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3	Theory Components of IOT MAC, Issue the Privacy in IOT, DNS, Raspberry Pi MQTT Protocol		14/8/2019	14/8/2019	AS
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To interface LED with Arduino and write a program to turn ON LED for 1 sec after every 2 sec.

Components Needed :-

- 1, Arduino Uno
- 2, LED
- 3, Resistor
- 4, Breadboard
- 5, Jumper wires

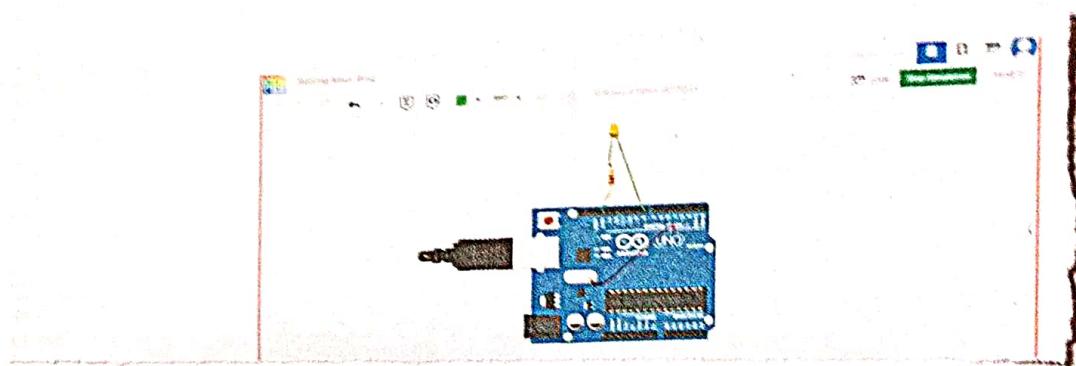
Procedure

- 1, Connect the LED
 - Place the LED on the breadboard
 - Connect the one end to the GND pin on the Arduino
 - Connect the other end of the LED to a Digital Pin (eg. Pin 8) on the Arduino using a jumper wire
- 2, Write a program
 - Open a tinkerboard and create a new circuit
 - Add Arduino Uno and the components
 - Use the following code to turn on the ~~light~~ LED for 1 second

```
int ledPin = 8;
```

```
void setup () {
  pinMode(ledPin, OUTPUT);
}
```

To interface LCD with Arduino and write
a program to turn on LCD for 1 sec after
0 sec

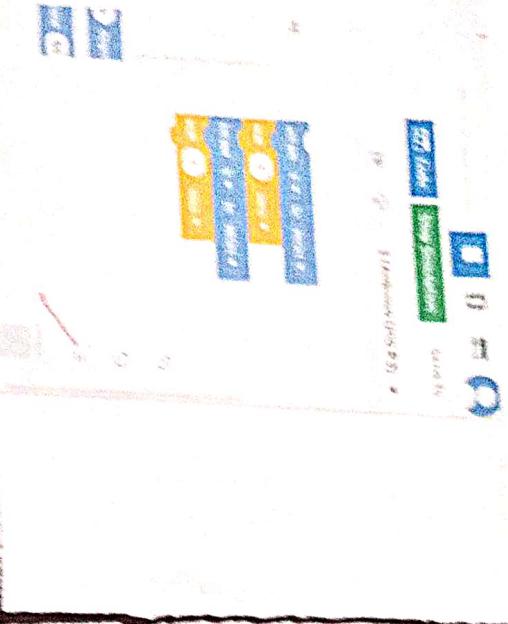


Ward Rock (17)
dry wash (soil) (17)

John (John) Johnson, a man of
great worth & wisdom, I am very
glad to see you again.

Mr. C. H. Smith, Mr. C. H. Smith,
Chairman of the Committee on Education
and the Board of Education.

This project demonstrates the benefit of integrating LEDS with an algorithm and using it during function to control the timing of LED.



To interface LED with arduino and write a program to turn on 3 LEDs for 1 sec after every 2 sec.

