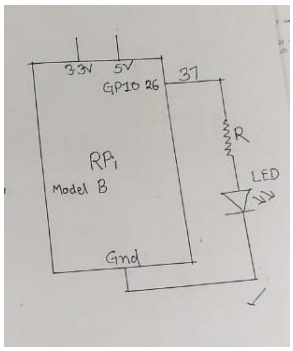
A1:**programming of rpi to control led's attached to gpio pins**

Aim:programming of Rpi to control Led's attached to the Gpio Pins

Apparatus:Rpi modulewith monitor ,keyboard,mouse,serial to hdmi cable,jumper wires

Circuit diagram:



Program:

```
import Rpi.GPIO as GPIO

import time

GPIO.setmode(GPIO.BOARD)

GPIO.setup(37,GPIO.OUT)

while True:

GPIO.output(37,GPIO.HIGH)


time.sleep(1)

GPIO.output(37,GPIO.LOW)


time.sleep(1)
```

questions:working of Led-led means light emitting diode is a semiconductor device that emits lights when an electric current flows through it

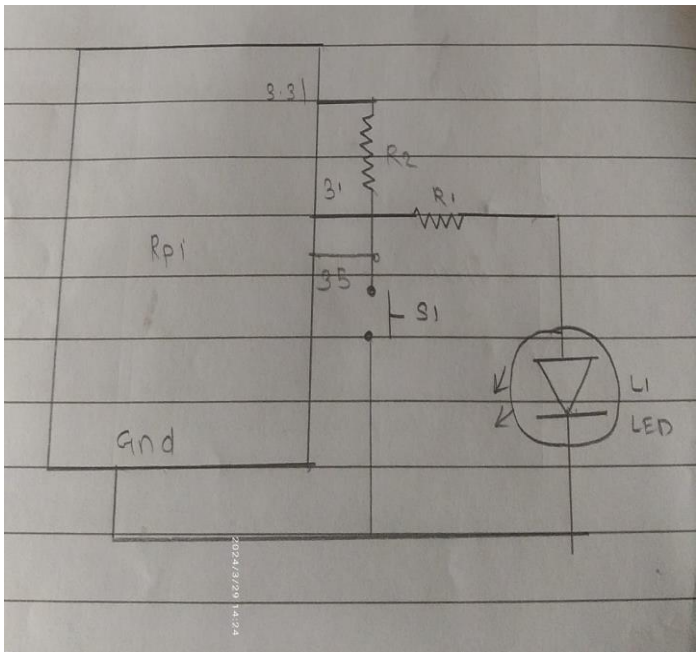
ram size:1GB

A2:programming of Rpi to get feedback from a switch connected to the gpio pins

Aim:interface and program rasphberry pi to get feedback from a switch

Apparatus:rpi,jumper wires,tactile push switch,led,resistor,power supply

Circuit diagram



Program:

```
import Rpi.GPIO as GPIO
import time
button=35
led=31
GPIO.setmode(GPIO.BOARD)
GPIO.setup(button,GPIO.IN)
GPIO.setup(led,GPIO.OUT)
while True:
   button_state=GPIO.input(button)
   if  button_state==false:
      GPIO.output(led,True)
```

```
        print('button pressed')
        while GPIO.input(button)==false:
        time.sleep(0.2)
else:GPIO.output(led,false)
```

Question's Ans:1]gpio pins is an uncommited digital signal pin on an integrated circuit or electronic circuit board which may be used as an input or output and is controllable by softwere

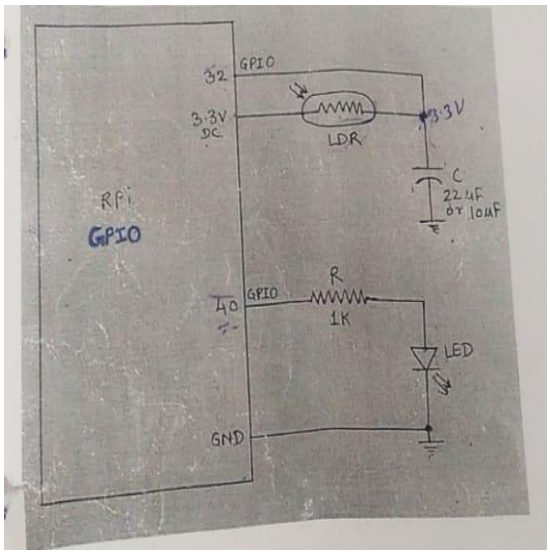
2].linear,tactile and clicky ,pushbutton,rotary are the types of switches

