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SUBJECT: IOT
CLASS : MCA 3RD SEM DIV-B
ROLL NO: 182

Q1. To interface LED with Arduino and write a program to turn ON/OFF LED light at interval of every 1 Sec.

```
#define LED_BUILTIN 13

void setup() {
  pinMode(LED_BUILTIN, OUTPUT);
}

void loop() {
  digitalWrite(LED_BUILTIN, HIGH);
  delay(1000);

  digitalWrite(LED_BUILTIN, LOW);
  delay(1000);
}
```

Q2. To interface LED with ESP32 (Node MCU) and write a program to turn ON/OFF LED light at interval of every 1 Sec

```
#define pin 2

void setup() {
  pinMode(pin, OUTPUT);
}

void loop() {
  digitalWrite(pin, HIGH);
  delay(1000);
  digitalWrite(pin, LOW);
  delay(1000);
}
```

Q3. To interface 2 LED with different colour and write a program to turn ON/OFF LED light at a same time.

```

#define LED_BUILTIN1 2
#define LED_BUILTIN2 3

void setup() {
  pinMode(LED_BUILTIN1, OUTPUT);
  pinMode(LED_BUILTIN2, OUTPUT);
}

void loop() {
  digitalWrite(LED_BUILTIN1, HIGH);
  digitalWrite(LED_BUILTIN2, HIGH);
  delay(500);

  digitalWrite(LED_BUILTIN1, LOW);
  digitalWrite(LED_BUILTIN2, LOW);
  delay(1000);
}

```

Q4. To interface BUZZER and write a program to turn ON/OFF Buzzer

```

#define bz 2

void setup() {
  pinMode(bz, OUTPUT);
}

void loop() {
  tone(bz,1000);
  delay(500);
  noTone(bz);
  delay(500);

  // digitalWrite(bz,HIGH);
  // delay(500);
  //
  // digitalWrite(bz,LOW);
  // delay(500);
}

```

Q5. To interface 2 LED with different colour and write a program to turn ON/OFF LED light on after another, which works light police Van Light. And also play the buzzer of police van or ambulance.

```

#define LED_BUILTIN1 2
#define LED_BUILTIN2 3
#define bz 4

void setup() {
  pinMode(LED_BUILTIN1, OUTPUT);
  pinMode(LED_BUILTIN2, OUTPUT);
  pinMode(bz, OUTPUT);
}

void loop() {
  digitalWrite(LED_BUILTIN1, HIGH);
  tone(bz,1000);
  delay(500);

  digitalWrite(LED_BUILTIN1, LOW);
  noTone(bz);

  digitalWrite(LED_BUILTIN2, HIGH);
  tone(bz,500);
  delay(1000);

  digitalWrite(LED_BUILTIN2, LOW);
  noTone(bz);
}

```

Q6. Write a program to play a melody using buzzer.

```

#define bz 4
int arr[]={100,300,200,1000,400};
void setup() {
  pinMode(bz, OUTPUT);
}

void loop() {
  for(int i=0;i<5;i++)
  {
    tone(bz,arr[i]);
    delay(500);
  }
}

```

```
    noTone(bz);  
}
```

Q7. To interface PULLUP BUTTON with Arduino. write a program to turn ON/OFF as per the button pullup.

```
#define LED_BUILTIN1 4  
#define pull 3  
  
void setup() {  
    pinMode(LED_BUILTIN1, OUTPUT);  
    pinMode(pull, INPUT_PULLUP);  
}  
  
void loop() {  
    if(digitalRead(pull)==LOW){  
        digitalWrite(LED_BUILTIN1, HIGH);  
    }  
    digitalWrite(LED_BUILTIN1, LOW);  
}
```