Components Needed:

Arduino Uno
3 LED's

Resistors
Breadboard

Jumper wires
Summarise

Procedure

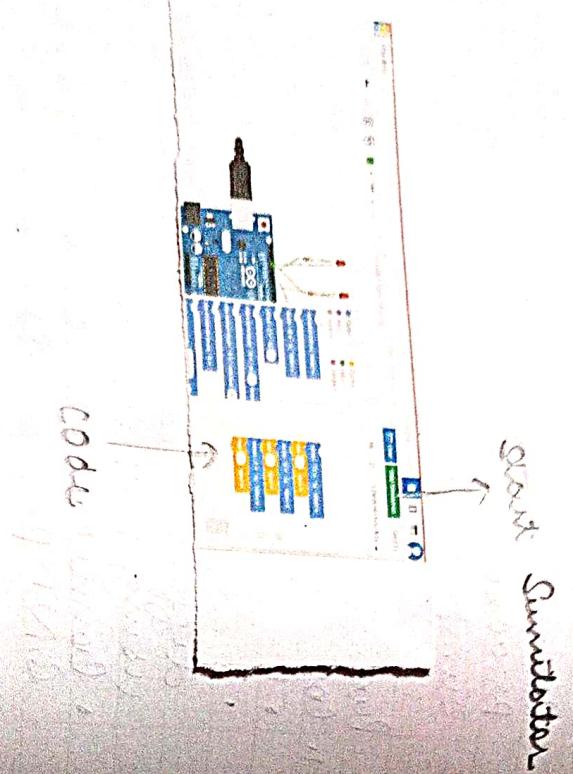
1. Connect the LEDs
- Place the three LEDs on the breadboard
- Connect the anode (long leg) of each led to different digital pins on Arduino (eg pin 18, 9, 11)
- Using jumper wires
- Connect the cathode of each led to the GND pin on the Arduino

Write a program

- Open Tinkercad and create new circuit
- Add ArduinoUno and the components
- Use the following code.

```
int ledPins[] = {8,9,10};
```

```
void setup() {
    for(int i=0; i<3; i++) {
        pinMode(ledPins[i], OUTPUT);
    }
}
```



Start Simulation

- 3
- 3 Simulate the circuit
- 3 Click on "START Simulation" in tickertape to see each LED turn on and off in sequence

Conclusion \Rightarrow This project demonstrate the basics of interfacing LEDs with our arduino and using delay function to control timing of

Code



Q1 Explain the components of IOT

The components of IOT are Physical Object, Sensors, actuators, Connectivity, User interface.

1. Physical Object :> They are embedded with electronics, software, sensors and network connectivity which enables these objects to collect and exchange data and play a remarkable role in many domains including transportation, healthcare, industrial automation etc.
2. Sensors :> It work to gather minute data from surrounding environment. They are sometime also known as detectors as the primary function of sensor is to detect.
3. Actuators :> It work opposite to that of sensors while sensors sense; actuators act. They receive a signal or a command and on that basis they perform an action.
4. Connectivity :> Sensors are connected to cloud through a variety of methods including cellular, Satellite, WIFI, Bluetooth.
5. User Interface :> The user interface is the visible

components that it uses, and in context.

Q_b) The IOT User.

Q) What is MAC (Media Access Control) address?

Every network connected device also has a MAC address. It is used to differentiate different machines on the same physical network so that they can exchange packets.

This relate to the lowest level "link-layer" of the TCP/IP stack. Though MAC addresses are globally unique, they don't typically get used outside of an Ethernet network.

MAC protocol will play a very crucial role in achieving the desired quality of service.

Q) Discuss the issue Q) Privacy in Internet of things?

IOT devices that we own aren't the only ones that should concern us when it comes to privacy. With more sensors and devices watching us and reporting data to the Internet, the privacy of third parties with cross our sensors path is an important consideration. Designers of an IOT service will need to balance these concerns carefully. However even seemingly innocuous application can leak personal information.

Write note on DNS

The DNS (Domain Name Service) helps our feeble brain navigate the Internet. Domain names, such as the following are familiar to us from the web, or perhaps from email or other service.

Each domain name has a ~~top~~ level domain (TLD)

Write note on Raspberry Pi?

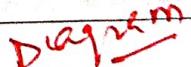
In 2012 the foundation work came to fruition with the creation of the Raspberry Pi, a credit card sized, low cost but fully functional and programmable computer with modern high definition multimedia capability. It may be the device that gets us back to ~~the~~ computing basics. Device looks like a motherboard with mounted chips and ports exposed something you'd expect to see only if you opened up your computer and looked at its internal board.

The various components of Raspberry Pi board:

1. ARM CPU / GPU

6. Power

2. GPIO

7. Audio out 

3. RCA

4. LED's

5. HDMI

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Q) Spared slot : It has OS in it used while booting
 Ethernet : Used for WIRED LAN

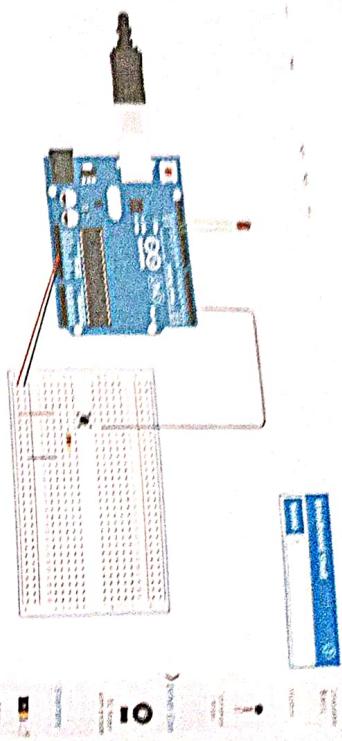
A) White note on MQTT Protocol

MQTT is one of the most commonly used protocols in IOT projects.