A-4:programming of rpi to detect light intensity using photocell sensor

Aim:interface and program Rpi to detect room light from a photocell sensor

Apparatus:Rpi,ldr,capacitor,Resistor,Led

Circuit Diagram:



Program:

```
import Rpi.GPIO as GPIO
import time
GPIO.setwarnings(False)
GPIO.setmode(GPIO.BOARD)
```

```
value=0
ldr=32
led=40
GPIO.setup(led,GPIO.OUT)
GPIO.output(led,False)
def rc_time(ldr):
    count=0
    GPIO.setup(ldr,GPIO.OUT)
    GPIO.output(ldr,False)
    time.sleep(1)
    GPIO.setup(ldr,GPIO.IN)
    while(GPIO.input(ldr)==0):
        count+=1
    return count
while True:
    print("Ldr value:")
    value=rc_time(ldr)
    print(value)
    if(value<=4000):
        print("lights are on")
        GPIO.output(led,True)
    elif(value>4000):
        print("lihts are off")
        GPIO.output(led,False)
```

Question's ans: working of Photocell=A photocell is a resistor that changes resistance depending on the amount of light incident on it. A photocell operates on semiconductor photoconductivity.

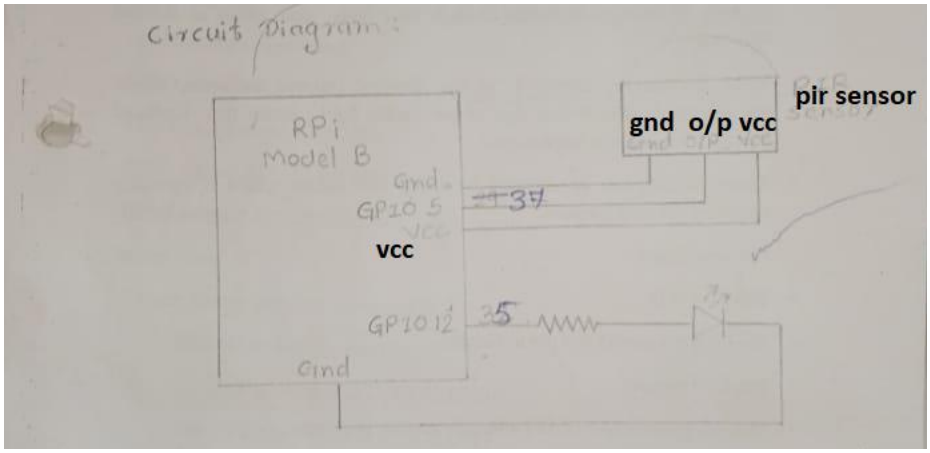
Role of adc=Analogue to Digital Converter, or ADC, is a data converter which allows digital circuits to interface with the real world by encoding an analogue signal into a binary code

A5-programming of rpi for Motion Detection(PIR sensor)

Aim:interface and program rpibfor motion detection using PIR

Apparatus:Rpi,jumper wires,pir sensor,led

Circuit Diagram:



Program:

```
import  RPI.GPIO as GPIO
import time
sensor=37
led=35
GPIO.setwarnings(False)
GPIO.setumode(GPIO.BOARD)
GPIO.setup(LED,GPIO,IN)
GPIO.setup(LED,GPIO.OUT)
GPIO.output(LED,GPIO.LOW)
while True:
        if(GPIO.input(PIR_input)):
                GPIO.output(LED,GPIO.HIGH)
       else: GPIO.output(LED,GPIO.LOW)
```

Questions Ans

1]rpi works on which os=The Raspberry Pi operates in the open source ecosystem: it runs Linux (a variety of distributions)

2]applications of pir=Home and Business Security Systems: – Integrated into security alarms for motion detection.

Automatic Lighting Systems: ...

Industrial Machinery Monitoring: ...

Structural Health Monitoring: ...

Manufacturing Processes: ...

