

Experiment No :- 1(A)

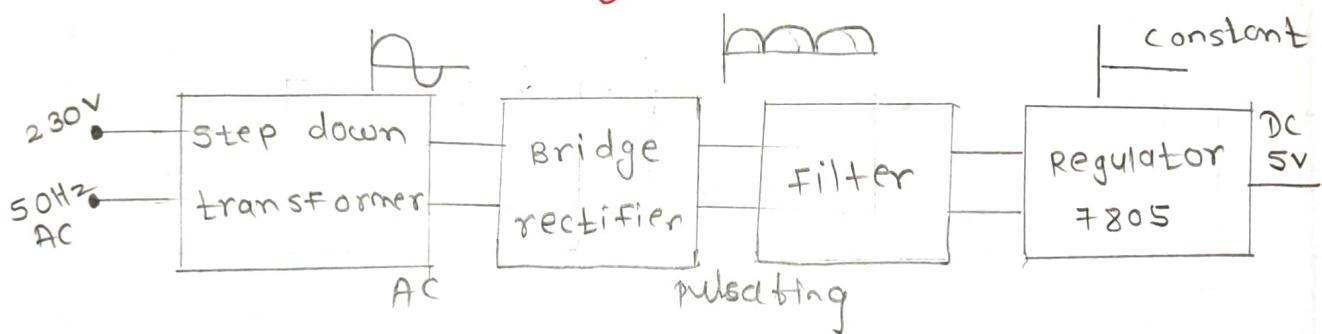
Aim :- Design of the following circuit using multism protues.

A) Regulated power supply

components required :- diodes, resistors, capacitors, 7805 IC, jumper wire, breadboard, transformer, etc.

Simulation tool :- Multisim software

Block diagram :-



Experiment No:- 1 (A)

Aim:- Design of the following circuit using Multisim Proteus.

- a) regulated power supply
- b) astable multivibrator

Objectives:- To study the circuit of the regulated power supply and

components required :- diodes, ~~resistor~~, resistor, capacitors 7805 IC, jumper wires, breadboard, transformers etc.

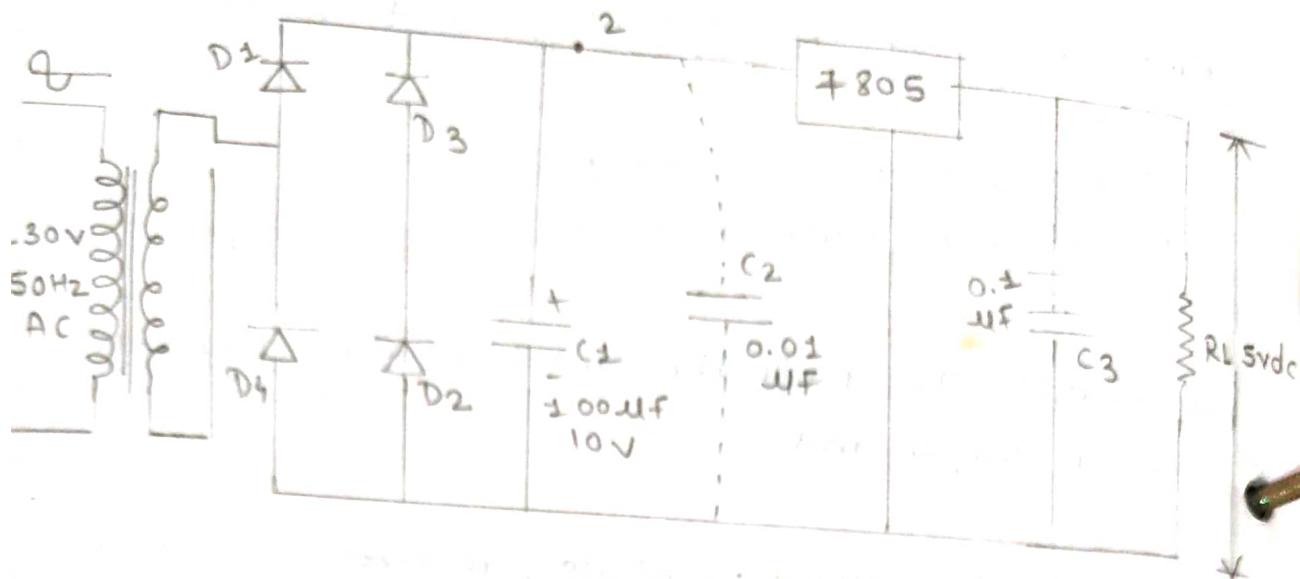
Simulation tool:- Multisim software

Theory:- A ~~regulated~~ power supply converts unregulated AC (Alternating current) to a constant DC (Direct current).

A regulated power supply is used to ensure that the output remains constant even if the input changes.

It is also known as a linear power supply it is an embedded circuit and consists of various blocks

circuit diagram:



Result:- we get the constant Dc as the output when use pass the unregulated Ac.

Observation:- we get 5vDC from the 230v AC in regulated power supply.

Conclusion:- almost all electronic equipments include a circuit that converts AC voltage or main supply into DC voltage this part of equipment is called power supply. even if the input changes, the output in regulated power supply remains constant.

is to ~~convert~~ convert the AC supply into a DC supply if takes the AC supply as input and gives the direct current as output.

The rectifier's output can be variable.

Filter:- The output of the rectifier circuit cannot provide the pure DC supply. There are some supply or AC components available in the DC power supply. To remove these supplies we use filters. The output of the rectifier is connected to the input of the filter circuit.

Regulator:- It is used to series 7805 of voltage regulator IC. Here the output voltage rating of the circuit is required 5V. That is why we used IC 7805. We also use two ceramic capacitors rated 0.01 μ F are connected to the input and output of the regulated IC. This is used for the noise reduction.

Results:- We get the constant DC as the output when we pass the unregulated AC.

The regulated power supply will accept an AC input and give a constant DC input. The basic blocks of a regulated DC power supply are as follows.

1. A step down transformer :- A transformer is a device that transfers the electrical energy from one circuit to another circuit by changing the voltage level. Here, in this circuit, a step down transformer is used that is used to step down the voltage it takes the 220V supply as the input and provides 12V or 6V as the output according to the circuit output requirement.
2. Rectifier:- The rectifier is an electrical circuit made up of PN junction diodes. The main function of the rectifier circuit.

calculations :-

Selection

1) Transformer

2) Diode (IN4007)

$$T_F = 1A$$

$$P_{IN} = \pm 1000V$$

$$3) R_L = \frac{V_0}{I_L} = \frac{5V}{5.5mA} = 909.09\Omega$$

$$R_L = \frac{\sqrt{2} - 2V_D}{T_L = T_D}$$

$$R_L = \frac{6\sqrt{2} - 2 \times 2.7}{5.5mA}$$

$$R_L = 1288.23\Omega$$

Select $R_L = 1K$

$$\frac{1}{4}V_{OL}$$

$$\text{Voltage } R_L = \frac{1}{4}V_{OL}$$

$$P_{RL} = T_L^2 \times R_L$$

$$= (5.5mA)^2 \times 1000\Omega$$

$$P_{RL} = 0.0302 \text{ watt}$$

$$P_{RL} = 30mW$$

4) capacitor (Electrolyte).

$$r = \frac{1}{4\sqrt{3} \times R_L \times C \times f} = 0.03$$

$$C = \frac{1}{4\sqrt{3} \times 1K \times 50Hz \times 0.03}$$

$$= 96\mu F$$

$$\boxed{\text{Select } C = 100\mu F}$$

Conclusion:- Almost all electronic equipments include a circuit that convert AC voltage or main supply into DC voltage this part of equipment is called power supply Even if the input changes, the output in regulated power supply remains constant.