- It stands for message queuing Telemetry Transport.
- It designed as a light weight messaging protocol that uses publish & subscribe operation to exchange data b/w client and the server.
- Its small size low power usage , minimized data packets and ease of implementation make the protocol ideal of the machine to machine or IOT "world". MQTT server is called broker and the clients are simply the connected devices .
- MQTT server is called broker and the clients are simply the connected devices .
- When a device (a client) want to send data to the broker , we call this operation a 'publish' .
- MQTT has unique feature you can hardly find in other protocol like . It is light weight protocol so its easy to implement in soft ware and fast in data transmission .
- It is based on a messaging technique .
- Minimized Data Packets

~~Teacher's Signature :~~

Driving sound with Arduino push button
To interface Push button | Digital Sensor (LDR) with Arduino & write a program to turn ON LED when Push button is pressed or at sensor detection.



Components

Arduino Uno

LED

Push button or Digital Sensor

Resistor

Bread board

Sensor wires

Procedure

- Open a Tinkercad card & create a new circuit
- Open a components & connect them
- Drag the resistors in the wiring section as described in the wiring section
- Paste the Arduino code in the code editor
- Start the simulation and test by pressing the push button on triggering the sensor.

~~Code~~

```
# Define pin numbers
const int buttonPin = 2;
const int sensorPin = 3;
const int ledPin = 13;
```

void setup () {

```
pinMode (ledPin, Output);
pinMode (buttonPin, INPUT);
pinMode (sensorPin, INPUT);
```

{

```
void loop () {
```

```
int buttonState = digitalRead (buttonPin);
int sensorState = digitalRead (sensorPin);
```

```
if (buttonState == HIGH) sensorState ==
HIGH {
```

```
digitalWrite (ledPin, HIGH);
}
```

else

```
digitalWrite (ledPin, LOW);
}
```

}

Conclusion

we successfully set up a circuit and written a program to turn ON a LED.

Code of the given circuit

```
void setup ()
pinMode (2, INPUT);
pinMode (13, OUTPUT);
}
void loop () {
```

```
if (digitalRead (2)
    == HIGH) {
    digitalWrite (13, HIGH);
} else {
    digitalWrite (13, LOW);
}
```

To interface OLED with Arduino and write a program to print temperature and humidity reading on it.

Components

Arduino Uno

OLED Display (12 () // LCD

DHT Sensor // Temperature Sensor

Resistor (10 KΩ)

Bread board.

Jumper wires.

Procedure

- 1, Log in to Tinker Cad
- Open Tinker Cad and go to circuits
- Create a New Circuit

2, Search and Add Components

3, Set up the circuit

- 1, Connecting the OLED Display
- 2, Connect the DHT11 sensor

4, Install the required libraries in Tinker Cad Editor.

5, Make sure to add Adafruit_SSD1306, Adafruit_GFX and DHT in the code

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5)

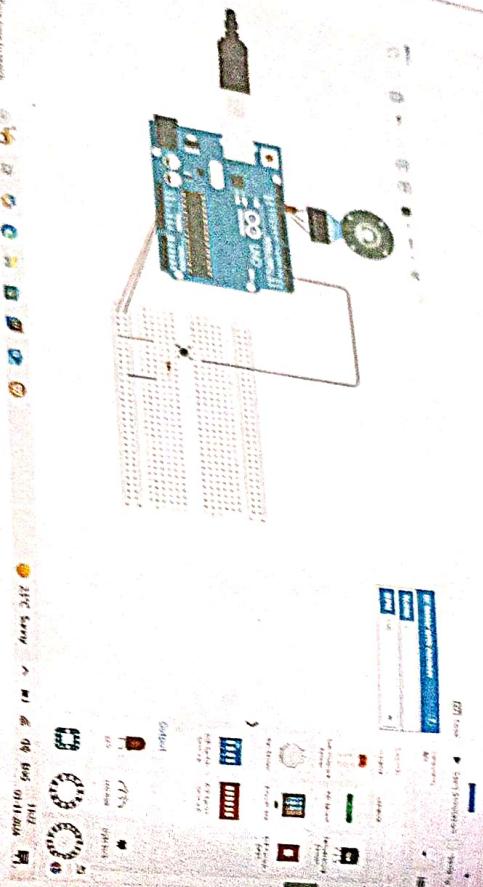
Program the arduino

- Click on Code to open the code editor
- Delete the existing code
- Paste or write the code.