Transportation Systems:

Aerospace Industry:

B-5 study of RFID system

Aim:study of RFID system

Apparatus:Arduino uno,RFID reader MFRC522,ledribbon cable,resistor 470ohm

Circuit diagram

Program:

```
#include <SPI.h>
#include <MFRC522.h>
#define SS_PIN 10
#define RST_PIN 9
#define LED 8
byte readCard[4];
String tag_UID = "AA9DFE80";
String tagID = "";
MFRC522 mfrc522(SS_PIN, RST_PIN);
void setup()
{
  pinMode(LED, OUTPUT);
  digitalWrite(LED, LOW);
  Serial.begin(115200);
  SPI.begin();
  mfrc522.PCD_Init();
   mfrc522.PCD_DumpVersionToSerial();
   Serial.println(F("Scan PICC to see UID, SAK, type, and data blocks..."));
}
void loop()
{
   mfrc522.PICC_DumpToSerial(&(mfrc522.uid));
   delay(1000);
   while (readID())
  {
    if (tagID == tag_UID)
    {
      digitalWrite(LED,HIGH );
```

```
      delay(1000);
      digitalWrite(LED,LOW );

    }
  }
}

  boolean readID()
  {

    if ( ! mfrc522.PICC_IsNewCardPresent())
    {
      return false;
    }

    if ( ! mfrc522.PICC_ReadCardSerial())
    {
      return false;
    }

    tagID = "";

    for ( uint8_t i = 0; i < 4; i++)
    {

      tagID.concat(String(mfrc522.uid.uidByte[i], HEX));
    }
    tagID.toUpperCase();
    mfrc522.PICC_HaltA();
    return true;
  }
```

Question’s ans:1]RFID stands forRadio Frequency Identification (RFID) technology uses radio waves to identify people or objects.
2]14 pins are available on arduino

B-6 Python programming

Aim:python programming

To acces gpio pins which command used

To use Raspberry Pi GPIO pins in Python, we need to import RPi. GPIO package which has class to control GPIO. This RPi. GPIO Python package is already installed on Raspbian OS.

1] sum and difference program where a=20 b=11

```
a=20

b=11

sum=a+b

difference=a-b

print('the addition of{0}and{1} is{2}'.format(a,b,sum))

print('the difference of{0}and{1} is{2}'.format(a,b,difference))
```

2]area and perimeter of triangle

```
a=float(input('enter first side'))

b=float(input('enter second side'))

c=float(input('enter third side'))

s=a+b+c

area=(s*(s-a) *(s-b) *(s-c))**0.5

print('perimeter of triangle is %0.2f '%s)

print('area of triangle is %0.2f'%area)
```

write a python program for append

```
names = ["Joseph", "Peter", "Cook", "Tim"]

print('Current names List is:', names)

new_name = input("Please enter a name:\n")

names.append(new_name) # Using the append() function.

print('Updated name List is:', names)
```

python program for sorting given dictionary

```
names = {1:'Alice' ,2:'John' ,4:'Peter' ,3:'Andrew' ,6:'Ruffalo' ,5:'Chris' }

print(sorted(names.keys()))

print(sorted(names.items()))
```

syntax for data types in python

Data Type	Syntax

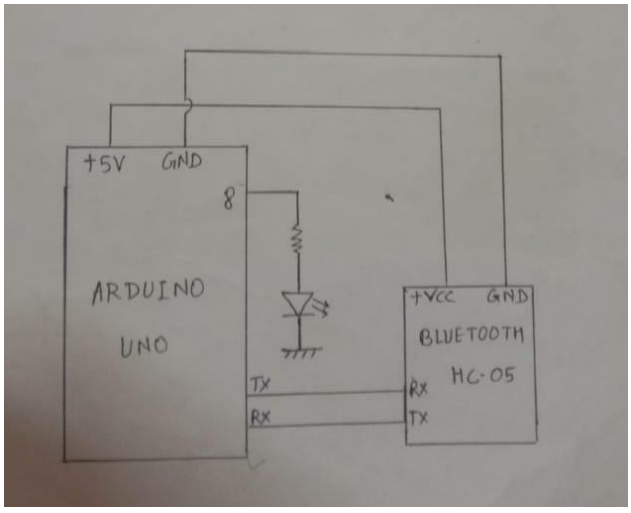
Strings	str()
Integer	int()
Floats	float()
Lists	Lists()