Q8. To interface DHT11 Sensor with Arduino and write a program to print temperature and humidity reading.

```
#include "DHT.h"  
#define DHTPIN 7  
#define DHTTYPE DHT11  
DHT dht(DHTPIN, DHTTYPE);  
  
void setup() {  
    Serial.begin(9600);  
    Serial.println("DHTxx test!");  
    dht.begin();  
}  
  
void loop() {  
    digitalWrite(Whitepin, LOW);  
    digitalWrite(Redpin, LOW);  
    delay(2000);  
    float h = dht.readHumidity();  
    float t = dht.readTemperature();  
    float f = dht.readTemperature(true);
```

```

    if (isnan(h) || isnan(t) || isnan(f)) {
        Serial.println("Failed to read from DHT sensor!");
        return;
    }

    float hif = dht.computeHeatIndex(f, h);
    float hic = dht.computeHeatIndex(t, h, false);

    Serial.print ("Humidity: ");
    Serial.print (h);
    Serial.print (" %\t");
    Serial.print ("Temperature: ");
    Serial.print (t);
    Serial.print (" *C ");
    Serial.print (f);
    Serial.print (" *F\t");
    Serial.print ("Heat index: ");
    Serial.print (hic);
    Serial.print (" *C ");
    Serial.print (hif);
    Serial.println (" *F");
}

```

Q9. Use DHT 11 and glow the red light if temperature goes above 30'c and play the buzzer and blink the green LED if temperature goes below 30'c and stop the buzzer.

```

#include "DHT.h"
#define DHTPIN 7 // what digital pin we're connected to
#define Redpin 8
#define Whitepin 9
#define bz 6
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);

void setup() {
    pinMode(bz, OUTPUT);
    pinMode(Redpin, OUTPUT);
    pinMode(Whitepin, OUTPUT);
    Serial.begin(9600);
    Serial.println("DHTxx test!");
    dht.begin();
}

```

```

void loop() {
  digitalWrite(Whitepin, LOW);
  digitalWrite(Redpin, LOW);
  delay(2000);
  float h = dht.readHumidity();
  float t = dht.readTemperature();
  float f = dht.readTemperature(true);

  if (isnan(h) || isnan(t) || isnan(f)) {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }

  float hif = dht.computeHeatIndex(f, h);
  float hic = dht.computeHeatIndex(t, h, false);

  if(t > 30){
    tone(bz, 1000, 500);
    delay(500);
    digitalWrite(Redpin, HIGH);
    //delay(200);
    digitalWrite(Whitepin, LOW);
  }else{
    noTone(bz);
    digitalWrite(Whitepin, HIGH);
    //delay(200);
    digitalWrite(Redpin, LOW);
    //delay(200);
  }
  // noTone(bz);
  Serial.print ("Humidity: ");
  Serial.print (h);
  Serial.print (" %\t");
  Serial.print ("Temperature: ");
  Serial.print (t);
  Serial.print (" *C ");
  Serial.print (f);
  Serial.print (" *F\t");
  Serial.print ("Heat index: ");
  Serial.print (hic);
  Serial.print (" *C ");
  Serial.print (hif);
  Serial.println (" *F");
}

```

Q10. Write a Program to read three values of temperature and 10 values of humidity. Perform Addition of three temperature readings and print the number is prime no or not. Calculate the average of 10 humidity readings

```
#include "DHT.h"
#define DHTPIN 7
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);

void setup() {
    Serial.begin(9600);
    Serial.println("DHTxx test!");
    dht.begin();

    //Temperature
    float sum=0;
    for(int i=0;i<3;i++){
        float t = dht.readTemperature();
        sum=sum+t;
    }
    if (isnan(t)) {
        Serial.println("Failed to read from DHT sensor!(Temperature)");
        return;
    }
    else{
        Serial.print ("Sum Temperature: ");
        Serial.print (sum);

        int flag=0;
        int m=sum/2;
        for(int i=2;i<=m;i++)
        {
            if(sum%i==0)
            {
                printf("Number is not prime");
                flag=1;
                break;
            }
        }
    }
}
```

```

        }
        if(flag==0)
            printf("Number is prime");
    }

    //Humidity
    float sum=0;
    for(int i=0;i<10;i++){
        float h = dht.readHumidity();
        sum=sum+h;
    }
    float avg=sum/10;

    if (isnan(h)) {
        Serial.println("Failed to read from DHT sensor! (Humidity)");
        return;
    }
    else{
        Serial.print ("Avg Humidity: ");
        Serial.print (avg);
    }
}