Code

Teacher's Signature :

new wells containing
motor when
Gelatine well is seen on monitor
when a program is passed to arduino
from laptop



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To order the motor using motors with Arduino
when motor is pressed &
know.

Component
Jumper wires

Bread board

L293D

Jumper wires

- Procedure is taken and write a new circuit
- Open a bread board and write a new circuit
 - Draw the components and connect them
 - as described in the writing section
 - Paste the Arduino code in the code editor
 - Start the simulation and set by pressing the push button or triggering the sensor.

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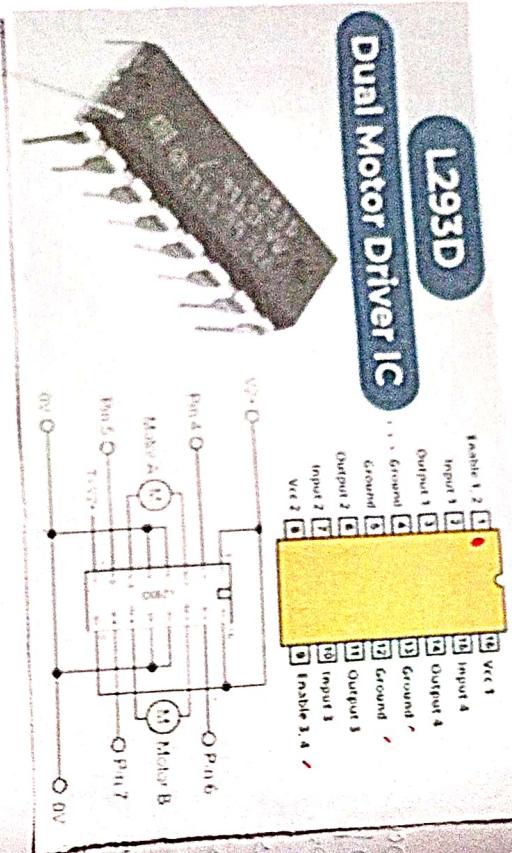
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- L293D
Dual Motor Driver IC
Used to control the direction and speed of DC motors
It contains two H-bridges circuits, allowing it to drive two DC motors simultaneously or one stepper motor

- Key features
• Dual H - Bridge
• Bidirectional Control
• Voltage Range
• Current Rating

Applications

- Robotics
• Home Automation
• Educational Projects.

