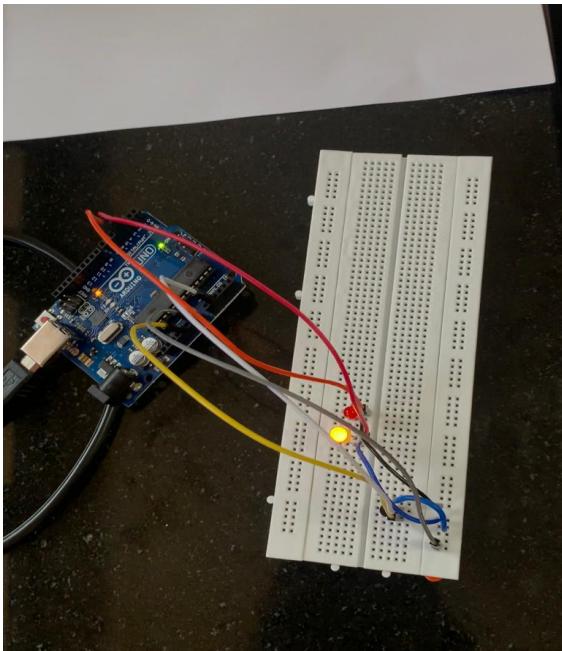


EXPERIMENT 10: Arduino-2

TASK 1: Design the Arduino Circuit to measure the temperature by using a temperature sensor (LM35) such that for temperature $> 30^{\circ}\text{C}$ yellow led will glow and for temperature $< 30^{\circ}\text{C}$ red led will glow.

CIRCUIT:



CODE:

```
const int hot = 31;
const int cold = 30;

void setup() {
pinMode(A0, INPUT);
pinMode(3, OUTPUT);
pinMode(4, OUTPUT);
Serial.begin(9600);
}

void loop() {
int sensor = analogRead(A0);
float voltage = (sensor / 1024.0) * 10.0;
float tempC = (voltage - .5) * 100;
float tempF = (tempC * 1.8) + 32;
Serial.print("temp: ");
Serial.print(tempF);

if (tempC < cold) {
digitalWrite(3, LOW);
digitalWrite(4, HIGH);
}
else if (tempC >= hot) {
digitalWrite(3, HIGH);
}
```

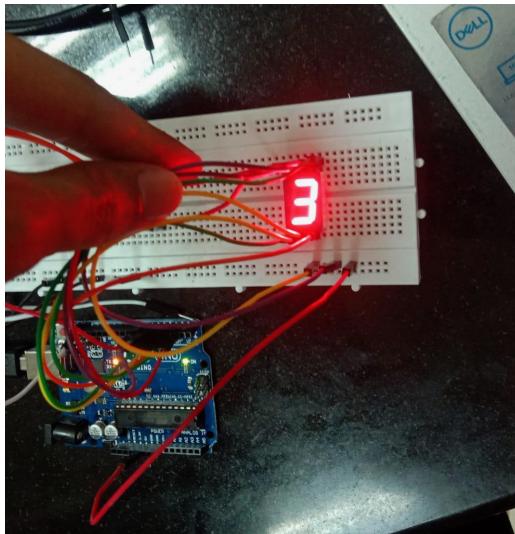
```
digitalWrite(4, LOW);
}
delay(10);
}
```

RESULTS:

The yellow LED glows when temperature is higher than 30 and red LED glows when temperature is less than 31.

TASK 2: Design the Arduino Circuit display the 0-9 digits on seven segments.

CIRCUIT:



CODE:

```
int loopvar = 0;

void setup()
{
  Serial.begin(9600);
  pinMode(2, OUTPUT);
  pinMode(3, OUTPUT);
  pinMode(4, OUTPUT);
  pinMode(5, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(8, OUTPUT);
  pinMode(9, OUTPUT);
}

void loop()
{
  int num = loopvar%10;
  loopvar = loopvar +1;

  if(num == 0)
  {
    digitalWrite(2, 0);
    digitalWrite(3, 0);
```

```
digitalWrite(4, 0);
digitalWrite(5, 0);
digitalWrite(6, 0);
digitalWrite(7, 0);
digitalWrite(8, 1);
```

```
} else if(num == 1) {
  digitalWrite(2, 1);
  digitalWrite(3, 0);
  digitalWrite(4, 0);
  digitalWrite(5, 1);
  digitalWrite(6, 1);
  digitalWrite(7, 1);
  digitalWrite(8, 1);
```

```
} else if(num == 2) {
  digitalWrite(2, 0);
  digitalWrite(3, 0);
  digitalWrite(4, 1);
  digitalWrite(5, 0);
  digitalWrite(6, 0);
  digitalWrite(7, 1);
  digitalWrite(8, 0);
```

```
} else if(num == 3) {
  digitalWrite(2, 0);
  digitalWrite(3, 0);
  digitalWrite(4, 0);
  digitalWrite(5, 0);
  digitalWrite(6, 1);
  digitalWrite(7, 1);
  digitalWrite(8, 0);
```

```
} else if(num == 4) {
  digitalWrite(2, 1);
  digitalWrite(3, 0);
  digitalWrite(4, 0);
  digitalWrite(5, 1);
  digitalWrite(6, 1);
  digitalWrite(7, 0);
  digitalWrite(8, 0);
```

```
} else if(num == 5) {
  digitalWrite(2, 0);
  digitalWrite(3, 1);
  digitalWrite(4, 0);
  digitalWrite(5, 0);
  digitalWrite(6, 1);
  digitalWrite(7, 0);
  digitalWrite(8, 0);
```

```
} else if(num == 6) {
  digitalWrite(2, 0);
  digitalWrite(3, 1);
  digitalWrite(4, 0);
```

```
digitalWrite(5, 0);
digitalWrite(6, 0);
digitalWrite(7, 0);
digitalWrite(8, 0);

} else if(num == 7) {
  digitalWrite(2, 0);
  digitalWrite(3, 0);
  digitalWrite(4, 0);
  digitalWrite(5, 1);
  digitalWrite(6, 1);
  digitalWrite(7, 1);
  digitalWrite(8, 1);

} else if(num == 8) {
  digitalWrite(2, 0);
  digitalWrite(3, 0);
  digitalWrite(4, 0);
  digitalWrite(5, 0);
  digitalWrite(6, 0);
  digitalWrite(7, 0);
  digitalWrite(8, 0);

} else if(num == 9) {
  digitalWrite(2, 0);
  digitalWrite(3, 0);
  digitalWrite(4, 0);
  digitalWrite(5, 0);
  digitalWrite(6, 1);
  digitalWrite(7, 0);
  digitalWrite(8, 0);

} else {
  digitalWrite(2, 1);
  digitalWrite(3, 1);
  digitalWrite(4, 1);
  digitalWrite(5, 1);
  digitalWrite(6, 1);
  digitalWrite(7, 1);
  digitalWrite(8, 1);
}

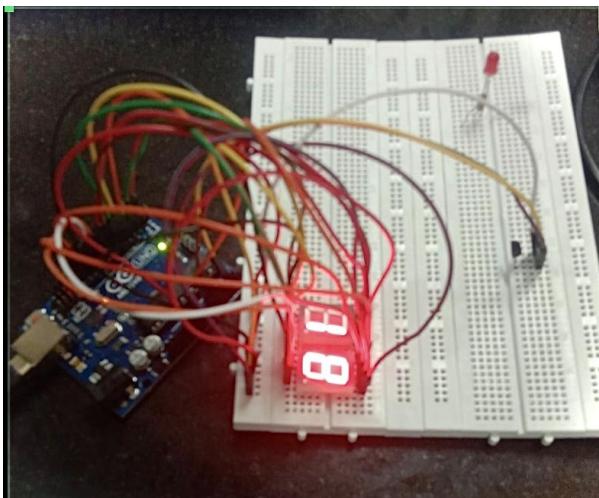
}
delay(1000);
}
```

RESULTS:

The numbers 0-9 were displayed on the seven segment display using the Arduino Board.

TASK 3: Design the Arduino Circuit to measure the temperature by using a temperature sensor (LM35) and display it on a seven segment display (2 digits).

