

1) Design and implement an IoT system using Arduino Uno/ Raspberry Pi using 'Ultrasonic sensor and Servo motor' such as 'Door opener in home automation'.

```
#include<Servo.h>

#define trig 9
#define echo 10
#define servo 11

Servo door;

void setup(){

  Serial.begin(9600);

  pinMode(trig, OUTPUT);
  pinMode(echo, INPUT);
  pinMode(servo, OUTPUT);
  door.attach(servo);
  door.write(0);
}

void loop(){

  long distance, duration;

  digitalWrite(trig, LOW);
  delayMicroseconds(2);
  digitalWrite(trig, HIGH);
  delayMicroseconds(10);
  digitalWrite(trig, LOW);

  duration = pulseIn(echo,HIGH);
```

```

distance = (duration*0.032/2);

if(distance<10) {
  door.write(90);
} else{
  door.write(0);
}

delay(500);
}

```

servo->

Object create

[objectName].attach([servo pin no from #define])

.write

Ultrasonic ->

Trig low high low

Duration = pulseIn(echo,HIGH)

Distance = (duration\*0.032)/2;

2) To detect object and tell user using led light

```

#define led 2
#define trig 9

#define echo 10

void setup() {
  Serial.begin(9600);
  pinMode(led,OUTPUT);
  pinMode(trig, OUTPUT); // my imp, trig sends signal so it's output
not input
  pinMode(echo,INPUT); // echo is input as it goes high when object is
detected
}

void loop() {

```

```

long distance, duration;

digitalWrite(trig, LOW);
delayMicroseconds(2);
digitalWrite(trig, HIGH);
delayMicroseconds(10);
digitalWrite(trig, LOW);

duration = pulseIn(echo, HIGH);

distance = (duration*0.034)/2; // IMP IMP IMP IMP IMP IMP IMP IMP IMP IMP

Serial.print("Distance is: ");
Serial.println(distance);

if(distance<10){
    digitalWrite(led, HIGH);
} else{
    digitalWrite(led, LOW);
}
delay(500);
}

```

### 3) led light blinking

```

#define led 2

void setup(){
    Serial.begin(9600); // not necessary
    pinMode(led, OUTPUT);
}

void loop(){
    digitalWrite(led, HIGH);
    delay(1000); // 1 seconds
    digitalWrite(led, LOW);
}

```

```
    delay(1000);  
}
```

4) Write a program to control the color of the LED by turning 3 different potentiometers. One will be read for the value of Red, one for the value of Green, and one for the value of Blue.

```
#define red 9  
#define green 10  
#define blue 11  
  
#define redPot A0  
#define greenPot A1  
#define bluePot A2  
  
void setup() {  
    Serial.begin(9600);  
  
    pinMode(red, OUTPUT);  
    pinMode(green, OUTPUT);  
    pinMode(blue, OUTPUT);  
}  
  
void loop() {  
  
    int redval, greenval, blueval;  
    redval = analogRead(redPot);  
    greenval = analogRead(greenPot);  
    blueval = analogRead(bluePot);  
  
    redval = map(redval, 0, 1023, 0, 255);  
    greenval = map(greenval, 0, 1023, 0, 255);  
    blueval = map(blueval, 0, 1023, 0, 255);  
  
    analogWrite(red, redval);  
    analogWrite(green, greenval);  
    analogWrite(blue, blueval);  
}
```

```

Serial.print("Red: ");
Serial.print(redval);
Serial.print("\t Green: ");
Serial.print(greenval);
Serial.print("\t Blue: ");
Serial.println(blueval);

delay(50);

}

```

Note: (The **analogWrite** function works only on pins that support PWM on your specific Arduino board.

On most Arduino boards like the Uno, the pins that support PWM are marked with a tilde (~) symbol next to the pin number. In your case, the **pins 2, 3, and 4** do not support PWM on the Arduino Uno. Therefore, you need to change the pins for the RGB LED to ones that support PWM.

You should use pins that support PWM, such as 9, 10, and 11, for the RGB LED.

)

How to solve →

Define, setup, pinmode, baud rate, loop, analogRead, map, analogWrite

No pinmode for analog devices

5) Temperature sensor

```
#define temp A0
```

```
void setup(){
```

```
Serial.begin(9600);
```

```
}
```

```
void loop(){
```

```

float t,f, rawvalue, voltage;

    rawvalue = analogRead(temp);
    voltage = (rawvalue/1023)*5000;
    t = (voltage-500)*0.1;
    f = (t*1.8)+32;
    Serial.print("Temperature is : ");
    Serial.println(t,1);
    Serial.print("Temp in far is : ");
    Serial.println(f,1);
    Serial.println();
    Serial.println();
    delay(2000);

}

```

6) max and min temp

float maxtemp; → global variable

```

Void setup(){
    maxtemp=0;
}

Void loop(){
    if(maxtemp<t){
        Maxtemp = t;
    }

    Serial.print(maxtemp);
}

```

7) temp crosses a value show user using led

#define led 2

```

void setup(){

```

```
Serial.begin(9600);  
  pinMode(led, INPUT);  
  digitalWrite(led,LOW);  
  
}  
  
Void loop(){  
  
  if(t>50){  
    digitalWrite(led,HIGH);  
  }  
  else{  
    digitalWrite(led,LOW);  
  }  
  
}
```