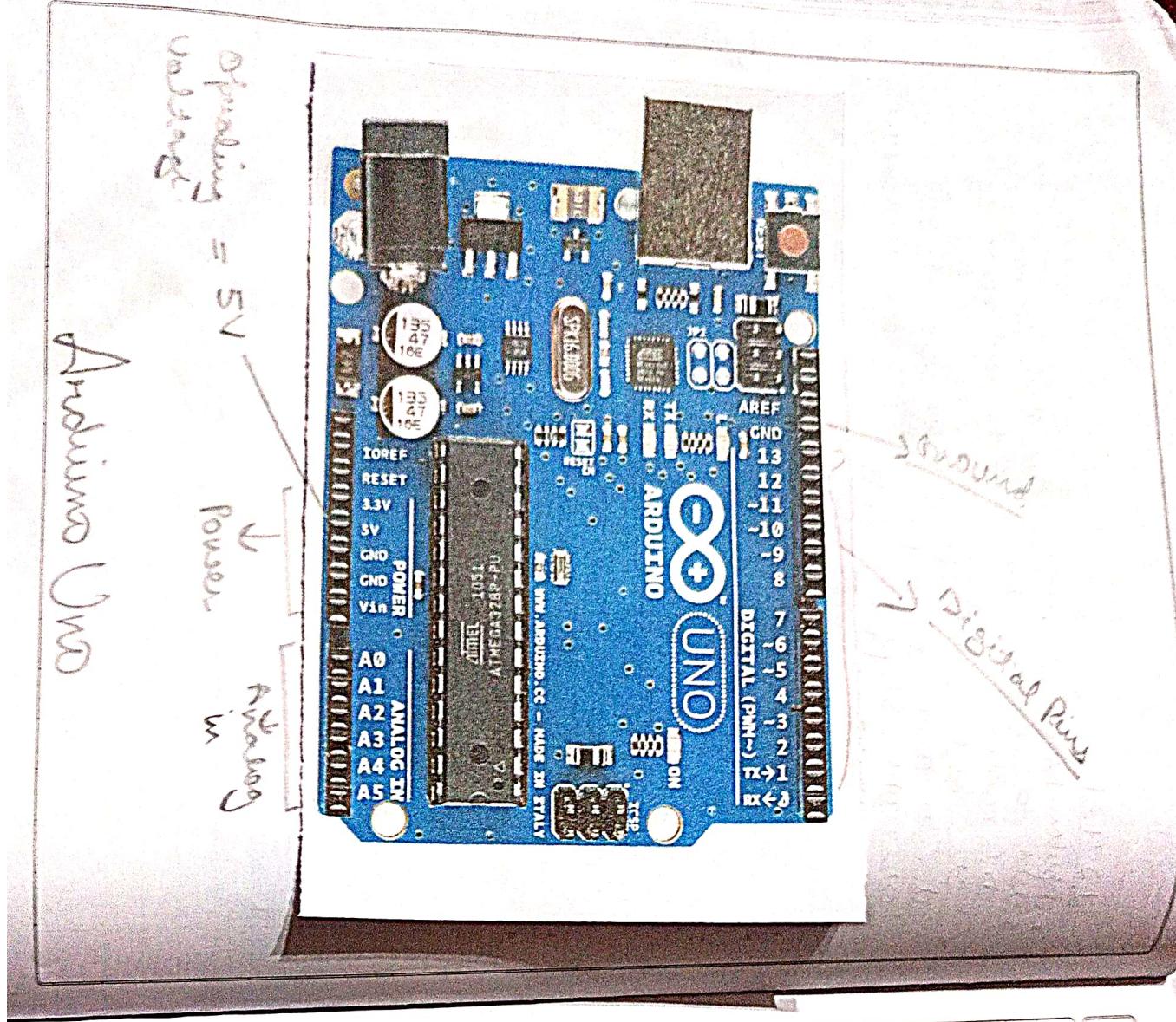


L293D

Used
in Broadcast

✓

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Arduino Uno

→ Widely used open source microcontroller board based on the ATmega 328P microcontroller. It is designed for beginners and professionals alike to build electronic projects with ease.

Key features

Microcontroller

Operating Voltage : 5V

Input Voltage : 7-12V

Digital I/O Pins : 14

Analog Input Pins : 6

Clock Speed : 16 MHz

Flash Memory : 32 kB

S RAM : 2 kB

e e PROM : 1 kB

Components

- Digital I/O Pins
- Analog Input Pins
- Power Pins
- USB Interface
- I2S Reader
- Read Pinhole

Arduino Uno

Operating Voltage

= 5V

Power

Analog in

Bread Board

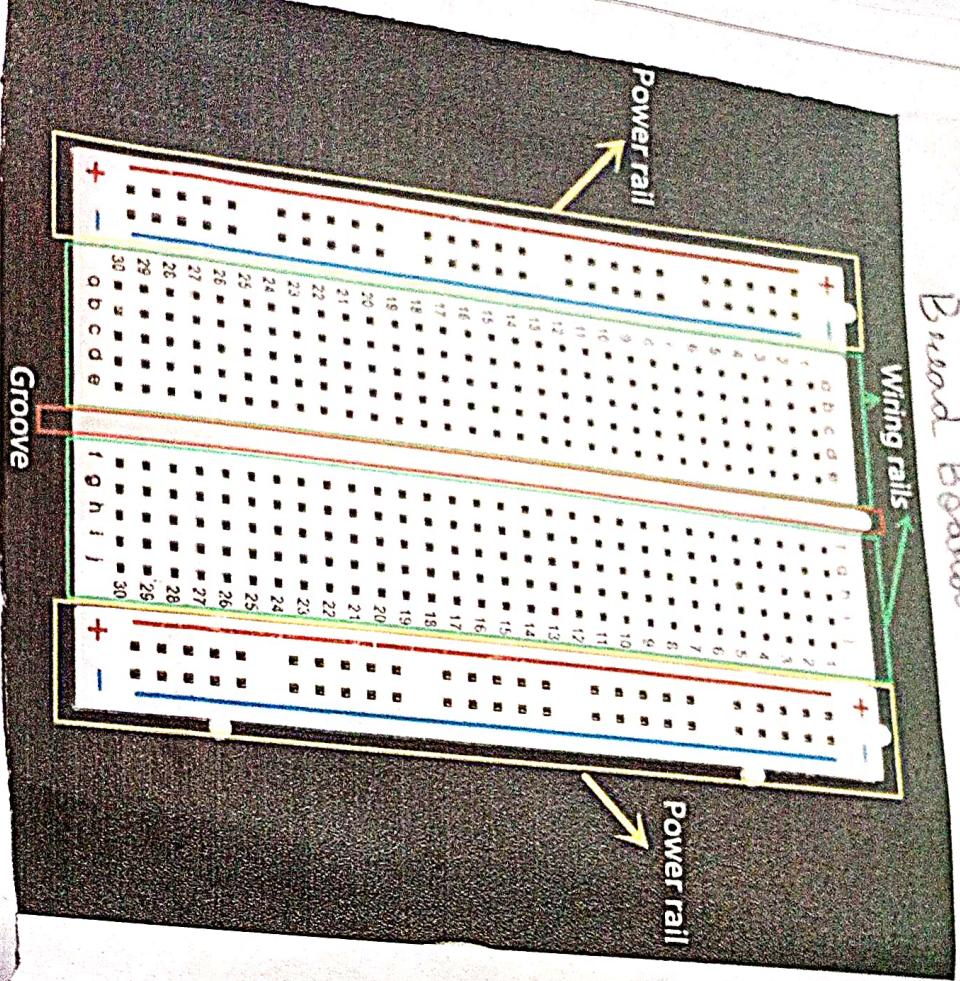
A breadboard is a rectangular plastic board with a grid of tiny holes that allows you to easily insert electronic components and wires to create prototype circuits without soldering.