```

Q11. Write a Program to read five values of temperature and calculate the average of readings. Run the loop up to the average values of temperature and print the temperature value in ascending order.

```

#include "DHT.h"
#define DHTPIN 7
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);

void setup() {
    Serial.begin(9600);
    Serial.println("DHTxx test!");
    dht.begin();

    float sum=0;
    for(int i=0;i<5;i++){
        float t = dht.readTemperature();
        sum=sum+t;
    }
}

```



```

    }
    float avg=sum/5;

    if (isnan(t)) {
        Serial.println("Failed to read from DHT sensor!");
        return;
    }
    else{
        Serial.print ("Avg Temperature: ");
        Serial.print (avg);
    }

    //.....
}

```

Q12. To interface IR Sensor with Arduino and write a program to print readings of IR sensor

```

void setup() {
    pinMode(8,INPUT);
    Serial.begin(9600);
}

void loop() {
    if(digitalRead(8)==LOW){
        Serial.println("1");
    }
    else{
        Serial.println("0");
    }
}

```

Q13.To interface IR Sensor with Arduino and write a program to blink red or white LED. If the Transmitter transmit and Photodiode receives the rays then glow White LED else glow Red LED/play the buzzer.

```

void setup() {
    // put your setup code here, to run once:
    pinMode(8,INPUT);
    pinMode(6,OUTPUT);
    pinMode(7,OUTPUT); //LED
}

```

```

void loop() {
    // put your main code here, to run repeatedly:

    if(digitalRead(8)==LOW){
        digitalWrite(7,LOW);
        noTone(6);
    }
    else{
        digitalWrite(7,HIGH);
        tone(6,1000,500);
        delay(100);
    }
}

```

Q13-b. To interface Ultrasonic Sensor with Arduino. Use the ultrasonic sensor and extract the distance of object

```

#define pingPin 8
#define echoPin 7
long duration, cm,inches,m;

void setup() {
    Serial.begin(9600);
    pinMode(pingPin, OUTPUT);
    pinMode(echoPin, INPUT);
}

void loop() {

    digitalWrite(pingPin, LOW);
    delayMicroseconds(2);

    digitalWrite(pingPin, HIGH);
    delayMicroseconds(10);

    digitalWrite(pingPin, LOW);

    duration = pulseIn(echoPin, HIGH);

    inches = microsecondsToInches(duration);
    cm = microsecondsToCentimeters(duration);
}

```

```

    m = inchesToMeter(inches);

    Serial.print(inches);
    Serial.print("in, ");

    Serial.print(cm);
    Serial.print("cm");

    Serial.print("Meter: ");
    Serial.print(m);

    Serial.println();
    delay(100);

}
long microsecondsToInches(long microseconds) {
    return microseconds / 74 / 2;
}

long microsecondsToCentimeters(long microseconds) {
    return microseconds / 29 / 2;
}

long inchesToMeter(long m) {
    return (m/39.37007874);
}

```

Q14. Take only 3 readings of ultrasonic sensor (after trigger) at the intervals of 2 seconds then stop taking further readings. Average the readings and find out if that number is palindrome number or not.

```

#define pingPin 8
#define echoPin 7
long duration, cm,inches,m;

void setup() {
    Serial.begin(9600);
    pinMode(pingPin, OUTPUT);
    pinMode(echoPin, INPUT);
}

```

```

int sum=0;
for(int i=0;i<3;i++){
    digitalWrite(pingPin, LOW);
    delayMicroseconds(2);
    digitalWrite(pingPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(pingPin, LOW);
    duration = pulseIn(echoPin, HIGH);
    sum=sum+duration;
}
int avg= sum/3;

    Serial.print("Avg:");
    Serial.print(avg);
int r,sum=0,temp;
    temp=avg;
    while(n>0)
    {
        r=n%10;
        sum=(sum*10)+r;
        avg=avg/10;
    }
    if(temp==sum)
        Serial.print("palindrome number ");
    else
        Serial.print("not palindrome");
}

```