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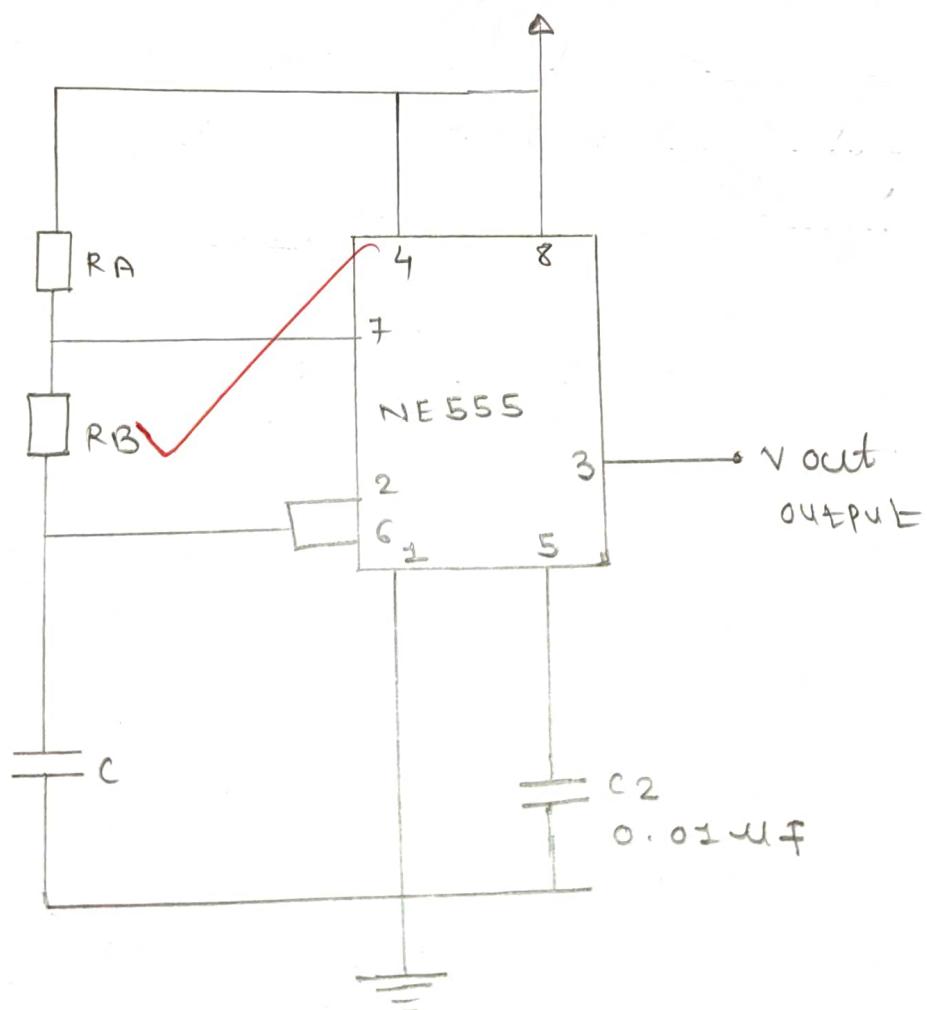
Experiment NO :- 1(B)

Aim:- Design of following circuit using multism / protenus

- (A) regulated power supply
- (B) astable multivibrator

Components required:- 555 timers IC, resistors, capacitor, breadboard, jumper wires

Circuit Diagram:-



Experiment no 1 (B)

Aim:- Design of following circuit using Multisim / Proteus

- (A) regulated power supply ✓
- (B) astable multivibrator ✓

Components required :- 555 timer IC resistors, capacitors breadboard jumper wires, etc.

Simulation tool :- Multisim software.

Theory:- 555 timer IC in astable mode can be used to produce a very stable 555 oscillator circuit for generating highly accurate free running waveforms whose output frequency can be adjusted by means of an externally connected RC tank circuit consisting of just two resistors and a capacitor the astable multivibrator is not stable and it repeatedly switches from one state to the other

An astable Multivibrator can be made by adding two resistors R_A and R_B (in ckt dia) and a

calculations:-

The time during which the capacitor C charges from $\frac{1}{3}V_{CC}$ to $\frac{2}{3}V_{CC}$ is equal to the time the output is high and given by

$$t_C \text{ or } T_{HIGH} = 0.693 (R_A + R_B) C$$

$$R_A = 10K$$

$$R_B = 20K$$

$$T_{HIGH} = 0.693 (10 + 20) \times 0.01 \times 10^{-6}$$

$$\boxed{T_{HIGH} = 0.2079 \times 10^{-6}}$$

The time during which the capacitor discharges

from $\frac{2}{3}V_{CC}$ for $\frac{1}{3}V_{CC}$ is equal to

$$t_D \text{ or } T_{LOW} = 0.693 R_B C$$

$$= 0.693 (20) (0.01 \times 10^{-6})$$

$$\boxed{T_{LOW} = 0.138 \times 10^{-6}}$$

capacitor to the 555 timer IC these two resistors and the capacitors are selected appropriately so as to obtain the desired 'on' and 'off' timings at the output terminal so basically, the on and off time at the output (i.e. High and Low state at the output terminal) is dependent on the values chosen for RA, RB and C. the capacitors is used to avoid noise problems that could arise in the circuit if that pin is left open.

Result:- The LED which is connected at the output glows, the glowing LED indicates that the circuit is of ~~an~~ astable multivibrator which produce a stable circuit for generating the square waveforms

Conclusion:- we have successfully completed the working explanation of an astable Multivibrator using 555 IC we can see the two important parameters.

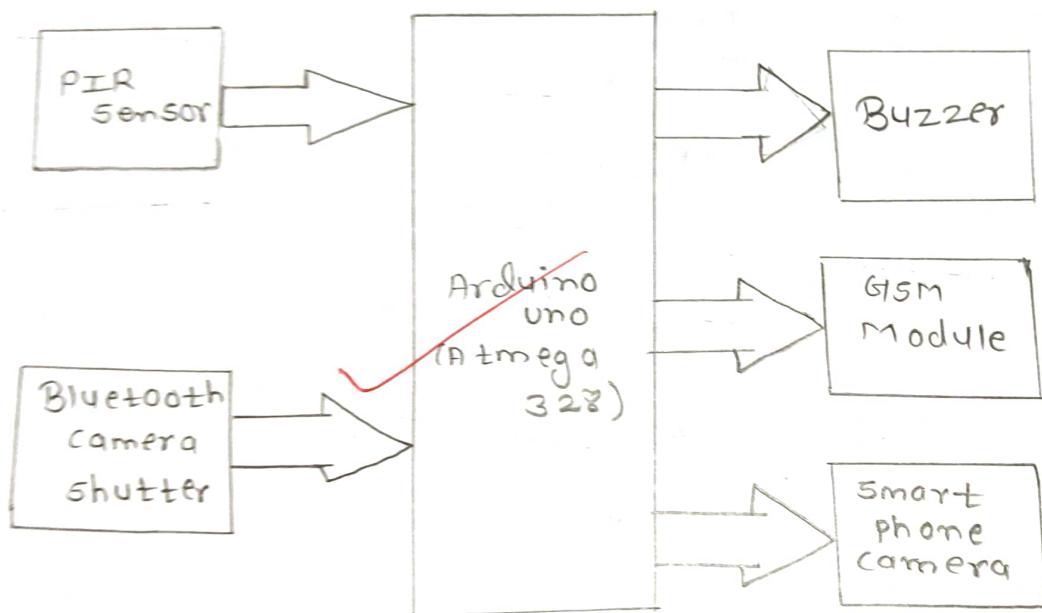
i.e on time and off ~~and~~ time which indicate the HIGH and Low state resp. on and off time are dependent on the ~~value~~ of RA, RB and C.

~~Revised~~ 13/15



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Block diagram:-



Experiment no:-3

Aim:- To study Arduino uno board

a) pin configuration

b) Features

Components:- Arduino uno board

Theory:- Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

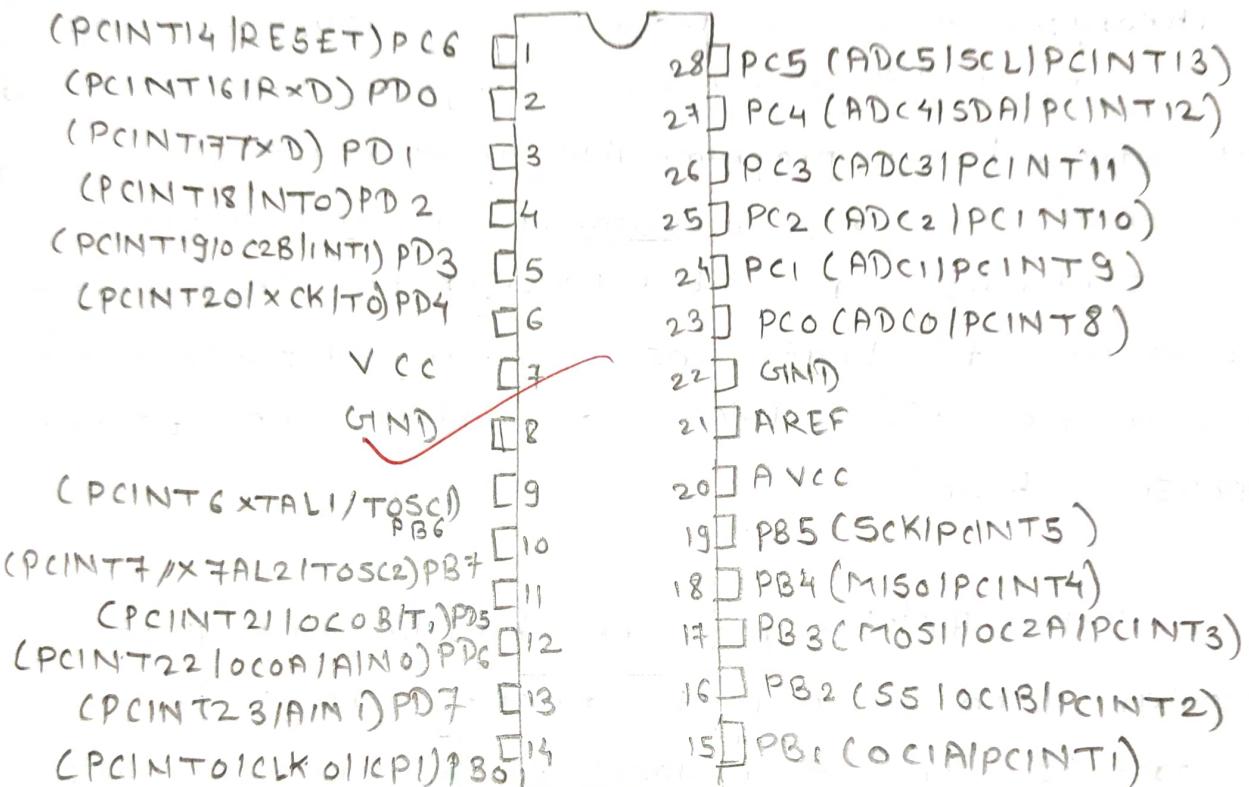
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The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board, -- you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.