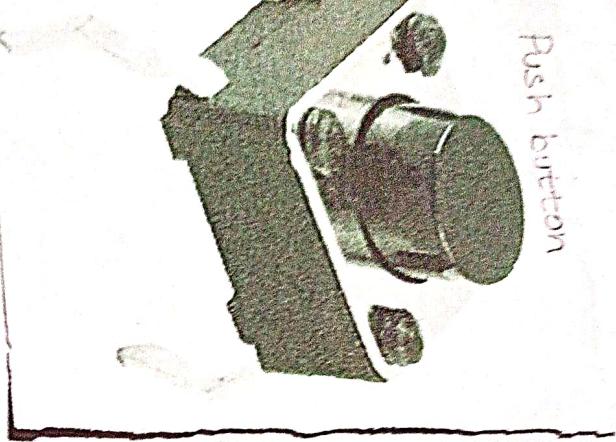
Advantages

- Reusable
- Flexible
- No Soldering Required

Application

- Prototyping → Commonly used for building and testing prototypes.
- Education → Widely used in educational settings to teach electronics and circuit design.
- DIY Projects → Popular among hobbyists for building various electronic projects.





Push Button

A push button is a simple switch mechanism you can press or release by pushing it. It consists of contacts which connect or disconnect depending on whether the button is pressed or not. Push buttons are commonly used in various electronic devices such as televisions, radios, and mobile phones.

Applications

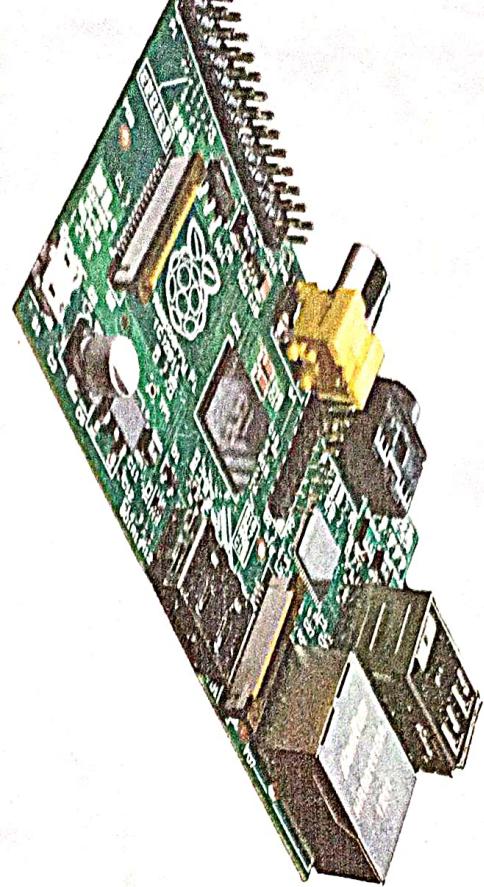
- 1) Control Panels
- 2) Consumer Electronics
- 3) Automotive
- 4) Home Appliances

Types of Push button

- 1) Momentary Push Button
- 2) Latching Push Button

Teacher's Signature :

Raspberry Pi



Raspberry Pi

The Raspberry Pi is a small, affordable, single board computer developed by Raspberry Pi foundation.