CIRCUIT:



CODE:

```
int val;
int tempPin = A4;
int led1 = 13;
int led2 = 12;
int dp = 0;
int num = 0;

void setup()
{
    Serial.begin(9600);
    pinMode(2, OUTPUT);
    pinMode(3, OUTPUT);
    pinMode(4, OUTPUT);
    pinMode(5, OUTPUT);
    pinMode(6, OUTPUT);
    pinMode(7, OUTPUT);
    pinMode(8, OUTPUT);

    pinMode(A0, OUTPUT);
    pinMode(A1, OUTPUT);
    pinMode(9, OUTPUT);
    pinMode(10, OUTPUT);
    pinMode(11, OUTPUT);
    pinMode(12, OUTPUT);
    pinMode(13, OUTPUT);
}
void loop()
{
    val = analogRead(tempPin);

    float cel = 500 * val / 1024;
    Serial.print("TEMPERATURE = ");
    Serial.print(cel);
```

```
Serial.print("*C");
Serial.println();

int tempint = (int) cel;

Serial.print("(Integer) = ");
Serial.print(tempint);
Serial.println();

int dig2 = tempint % 10;
int dig1 = (tempint - dig1)/ 10;

num = dig1;
if(num == 0)
{
    digitalWrite(2, 0);
    digitalWrite(3, 0);
    digitalWrite(4, 0);
    digitalWrite(5, 0);
    digitalWrite(6, 0);
    digitalWrite(7, 0);
    digitalWrite(8, 1);
}
else if(num == 1){
    digitalWrite(2, 1);
    digitalWrite(3, 0);
    digitalWrite(4, 0);
    digitalWrite(5, 1);
    digitalWrite(6, 1);
    digitalWrite(7, 1);
    digitalWrite(8, 1);
}
else if(num == 2){
    digitalWrite(2, 0);
    digitalWrite(3, 0);
    digitalWrite(4, 1);
    digitalWrite(5, 0);
    digitalWrite(6, 0);
    digitalWrite(7, 1);
    digitalWrite(8, 0);
}
else if(num == 3){
    digitalWrite(2, 0);
    digitalWrite(3, 0);
    digitalWrite(4, 0);
    digitalWrite(5, 0);
    digitalWrite(6, 1);
    digitalWrite(7, 1);
    digitalWrite(8, 0);
}
else if(num == 4){
    digitalWrite(2, 1);
    digitalWrite(3, 0);
    digitalWrite(4, 0);
    digitalWrite(5, 1);
}
```

```
digitalWrite(6, 1);
digitalWrite(7, 0);
digitalWrite(8, 0);
}
else if(num == 5) {
  digitalWrite(2, 0);
  digitalWrite(3, 1);
  digitalWrite(4, 0);
  digitalWrite(5, 0);
  digitalWrite(6, 1);
  digitalWrite(7, 0);
  digitalWrite(8, 0);
}
else if(num == 6) {
  digitalWrite(2, 0);
  digitalWrite(3, 1);
  digitalWrite(4, 0);
  digitalWrite(5, 0);
  digitalWrite(6, 0);
  digitalWrite(7, 0);
  digitalWrite(8, 0);
}
else if(num == 7) {
  digitalWrite(2, 0);
  digitalWrite(3, 0);
  digitalWrite(4, 0);
  digitalWrite(5, 1);
  digitalWrite(6, 1);
  digitalWrite(7, 1);
  digitalWrite(8, 1);
}
else if(num == 8) {
  digitalWrite(2, 0);
  digitalWrite(3, 0);
  digitalWrite(4, 0);
  digitalWrite(5, 0);
  digitalWrite(6, 0);
  digitalWrite(7, 0);
  digitalWrite(8, 0);
}
else if(num == 9) {
  digitalWrite(2, 0);
  digitalWrite(3, 0);
  digitalWrite(4, 0);
  digitalWrite(5, 0);
  digitalWrite(6, 1);
  digitalWrite(7, 0);
  digitalWrite(8, 0);
}
else {
  digitalWrite(2, 1);
  digitalWrite(3, 1);
  digitalWrite(4, 1);
  digitalWrite(5, 1);
  digitalWrite(6, 1);