Pinouts

Pinouts are used to identify pin functions and
pin numbers for each pin.

b) Pin diagram :-



Finally, Arduino provides a standard from Fauor that breaks out the function of the micro-controller into a more accessible package.

Arduino uno ATmega328 :-

The ATmega328 is one kind of single-chip micro-controller formed with Atmel within the mega AVR family. The architecture of this Arduino uno is a customized Harvard architecture with 8-bit RISC processor core. Other board of Arduino uno include Arduino pro mini, Arduino nano, Arduino Due, Arduino mega and Arduino Leonardo.

features of Arduino uno boards:-

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The Features of Arduino uno ATmega328 includes the following

- 1) The operating voltage is 5V
- 2) The recommended input voltage will range from 7V to 12V
- 3) The input voltage ranges from 6V to 20V
- 4) Digital input / output pins are 14
- 5) Analog I/O pins are 6

- 6) DC current for each input/output pin is 40mA.
- 7) DC current for 3.3V pin is 50mA.
- 8) each memory is 32KB
- 9) SRAM is ~~2~~ 2KB
- 10) EEPROM is \pm 1KB
- 11) CLK speed is 16MHz

Pin Diagram :-

The Arduino uno board can be built with power pins, analog pins, ATmega328, ICSP header, Reset button, power LED, digital pins, test led 13, Tx/Rx pins, UCB interface, an external power supply. ~~The Arduino uno board description is discussed below.~~

1) power supply:-

The Arduino power supply can be done with the help of a USB cable or an external power supply. The external power supplies mainly include AC to DC adapter otherwise a battery. The adapter can be connected to the arduino Uno by plugging into the power jack of the Arduino board. The suggested voltage range will be 7 Volts to 12 Volts.

2) Input and output :-

The 14 digital pins on the Arduino uno can be used as input and output with the help of the function like pinmode(), digitalWrite(), and digitalRead().

3) pin 1 (TX) and pin 0 (RX) (serial):-

This pin is used to transmit and receive TTL serial data, and here are connected to the ATmegaν2 USB to TTL serial chip equivalent pins.

4) pin 2 and pin 3 (external interrupt):-

~~External pins~~ can be connected to activate an interrupt over a low value change in value

5) pin 3, 5, 6, 9, 10 and 11 (PWM):-

This pin gives 8-bit PWM output by the function of analogWrite().

6) SPI pins (pin - 10 (SS), pin - 11 (MOSI), pin - 12 (MISO), pin 13 (SCK)):-

These pins maintain SPI-communication, even though offered by the fundamental hardware is not presently

included within the arduino language

7) Pin -13 (LED):-

The Prebuilt LED can be connected to pin -13 (digital pin). As the 'High'-value pin, the light emitting diode is activated, whenever the pin is Low.

8) Pin-4 (SDA) and pin-5 (SCL) (I₂C):-

It supports TWI-communication with the help of the wire library

9) AREF (Reference voltage):-

The reference voltage is for the analog pins with analogReference ()

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10) Reset pin:-

This pin is used for reset (RST) the microcontroller.

11) Memory:-

The memory of this Atmega 328 Arduino microcontroller includes Flash memory - 32 kB for storing code, SRAM - 2 KB, EEPROM - 1 KB,

Question and Answer

1) what is name of microcontroller IC for arduino uno board?

Ans:- Arduino uno is a microcontroller board based on the 'ATmega 328p'. It has 14 digital I/O pins, 6 analog pins inputs, a 16MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button.

2) Identify and name the major blocks of arduino uno boards?

Ans:- The major component are :- USB connector, power port, microcontroller, Analog input pins, Digital pins, Reset switch, crystal oscillator, USB interface chip.

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3) How can Arduino boards used for developing embedded system?

Ans:- Arduino uno is build around ATmega microcontroller and any microcontroller is the heart of an embedded system. Arduino is an open-source based prototyping platform used to sense and control physical devices (temperature, humidity, moisture level, etc).

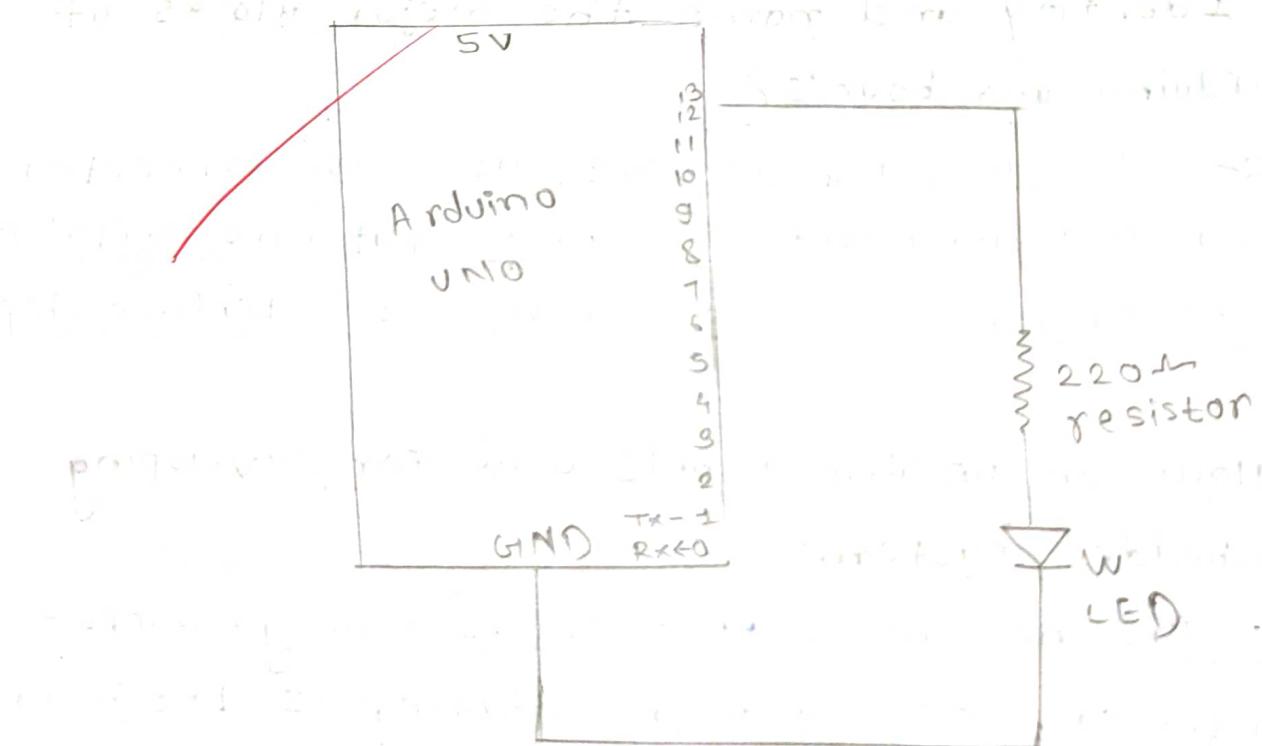
Experiment No: 4

Interfacing switch and relay with the

Aim:- To interface switch and relay with the
Arduino uno board.

Components :- Arduino uno board, push button,
LED, types of switches and relay

① Interfacing LED with arduino uno board.



Experiment No. 4

Aim:- To interface LED, switch and relay with the arduino uno board.

components required :- Arduino uno board. push button LEDs, types of switches and relay.

Theory:- we will use push button as input device LED as output device and relay are output device

Interfacing LED with Arduino uno board :-

int led-pin = 13; // set pin no. of arduino to

which led is connected

void setup()

{

pinmode (led-pin, OUTPUT);

}

void loop()

{

digitalwrite (led-pin, HIGH);

delay (1000);

digitalwrite (led-pin, LOW);

b) Interfacing switch with arduino uno.