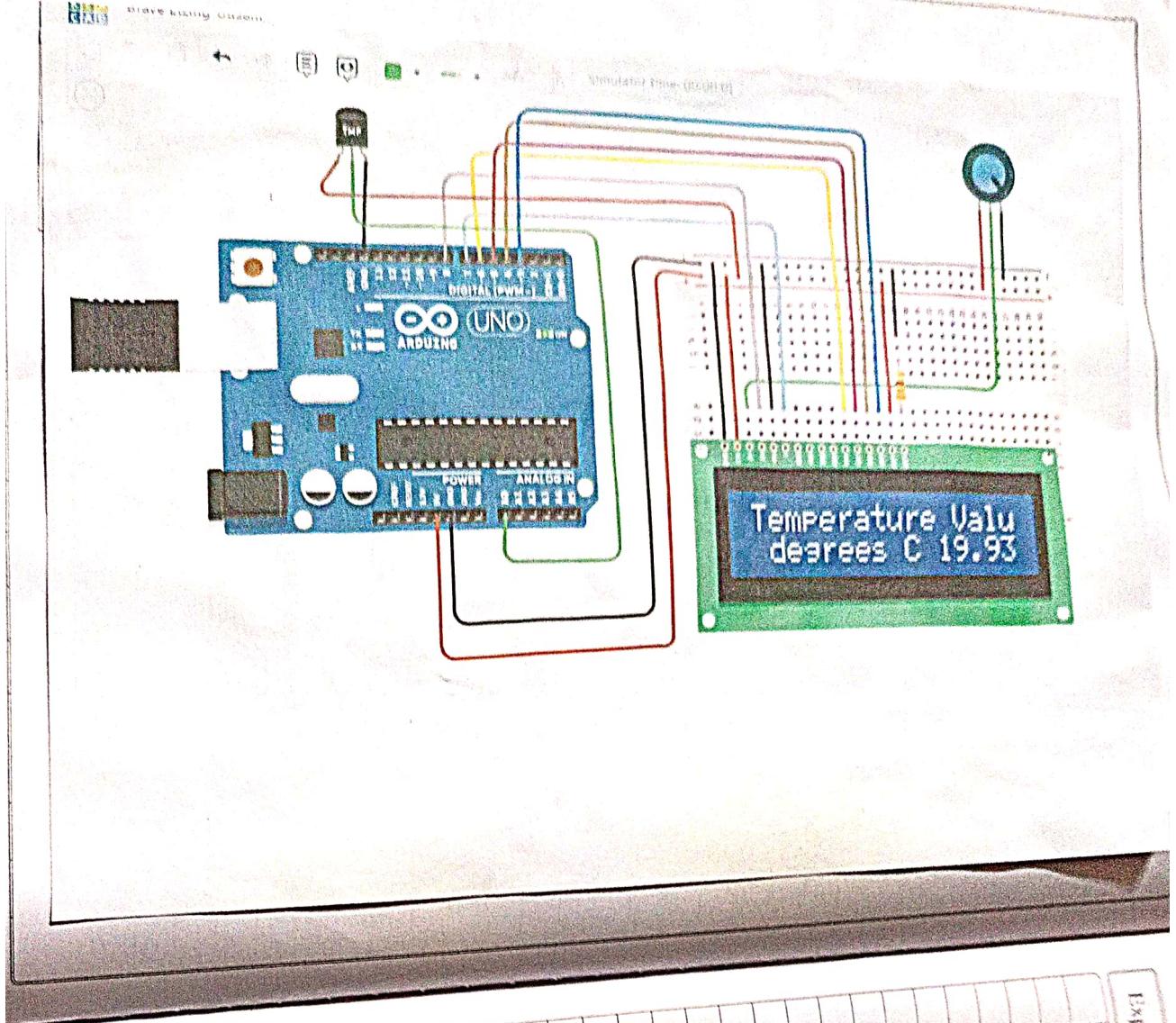
Key features

1. Processor : ARM based CPU
2. RAM
3. Storage : MicroSD card slot for storage
4. USB port : Multiple USB ports
5. HD MI Port : for video output
6. GPIO Pins
7. Networking : Ethernet port
8. Audio Output : 3.5 mm audio Jack and HDMI

Applications

1. IOT Projects
2. Web servers
3. Media Centers
4. Home Automation
5. DIY Projects
6. Educational Projects

(With a large red checkmark)



Expt. No.

