does, like games, word processing, spreadsheets and also to play HD video.

The raspberry pi comes in two models, they are model A and model B. The main difference between model A and model B is USB port. Model A board will consume less power and that does not include an Ethernet port. But, the model B board includes an Ethernet port and designed in china. The raspberry pi comes with a set of open source technologies, i.e. communication and multimedia web technologies. In the year 2014, the foundation of the raspberry pi board launched the computer module, that packages a model B raspberry pi board into module for use as a part of embedded systems, to encourage their use.

Raspberry Pi Model A features :-

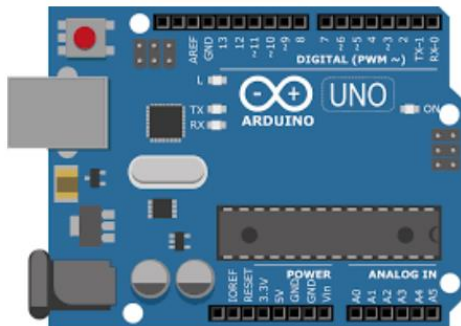
- The Model A raspberry pi features mainly includes
- 256 MB SDRAM memory
- Single 2.0 USB connector
- Dual Core Video Core IV Multimedia coprocessor
- HDMI (rev 1.3 & 1.4) Composite RCA (PAL and NTSC) Video Out
- 3.5 MM Jack, HDMI, Audio Out
- SD, MMC, SDIO Card slot on board storage
- Linux Operating system
- Broadcom BCM2835 SoC full HD multimedia processor
- 8.6cm*5.4cm*1.5cm dimensions.

Raspberry Pi Model B features :-

- 512 MB SDRAM memory
- Broadcom BCM2835 SoC full high definition multimedia processor
- Dual Core Video Core IV Multimedia coprocessor
- Single 2.0 USB connector
- HDMI (rev 1.3 and 1.4) Composite RCA (PAL & NTSC) Video Out
- 3.5 MM Jack, HDMI Audio Out
- MMC, SD, SDIO Card slot on board storage
- Linux Operating system
- Dimensions are 8.6cm*5.4cm*1.7cm
- On board 10/100 Ethernet RJ45 jack

Arduino :-

Arduino is an open hardware development board that can be used by tinkerers, hobbyists, and makers to design and build devices that interact with the real world. While Arduino refers to a specific type of board design, it can also be used to refer to a company which manufactures a specific implementation of these boards, and is typically also used to describe the community around compatible boards made by other people or companies which function in a similar way.