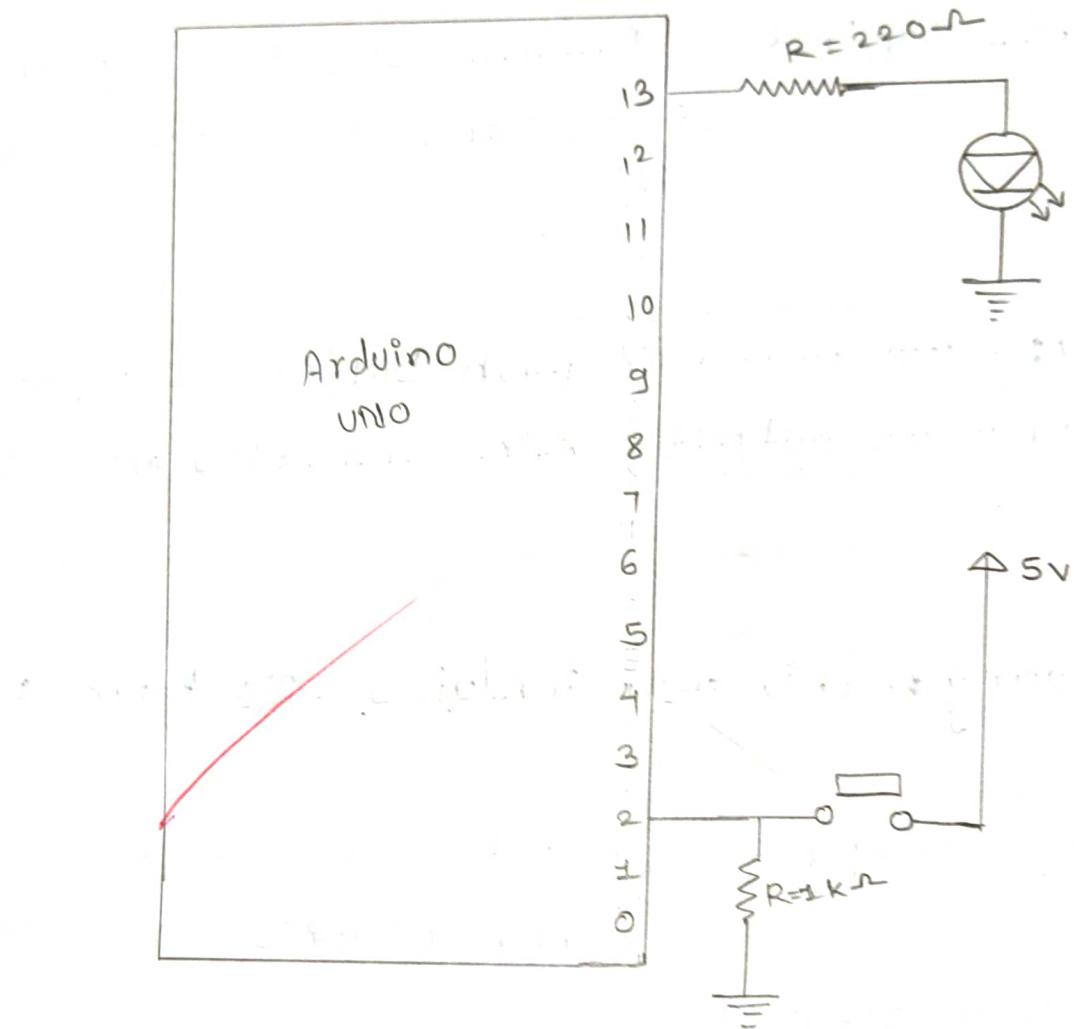


Fig:- Interfacing of switch as input with arduino

```
dig.delay(1000);
```

b) Interfacing Switch with Arduino Uno

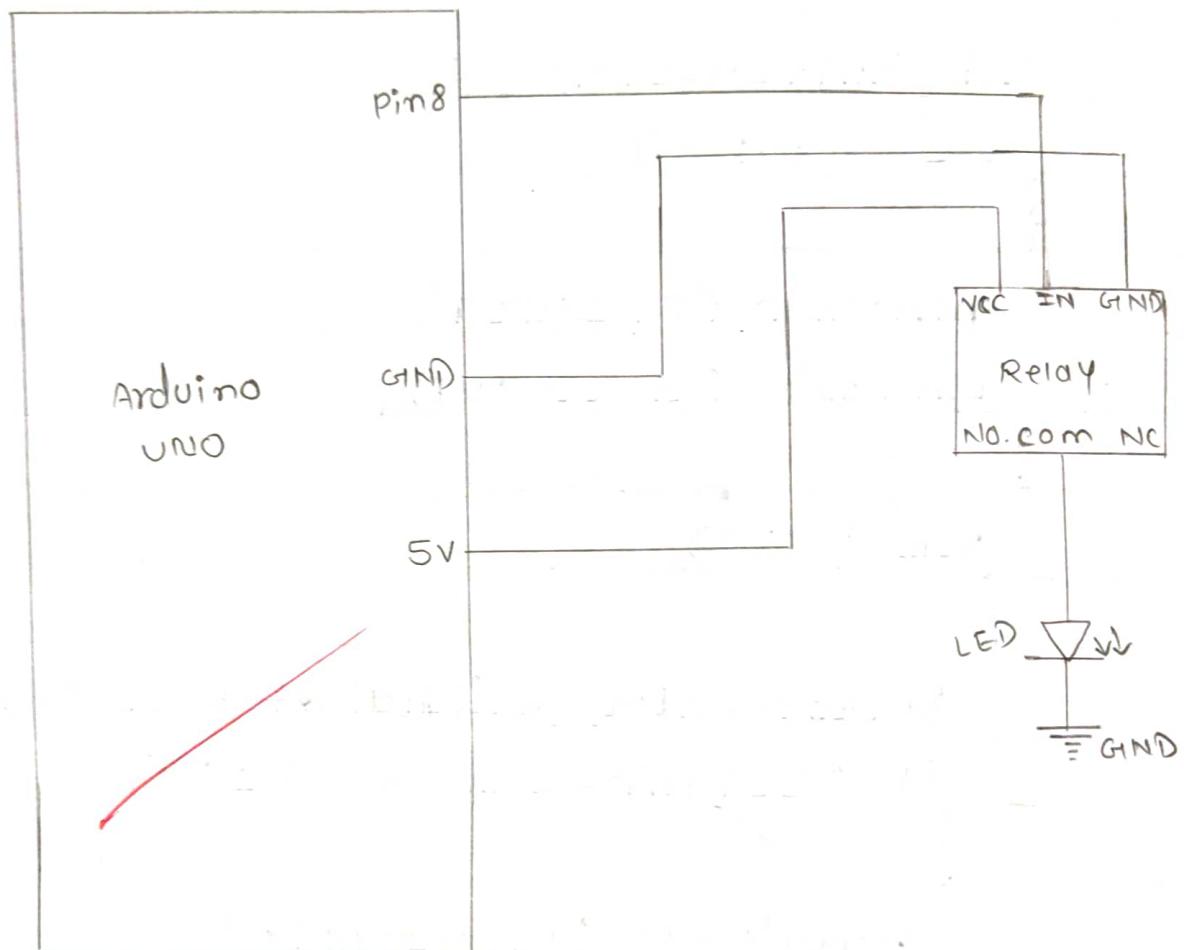
```

int button-state = 0
void setup ()
{
    pinMode (2, INPUT)
    pinMode (13, OUTPUT)
}

void loop()
{
    button-state = digitalRead (2);
    if (button-state == HIGH)
    {
        digitalWrite (13, HIGH);
    }
    else (button-state == HIGH) LOW)
    {
        digitalWrite (13, LOW);
    }
}

```

c) Interfacing Relay with arduino uno



c) Interfacing relay with Arduino uno

```
int relay-pin = 8
```

```
void setup()
```

```
{
```

```
} pinmode (relay-pin,OUTPUT);
```

```
void loop()
```

```
{
```

```
digitalwrite (relay-pin,LOW);
```

```
delay (1000);
```

```
digitalwrite (relay-pin,HIGH);
```

```
delay (1000);
```

```
}
```

Questions:-

1) How is arduino used as o/p programming device?

Explain the ~~ANSWER & SHINE~~

Ans:- The Arduino boards mostly use the relays as
are . The instruction used in programming are:

i) `setup()` :- used to initialize, pin mode or begin
serial it is called once when the

starts

2) `loop ()` :- The function loops consecutively

3) `pinmode` :- To configure the pin a either input
or output .

- 4) DigitalRead (pin) :- reads the value from a specified digital pin result either high or low
- 5) digitalWrite (pin,value) :- output either logic level high or low at a specified digital pin. The pin can be specified as either a variable or constant
- 6) delay (ms) :- pause a program for the amount of time as specified in milliseconds.