Date: 20/09/2018

To interface Arduino and write a program
to write on LCD to print temperature and
humidity reading

Components

Arduino Uno

Jumper wires

Breadboard

2x3 D

Potentiometer

Temperature sensor (TMP)

Procedure

- Open a terminal window
- Create a new circuit
- Drag all the components
- Connect them as described
- Paste the Arduino code below in the code editor
- Start the simulation and test by pressing play button

AKG

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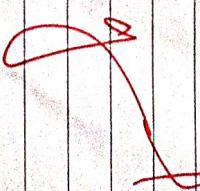
we used "liquid crystal" in
disorderly state fed (0, 7, 16, 15, 4, 13) in
wt sensor pin = 0;

Serial. begin (9600) if
led. begin (1012);

void loop()
{}
int reading = analogRead (sensorPin

present voltage = reading 4.68;
voltage $I = 1024.0$;
float temperature ($= \text{voltage} - 0.5$) $\times 100$;
Serial. print ("Temperature");
Serial. print ~~(degrees C")~~;

Lcd. setcursor (0,0);
Lcd. print ("Temperature Value ");

delay (100); } 

float temperature (\equiv voltage - 0.5) * 150;
Serial. print (temperature());
Serial. println (degrees C);

red. set cursor (0,0);
red. print ("Temperature Value ");
delay (100); }

Teacher's Signature

Teacher's Signature

110 Min. 4

To understand how to define and
use the program for both variable data to
control a servo using Arduino

Variables

for Arduino

Variables define

Variable types

byte b

int i

float f

double d

char c

String s

Boolean b

void void

functions

methods

variables

parameters

return

statements

operators

control

loops

decisions

functions

variables

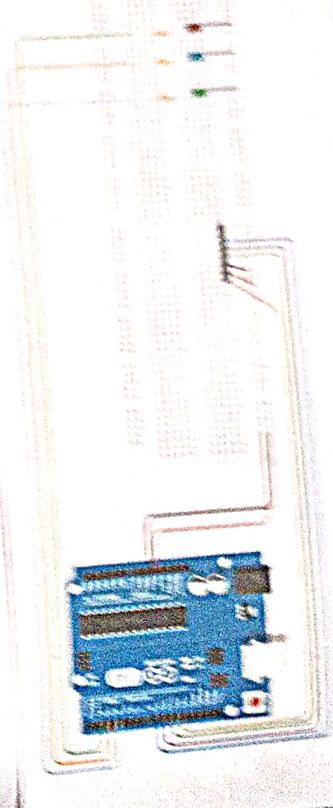
constants

functions

variables

Variables

10



1 Write a program on Arduino to print the temperature data to my PC screen.

Components Required:

Arduino Uno

Optical Temperature Sensor

LED

Procedure

Open arduino IDE

Insert breadboard

Do all the connections

Connect them in breadboard

Write the code in code editor

Upload a code in code editor

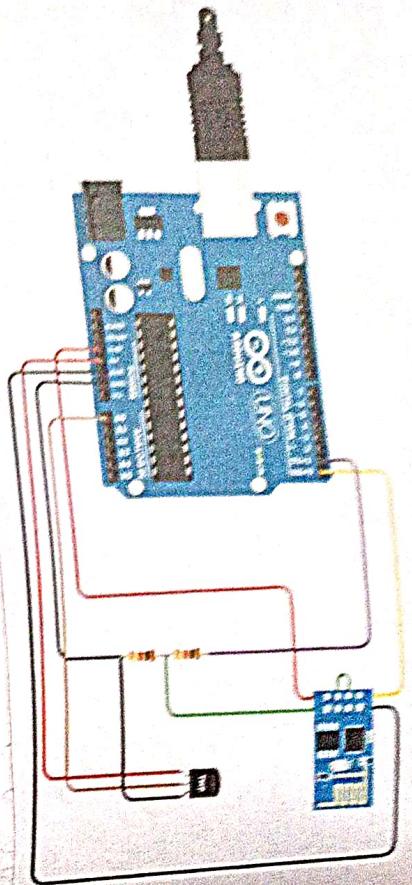
Upload a simulation and then the program

Program on - we can say our connection

is work properly



Write a program on Arduino to upload data and humidity data to thingspeak cloud



Components

- Arduino Uno
- Jumper wires
- DHT11 Sensor
- Jumper wires
- Relay
- WiFi Module (ESP8266)

Procedure

- Open a Tinker Cad
- Create a new circuit
- Drag all the components
- Connect them as described with jumper wires
- Parse them
- Write a code in code editor
- Start or ~~start~~ simulator

Code

```
string said = "simulation visible";
string password = " ";
string URL = "
```

but set up ESP 266 (verb) 9
second channel (115200)
second protocol (AT);
delay (10) 1

return
3

```
int temp = map (analogRead (A0, 135));
```

String httpPacket = "GET" + url + "HTTP/1.1\r\n"

vars setup()

~~setup tscr2t6();~~

vänt körp () sp
ann data (),
doksy (10 000) ;