Activity 6: DC Motor with Temperature Sensor:

Description:
This circuit, we will use the photoresistor to control the speed of the DC motor.

Materials:

1 Arduino Uno R3
1 Breadboard
1 DC Motor
1 Temperature Sensor [TMP36]
Wires

Codes:

```
int tempMin = 22.00;
int tempMax = 125.00;
int fanSpeed;
int tempPin = A0;
int fan = 6;
float temp;
int readTemp() {
  temp = analogRead(tempPin);
  return temp * 0.48828125;
}

void setup() {
  Serial.begin(9600);
  pinMode(fan, OUTPUT);
  pinMode(tempPin, INPUT);
}

void loop() {

   temp = readTemp();
  Serial.print(temp);
   if(temp  < tempMin) {
      fanSpeed = 0;
      digitalWrite(fan, LOW);
```

```
      delay(1000);
   }
   if((temp  >= tempMin) && (temp <= tempMax)) {
      fanSpeed = map(temp, tempMin, tempMax, 32, 255);
      analogWrite(fan, fanSpeed);
   }
}
```

Explanation on codes:

```
int tempMin = 22.00;
int tempMax = 125.00;
int fanSpeed;
int tempPin = A0;
int fan = 6;
float temp;

float temp;
```

temp: variable name

- First, we declare our variables with names. Now there is a variable declaration called float.
- We declared our variable "temp" as a float so that it can read negative and decimal numbers because we are using the temperature sensor.

```
int readTemp() {
  temp = analogRead(tempPin);
  return temp * 0.48828125;
}
```

- This code is a function that declares the variable readTemp as int or integer.
- It has a statement of "the name "temp" will be the value of analog read of the pin "tempPin" or pin "A0."
- The value of "temp" will be multiplied by 0.48828125 and subtracted by 50 and return the value to the variable "readTemp.""

Why 0.48828125?
The value where the analog value can be represented by ATmega, the actual voltage is obtained by VOLTAGE_GET / 1024. 1000 is used to change the unit from V to mV & 10 is a constant as each 10 mV is directly proportional to 1 Celsius in LM35.
So (5.0 * 1000 / 1024) / 10 = 0.48828125.

```
void setup() {
  Serial.begin(9600);
  pinMode(fan, OUTPUT);
  pinMode(tempPin, INPUT);
}
```

- We initialized the serial reading with the code “Serial.begin” with the bandwidth of 9600. Next, we declared the variables as an output or input.

```
void loop() {

  temp = readTemp();
  Serial.print(temp);
```

- In the function void loop(), we started by declaring the “readtemp()” as temp.
- Then we send the value “temp” with the “Serial.print” code.

```
  if(temp  < tempMin) {
     fanSpeed = 0;
     digitalWrite(fan, LOW);
     delay(1000);
   }
```

- We have the if statement with the condition of “if the value of “temp” is less than the value of “tempMin”, it will turn off the fan and turn down the “fanSpeed” with a delay of 1000 millisecond or 1 second.”

```
if((temp  >= tempMin) && (temp <= tempMax))
```

- The last code is the if statement that will turn on the fan and the speed of the fan will act in accordance to the temperature.
- The condition is “if the value of “temp is greater than or equal to the value of “tempMin” AND less than or equal to the value of “tempMax.””

```
{
    fanSpeed = map(temp, tempMin, tempMax, 32, 255);
    analogWrite(fan, fanSpeed);
  }
}
```

- Here, the value of the “temp” will be mapped.
- If the value of “temp” is equal to “tempMin,” then it will be mapped to 32.
- If the value of “temp” is equal to “tempMax,” then it will be mapped to 255.
- And the values in-betweens will be mapped to the values in-betweens.
- Then the mapped values will be the output (as an analog) to the fan.