2) What is the current limiting value resistor for Arduino Relay blinking program?

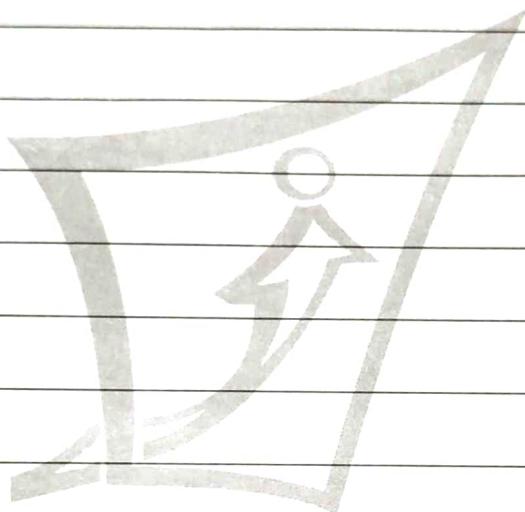
→ The resistor limit the current to keep the arduino pin from being damaged ($5V - 0.7V$) $1135mA = 123 - 2.50$, use something like a standard 150 ohm resistor to turn the transistor on full and protect the arduino o/p pin

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- 3) Show how can switch the interfaced to arduino?
- Switch is an input device used to make or break an electrical connections. To turn on LED the arduino needs to send a high signal to one of its pins and vice-versa. If the switch button is high the LED glows else the LED is off. It is to make sure to connect a pull-up register, resistor of value 1K to 10K because it can active low pin.

~~Result:- This experiment tell us about the arduino interfacing with LED, switch and relay.~~

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Experiment No. 5

Aim:- To interface different types of sensors with arduino uno board.

- i) Interfacing ultrasonic sensor with arduino uno board.

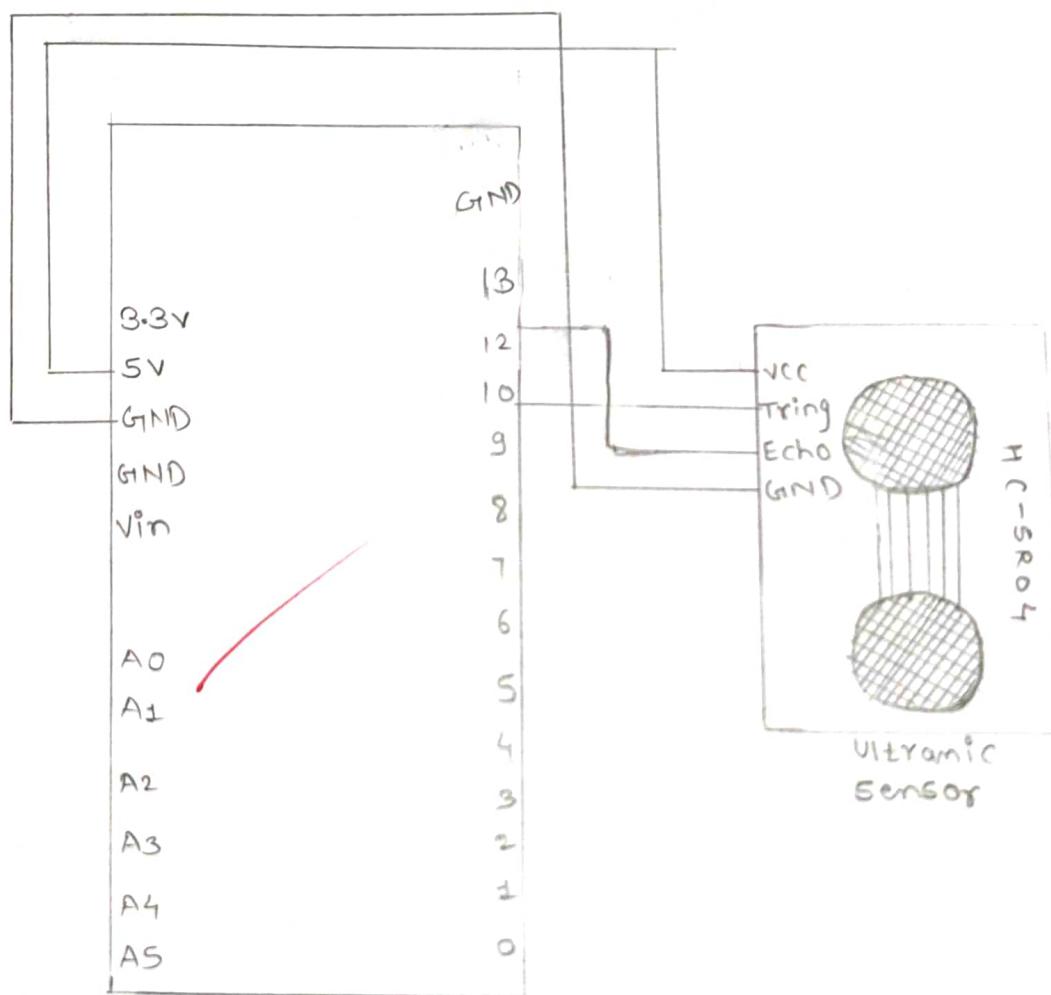


Fig :- Interfacing of ultrasonic sensor with arduino

Experiment No 5

Aims:- To interface different types of sensors with arduino uno board.

components:- Arduino uno board, different types of Sensors.

Theory:- Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Our ultrasonic sensors, like many other, use a single transducer to send a pulse and receive the

➤ Interfacing ultrasonic sensor with arduino

```
#define echopin 12
#define trigpin 10
long duration;
int distance;
void setup()
{
    Serial.begin(9600);
```

2) Interfacing 7 flash led sensor with arduino uno

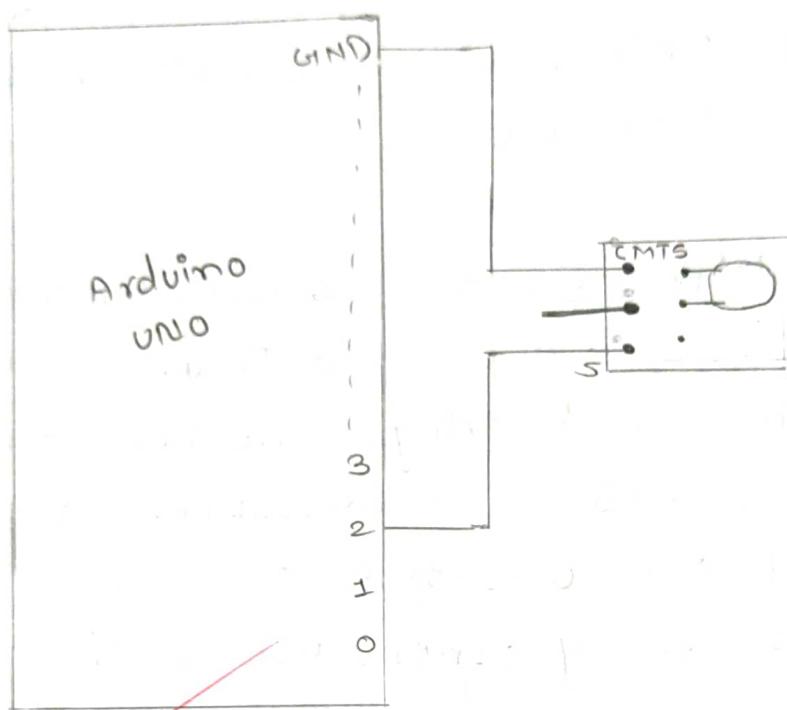


Fig:- Interfacing 7 Flash led sensor with arduino

```

pinmode (trigpin, OUTPUT);
pinmode (echopin, INPUT);
}

void loop ()
{
    digitalWrite (trigpin, LOW);
    delayMicrosecond (2);
    digitalWrite (trigpin, HIGH);
    delayMicrosecond (10);
    digitalWrite (trigpin, LOW);

    duration = pulseIn (echopin, HIGH);
    distance = (duration * 0.03412);
    serial . print ("Distance:");
    serial . print (distance);
    serial . println ("cm");
    delay (1000); & SHINE
}

```

2) Interfacing 7 colour flash with arduino

```

program: int s = 2;
void setup ()
{
    Serial.begin (9600);