B-7 To study Arduino based Led switching using mobile

Aim:To study Arduino based Led switching using mobile

Apparatus:Arduino UNO, Bread Board,HC-05,LED'S,Android

Circuit diagram:



program

```
void setup()
{
  Serial.begin(9600);
  pinMode(8,OUTPUT);
}
void loop()
{
  if(Serial.available()>0)
  {
   char data=Serial.read();
   switch(data)
   {
    case 'a':digitalWrite(8,HIGH);
```

```
     break;
     case 'b':digitalWrite(8,LOW);
     break;
     default:break;
    }
    delay(50);
    }
}
```

Question's Ans

1]Hc-05 range 10 meter

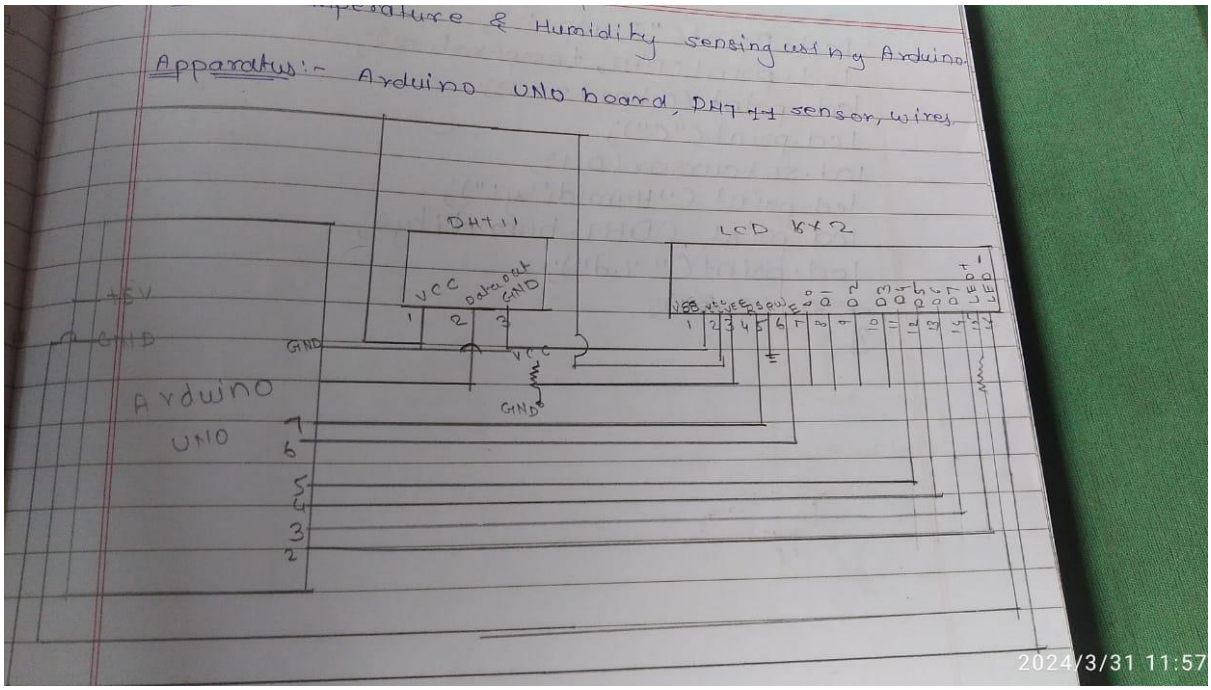
2] Arduino works on the basis of a microcontroller. Raspberry Pi, on the other hand, works on the basis of a microprocessor

B-8:-temperature and humidity sensing using Arduino

Aim: temperature and humidity sensing using a Arduino

Apparatus:temperature and humidity sensing Arduino

Circuit diagram:



Program:

```
Program:
#include<dht.h>
#include<Liquid Crystal.h>
Liquid Crystal lcd(7,6,5,4,3,2);
dht DHT;
#define DHT11_PIN 8
void setup()
{
```

```
lcd.begin(16,2);
}
Void loop()
{
int chk=DHT.read11(DHT_PIN);
lcd.setCursor(0,0);
lcd.print(“Temp”);
lcd.print(DHT.temperature);
lcd.print((char)223);
lcd.print(“c”);
lcd.setCursor(0,1);
lcd.print(“Humidity:”);
lcd.print(DHT.humidity);
lcd.print(“%d”);
delay(1000);
}
```

1] how many analog pins are available on arduino board

=>The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.

2]explain working principle of DHT 11 sensor

The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air and spits out a digital signal on the data pin (no analog input pins needed).