Arduino Uno ATmega328

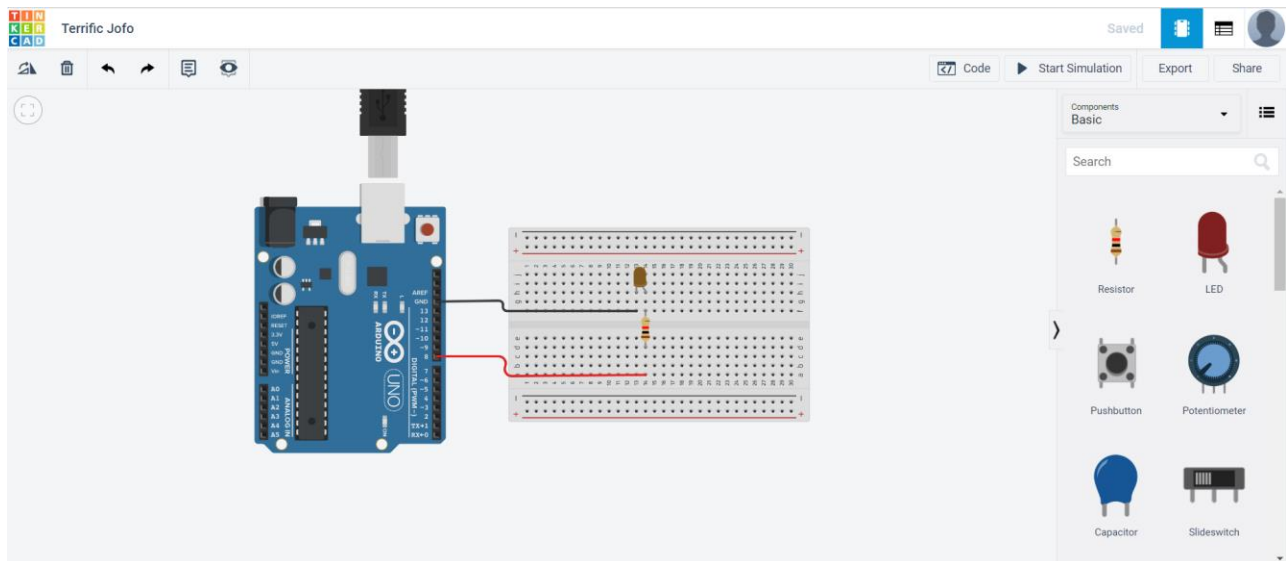
Features of Arduino Uno ATmega328:-

- The operating voltage is 5V
- The recommended input voltage will range from 7v to 12V
- The input voltage ranges from 6v to 20V
- Digital input/output pins are 14
- Analog i/p pins are 6
- DC Current for each input/output pin is 40 mA
- DC Current for 3.3V Pin is 50 mA
- Flash Memory is 32 KB
- SRAM is 2 KB
- EEPROM is 1 KB
- CLK Speed is 16 MHz

3. Tinker CAD :-

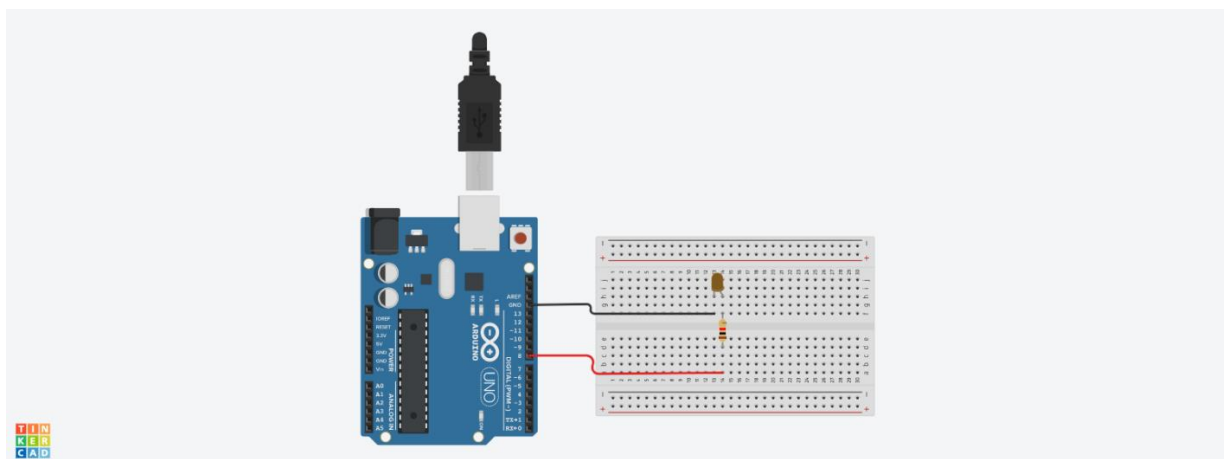
Tinkercad is an **online** collection of software tools from Autodesk that enable complete beginners to create #D Models , design circuits and simulate them. This CAD software is based on constructive solid geometry (CSG), which allows users to create complex models by combining simpler objects together. As a result, this 3D modeling software is user-friendly and currently enjoyed by many, particularly teachers, kids, hobbyists and designers. Additionally, it is **free**!

Tinkercad is a free online collection of software tools that help people all over the world think, create and make. We're the ideal introduction to Autodesk, the leader in 3D design, engineering and entertainment software.



Tinker Simulator has following tyoes of components for virtual simulation of IOT • Basic Components, Input Sensors Output Actuators, Power Supplies, Breadboards • Measurement meters, OPAMP Ics, Connectors, Logic ICs

4. Sketch of your experiment (for ex LED with Arduino in TinkerCAD)



```
//Setup function runs once when we start the simulation
void setup()
{
  pinMode(8, OUTPUT);
}
//loop runs infinite time again and again
void loop()
{
  digitalWrite(8, HIGH); //LED Glows
  delay(1000); // Wait for 1000 millisecond(s) //Glow for 1 sec
  digitalWrite(8, LOW); //LED off
  delay(1000); // Wait for 1000 millisecond(s) //Off for 1 sec to produce blinking effect
}
```

6. Conclusion:-

Thus we have studied two popular IoT platforms. We have studied IoT platforms features with its layout. Above tutorials / labs show how to setup the Arduino with tinker CAD, Raspberry Pi and make them ready for IoT experiments. Also demonstrated LED blinking program using Raspberry pi and TinkerCAD Arduino.