```

3) Interfacing RGB LED sensor with arduino uno

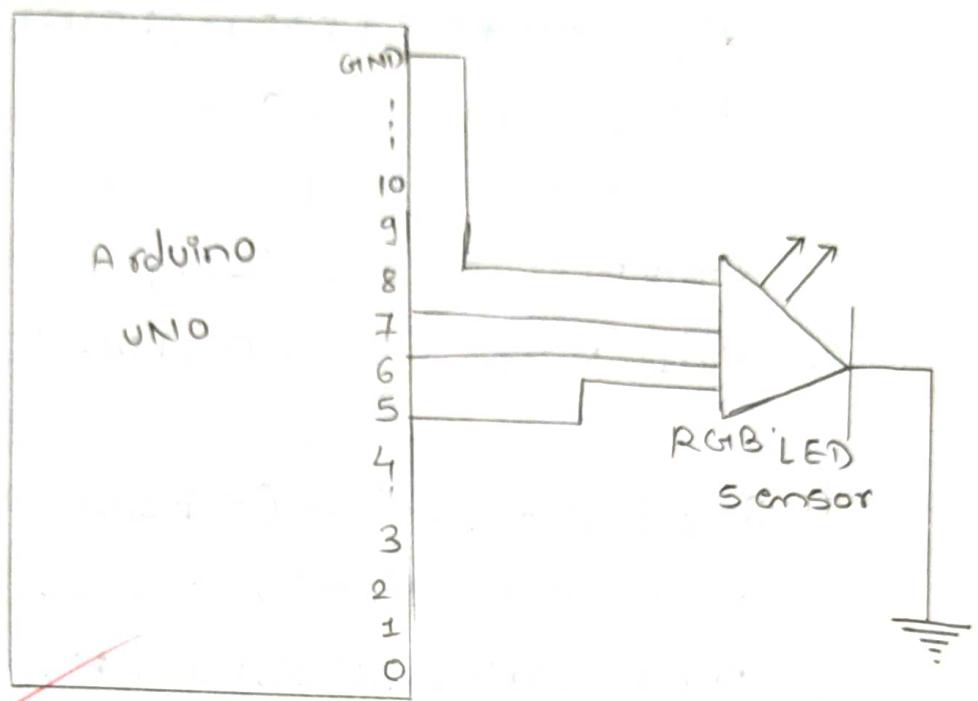


Fig:- Interfacing RGB Sensor with arduino

```

pinMode (2, OUTPUT);
digitalWrite (2, LOW);
}

void loop()
{
    digitalWrite (2, HIGH);
    delay (5000);
}

```

3) Interfacing RGB sensor with arduino uno

Program \Rightarrow

```

int redpin = 5;
int greenpin = 6;
int bluepin = 7;

```

~~void setup()~~

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```

pinMode (redpin, OUTPUT);
pinMode (greenpin, OUTPUT);
pinMode (bluepin, OUTPUT);
}

```

void loop() {

setColour (255, 0, 0); // Red colour
delay (1000);

setColour (0, 255, 0); // Green color
delay (1000);

```
setcolor (0, 0, 255); // Blue color
delay (1000);
```

```
setcolor (255, 255, 255); // White color
delay (1000);
```

```
setcolor (170, 0, 255); // Purple color
delay (1000);
```

```
setcolor (127, 127, 127); // Light blue
delay (1000);
```

{

```
void setcolor (int red value, int green value, int
blue value)
```

{

```
analog write (redpin, redvalue);
```

```
analog write (greenpin, greenvalue);
```

```
analog write (bluepin, bluevalue);
```

{

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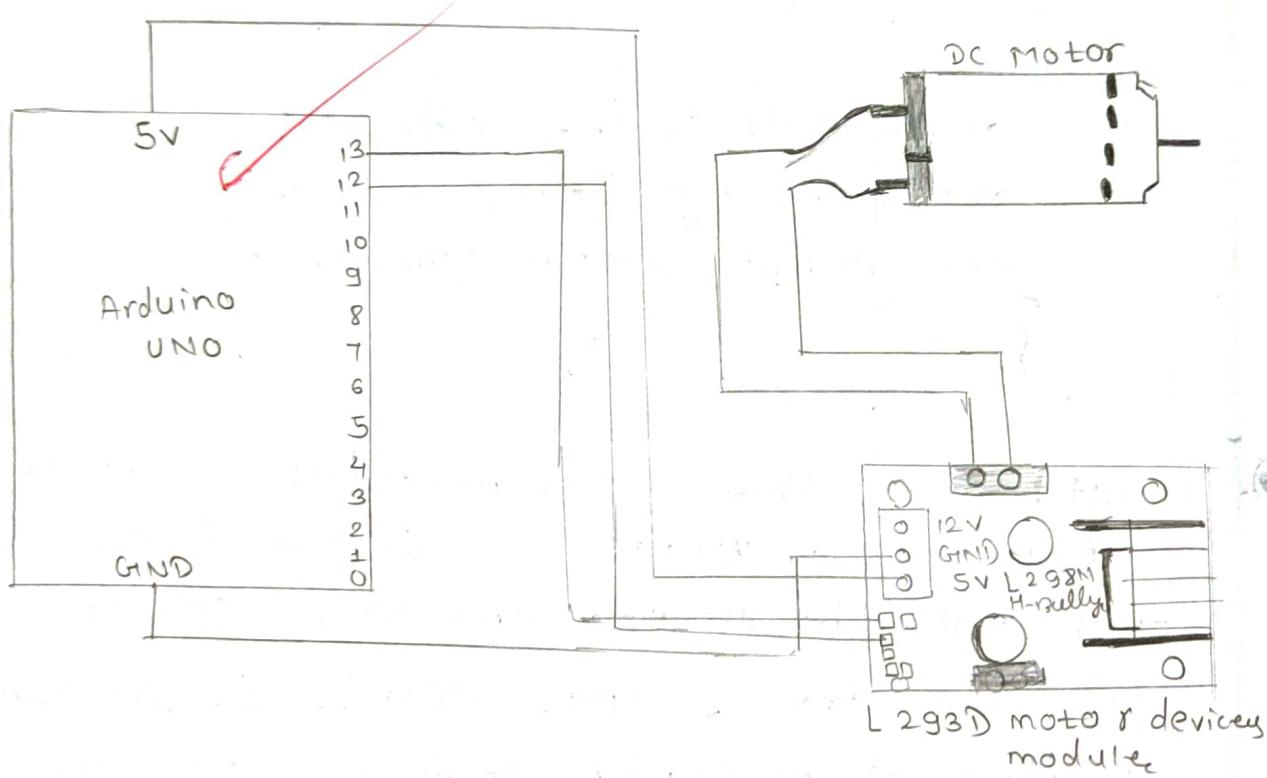
Result:- In this experiment we interface RGB sensor ultrasensor 7, colour flash with the Arduino uno board sensor are the devices that detects or measures a physical property, indicates or otherwise responds to it.

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Smart~~ 18/15

Experiment No: 6

Aim:- Interface DC Motor, servo Motor, Stepper Motor with Arduino uno board

Components:- Arduino uno, DC Motor, Stepper Motor, servo Motor, Arduino uno



Experiment No:- 06

Aim:- Interface DC motor, servo motor
stepper motor with Arduino uno board.

Components :- Arduino uno, DC motor, stepper
motor, servo motor. Arduino uno
board.

Theory:- An electrical motor is a machine
that converts electrical energy
into mechanical energy. It is
used generating torque to move objects
other machine.
These are different type of
motor AC, DC. Special types of motors

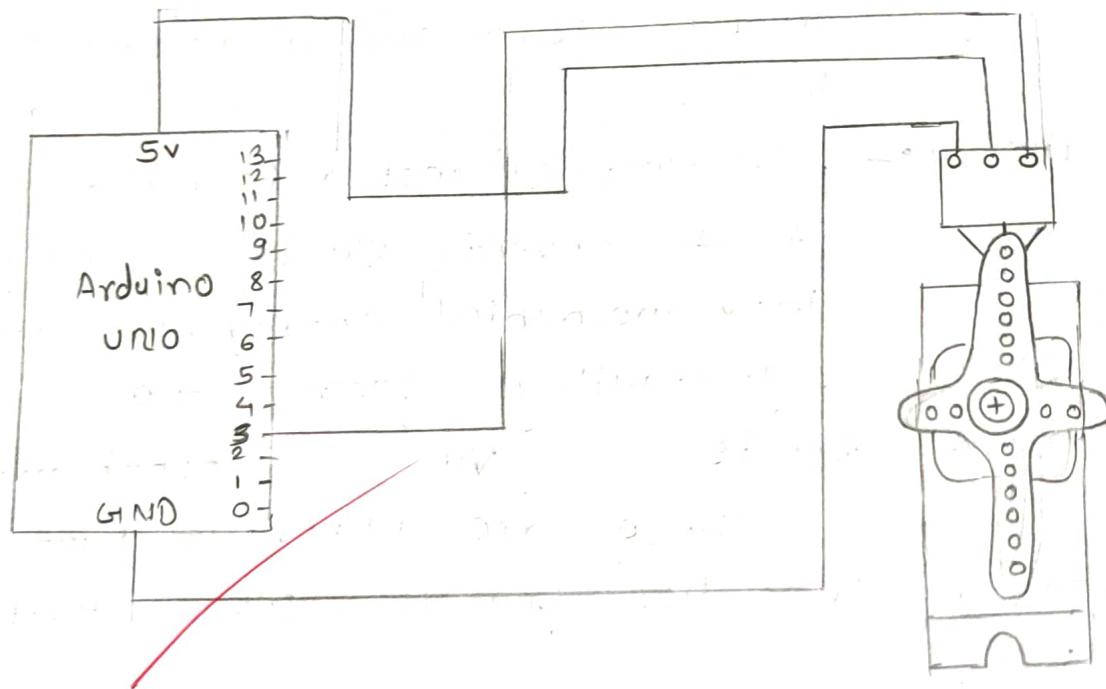
① DC motor with Arduino uno

→ A DC Motor is a electrical motor that
only runs on DC direct current.

There are no phases in direct current
that is why DC electric motors only uses
2 wires to

→ The basic working principle of DC
motors is the Flemings left

② Interfacing servo motor with Arduino uno



① Interfacing DC motor with Arduino uno
 → program