```

```
digitalWrite(7, 1);
digitalWrite(8, 1);
}

num = dig2;

if(num == 0)
{
    digitalWrite(A0, 0);
    digitalWrite(A1, 0);
    digitalWrite(9, 0);
    digitalWrite(10, 0);
    digitalWrite(11, 0);
    digitalWrite(12, 0);
    digitalWrite(13, 1);
}
else if(num == 1){
    digitalWrite(A0, 1);
    digitalWrite(A1, 0);
    digitalWrite(9, 0);
    digitalWrite(10, 1);
    digitalWrite(11, 1);
    digitalWrite(12, 1);
    digitalWrite(13, 1);
}
else if(num == 2){
    digitalWrite(A0, 0);
    digitalWrite(A1, 0);
    digitalWrite(9, 1);
    digitalWrite(10, 0);
    digitalWrite(11, 0);
    digitalWrite(12, 1);
    digitalWrite(13, 0);
}
else if(num == 3){
    digitalWrite(A0, 0);
    digitalWrite(A1, 0);
    digitalWrite(9, 0);
    digitalWrite(10, 0);
    digitalWrite(11, 1);
    digitalWrite(12, 1);
    digitalWrite(13, 0);
}
else if(num == 4){
    digitalWrite(A0, 1);
    digitalWrite(A1, 0);
    digitalWrite(9, 0);
    digitalWrite(10, 1);
    digitalWrite(11, 1);
    digitalWrite(12, 0);
    digitalWrite(13, 0);
}
else if(num == 5){
    digitalWrite(A0, 0);
    digitalWrite(A1, 1);
```

```

digitalWrite(9, 0);
digitalWrite(10, 0);
digitalWrite(11, 1);
digitalWrite(12, 0);
digitalWrite(13, 0);
}
else if(num == 6) {
  digitalWrite(A0, 0);
  digitalWrite(A1, 1);
  digitalWrite(9, 0);
  digitalWrite(10, 0);
  digitalWrite(11, 0);
  digitalWrite(12, 0);
  digitalWrite(13, 0);
}
else if(num == 7) {
  digitalWrite(A0, 0);
  digitalWrite(A1, 0);
  digitalWrite(9, 0);
  digitalWrite(10, 1);
  digitalWrite(11, 1);
  digitalWrite(12, 1);
  digitalWrite(13, 1);
}
else if(num == 8) {
  digitalWrite(A0, 0);
  digitalWrite(A1, 0);
  digitalWrite(9, 0);
  digitalWrite(10, 0);
  digitalWrite(11, 0);
  digitalWrite(12, 0);
  digitalWrite(13, 0);
}
else if(num == 9) {
  digitalWrite(A0, 0);
  digitalWrite(A1, 0);
  digitalWrite(9, 0);
  digitalWrite(10, 0);
  digitalWrite(11, 1);
  digitalWrite(12, 0);
  digitalWrite(13, 0);
}
delay(2000);
}

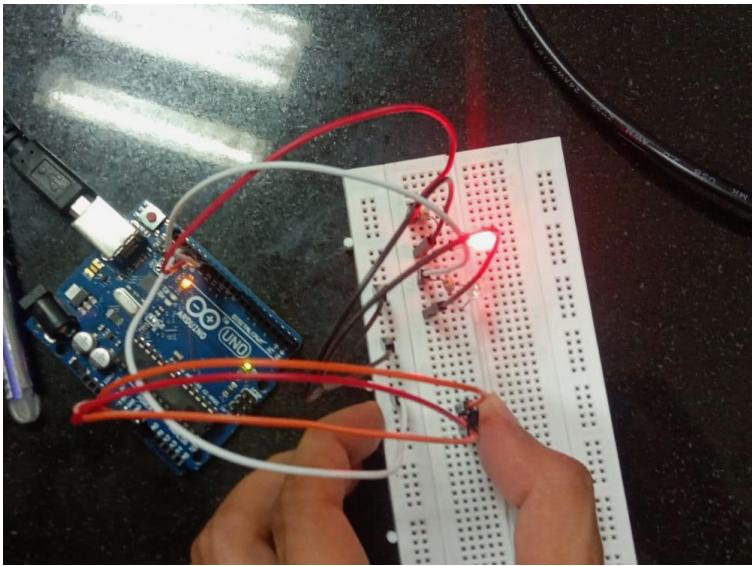
```

RESULTS:

The temperature input is displayed on two seven segment displays through the Arduino board.

TASK 4: Design the Arduino Circuit to measure the temperature by using temperature sensor (LM35) and blink external LED when the temperature > 30°C.

CIRCUIT:



CODE:

```
const int hot = 30;

void setup() {
pinMode(A0, INPUT);
pinMode(3, OUTPUT);
Serial.begin(9600);
}

void loop() {
int sensor = analogRead(A0);
float voltage = (sensor / 1024.0) * 10.0;
float tempC = (voltage - .5) * 100;
float tempF = (tempC * 1.8) + 32;
Serial.print("temp: ");
Serial.print(tempF);

if (tempC > hot) {
digitalWrite(3, HIGH);
delay(100);
digitalWrite(3, LOW);
}
else {
digitalWrite(3, LOW);
}
delay(10);
}
```

RESULTS:

The red LED blinks when temperature is higher than 30.