```

void set setup()
{
  pinmode (13.OUTPUT);
  pinmode (12.OUTPUT);
}

void loop()
{
  digitalWrite (13.HIGH);
  digitalWrite (12.Low);
  delay (1000);
  digitalWrite (13.Low);
  digitalWrite (12.HIGH);
  delay (1000);
}
  
```

ARISE & SHINE

② Interfacing servo motors with Arduino uno
 → program

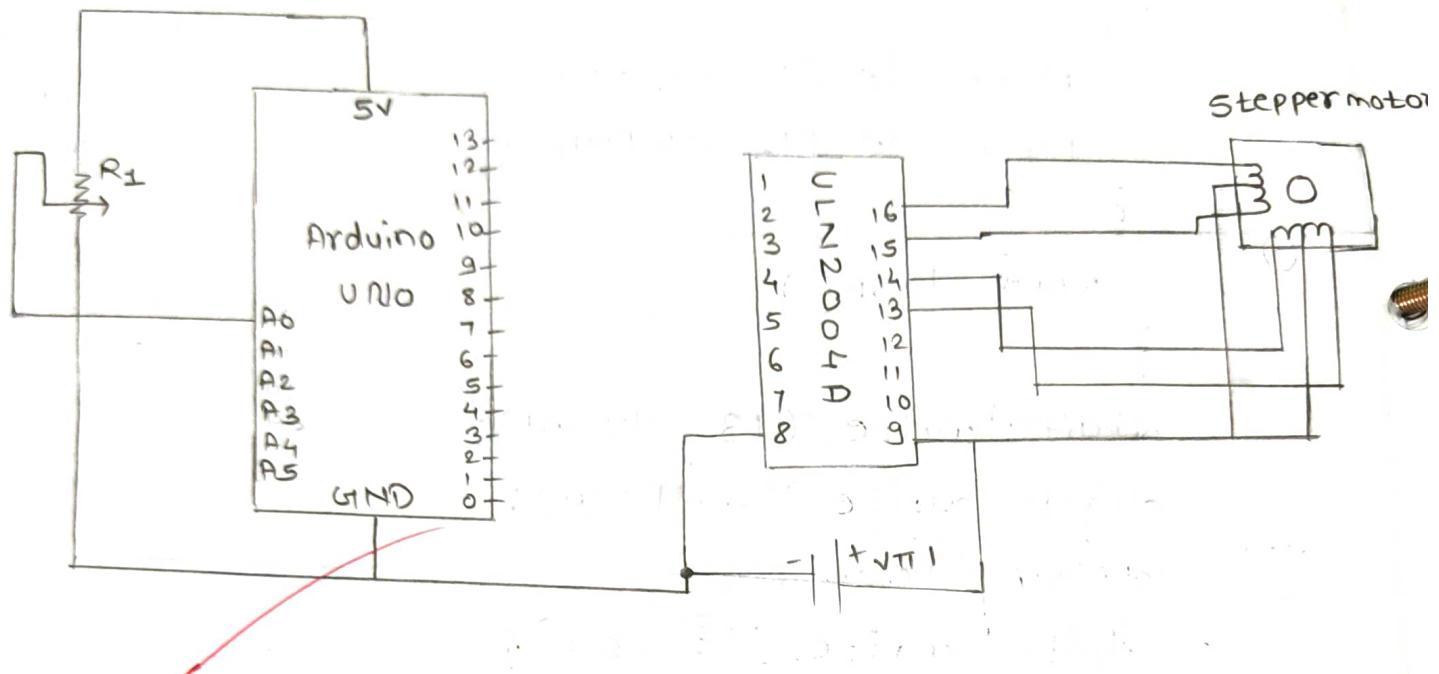
```

#include <servo.h>

Servo myservo;
int pos;

void set setup()
{
  
```

③ Interfacing stepper motor with Arduino uno



```

myservo.attach(3);

}

void loop()
{
    (pos = 0; pos <= 180; pos++)
    {
        myservo.write(pos);
        delay(15);
    }
    delay(1000);
    {
        (pos = 180; pos >= 0; pos--).
        {
            myservo.write(pos);
            delay(15);
        }
        delay(1000);
    }
}
ARISE & SHINE

```

3) Interfacing stepper motor with Arduino uno

```

#include <stepper.h>;
const int steps perRevolution = 200;
Stepper Mystepper(steps perRevolution, 8, 9,
10, 11);

```

```
int stepcount=0;  
void setup()  
{  
}  
void loop()  
{  
    int sensordReading = analogRead (A0);  
    int motorSpeed = map (SensordReading, 0, 1023, 0, 250)  
    if (motorSpeed > 0)  
    {  
        myStepper.setSpeed (motorSpeed);  
        myStepper.step (steps per Revolution / 100);  
    }  
}
```

ARISE & SHINE

Viva Question

- 1) Identify the categories of sensors given from the list a) Analog b) digital (Voltage current resister)

Ans:- i) Analog sensors :- An analog sensor produce an analog output i.e a ~~continuous~~ continuous output signal with respect to the quantity being measured

a) Temperature sensor :- one of the most common and most popular sensor is the temperature sensor, A temperature sensor as the name suggest it sensor the temperature i.e it measures the changes in the temperature.

b) A proximity sensor is a non-contact type sensor the detects the presence of an object proximity sensor can be implemented using different techniques like optical, sound, magnetic, capacitive etc.

c) Infrared sensor (IR sensor) :- IR sensor are light based sensor that are used in various applications like proximity and object detection. IR sensor are used as proximity sensor in almost all mobile phones.

2) Digital sensor :- Digital sensor in contrast analog sensor work discrete or digital data

2) Explain Every sensor in detail.

Ans:- A sensor is a device that detects and responds to some types of input from the physical environment.

1) Ultrasonic sensor :- It is a non-contact type device that can be used to measure distance as well as velocity of an object.

2) Light sensor :- sometimes also known as photo sensor. Light sensors are one of the important sensors. A simple light sensor available today is the light dependent resistor.

3) Smoke and gas sensor :- one of the very useful sensors in safety related applications are smoke and gas sensors.

4) Touch sensor :- Touch sensor as the name suggests, detect touch of a finger or a stylus. Often touch sensors are classified into resistive and capacitive type.

3) Interface one digital and analog sensor with arduino and make an LED on off.

Ans:-

For digital output

const int proxSensor = 2;

int inputVal = 0;

```

void setup()
{
    pinmode (13,OUTPUT);
    pinMode (proxsensor,INPUT);
    serial.begin (9600);
}

void loop()
{
    if (digitalRead (proxsensor) == HIGH)
    {
        digitalWrite (13,HIGH);
    }
    else
    {
        digitalWrite (13,LOW);
    }

    inputval = digitalRead (proxsensor);
    serial.println (inputval);
    delay (1000);
}

```

Result:- Hence we successfully interface different types of sensor with arduino uno.

Dipti (1516)

Experiment No-1

Aim:- To study raspberry pi board

Theory :- The Raspberry pi is a series of small single - board computers developed in the United Kingdom by the Raspberry pi foundation to promote teaching of basic computer science. It does not include peripherals (such as keyboards and mice).

The Raspberry pi is a low cost creditcard sized computer that plugs into a computer monitor or TV. It can function as a proper desktop computer to be used to build smart-devices. It has generally a linear operating system and the ability to run multiple programs. It is a signal board computer. It is commonly used in robotics.

Raspberry pi pin configuration:-

A Raspberry pi 3 board has 40 pins on it. Among these pins, we have four power pins on the Raspberry pi, two are 3.3 V pins of which are 5V pins.

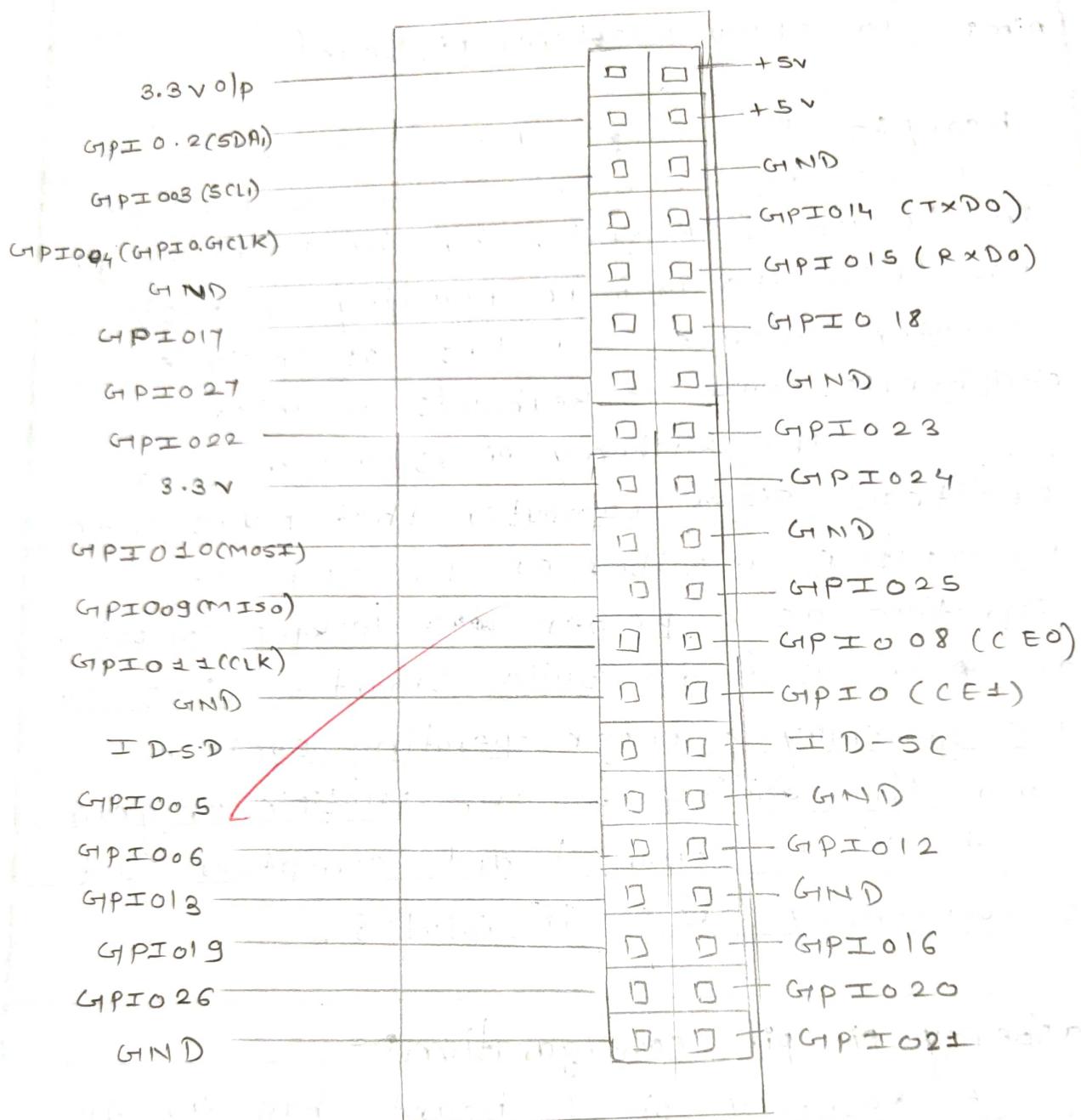


Fig:- raspberry pi

and other two are 3.3 V pins, the 5V power pins are connected directly to the Raspberry Pi's power input and we can use these pins to run the low power application.

| pin group | pin Name | Description |
|---------------|---|---|
| power source | +5V, +3.3V, GND and VIN | +5V, +3.3V. power output GND - ground pin |
| communication | UART Interface (RXD, TXD) | UART (Universal asynchronous receiver transmitter) used for interfacing sensor and other devices |
| SPI Interface | SPI (serial) (MOSI, MOSI, peripheral interface) (CLK, CE) x 2 | used for communicating with other boards or peripherals |

| | | |
|---------------------------------|--|--|
| INPUT OUTPUT Pins | 26 I/O | Although there some pins have multiple function they can be considered as I/O pins |
| TWI Interface (SDA, SCL) x 2 | TWI (Two wire Interface) Interface can be used to connect peripherals. | |
| PWM | Hardware PWM GPIO12, GPIO13, GPIO18, GPIO19 | These 4 channels available on can provide PWM (pulse width modulation) outputs * Software PWM available on all pins |
| External Interrupts | All I/O | In the board all I/O pins can be used as interrupt. |

Features of Raspberry Pi :-

- 1) 256 MB SDRAM Memory
- 2) Broadcom BCM2835 SoC Full HD multimedia processor
- 3) Dual core video core 1V Multimedia co-processor
- 4) single 2.0 USB connector
- 5) HDMI (rev 1.3 and 1.4) composite RCA video out
- 6) linear operating system
- 7) 8.6 cm + 5.4 cm + 1.5 cm dimension

Conclusion:- Learning about the GPIO pins helps to perform communication of the Favourite Raspberry Pi with other devices.

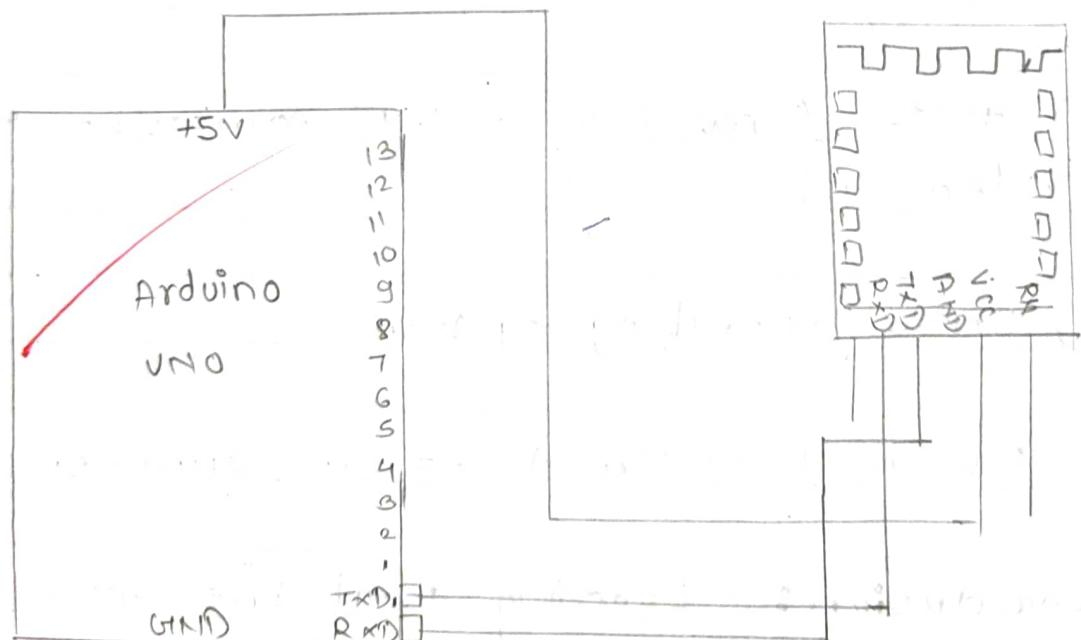
Dr. Shrikant
Date 10/10

Experiment No:-08

Aim:- To interface bluetooth module with arduino

Apparatus :- Arduino uno (HC-05) bluetooth module

circuit diagram :-



Experiment No. 08

Aim:- To interface bluetooth module with arduino

Theory:- HC-05 is a bluetooth module which is designed for wireless communication. This module can be used in a master.

In slave configuration it is used for many application like wireless headest game controllers, wireless to mouse, wireless keyboard and many more consumer applications. It has range upto <100m which depends upon transmitter and receiver, atmosphere, geographic and urban condition. It is IEEE 802.15.1 standardized protocol through which build wireless personal area network (PAN). It uses frequency hopping spread spectrum (FHSS) radio technology to send data over air. It uses serial communication to communicate with devices. It communicate with Microcontroller using serial port (USART).

Interfacing Bluetooth with arduino

~~Arduino~~

Arduino UNO

Rx

T_{xe}

5V

Bluetooth module

T_{xe}

R_{xe}

5V

```

program:- char input byte;
void setup ()
{
    serial.begin (9600);
    pinmode (13,OUTPUT);
}

void loop ()
{
    while (serial.available (>0))
    {
        input Byte = serial.read ();
        serial.println (input Byte);
        if (input Byte == 'z')
        {
            digital write (13,High);
        }
        else if (input Byte == 'z')
        {
    }
}

```

digital write (13, LOW);

{

{

{

Result:- This experiment tell us about the arduino uno interfacing with bluetooth module (HC-05)

Conclusion :- Hence, we have successfully performed to interface bluetooth module with arduino.

~~Dr. Girish~~ 15/15

ARISE & SHINE