

## ARDUINO TEMPERATURE CONTROL SYSTEM

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### Arduino Code

// the setup function runs once when you press reset or power the board

```
void setup() {
```

```
  // initialize digital pin 13 as an output.
```

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

```
  pinMode(13, OUTPUT);
```

```
  pinMode(12, OUTPUT);
```

```
}
```

// the loop function runs over and over again forever

```
void loop() {
```

```
  //read the input on analog pin 0;
```

```
  float Temp = analogRead(A0);
```

```
  //print out the value you read;
```

```
  //Serial.println(Temp*0.00488*100);
```

```
  delay(1);    // delay in between reads for stability
```

```
  float Truetemp = Temp*0.00488*100;
```

```
  Serial.print("The current temperature is: ");
```

```
  Serial.print(Truetemp);
```

```
  Serial.print(" degrees C");
```

```
  Serial.println(' ');
```

```
  if (Truetemp < 32)
```

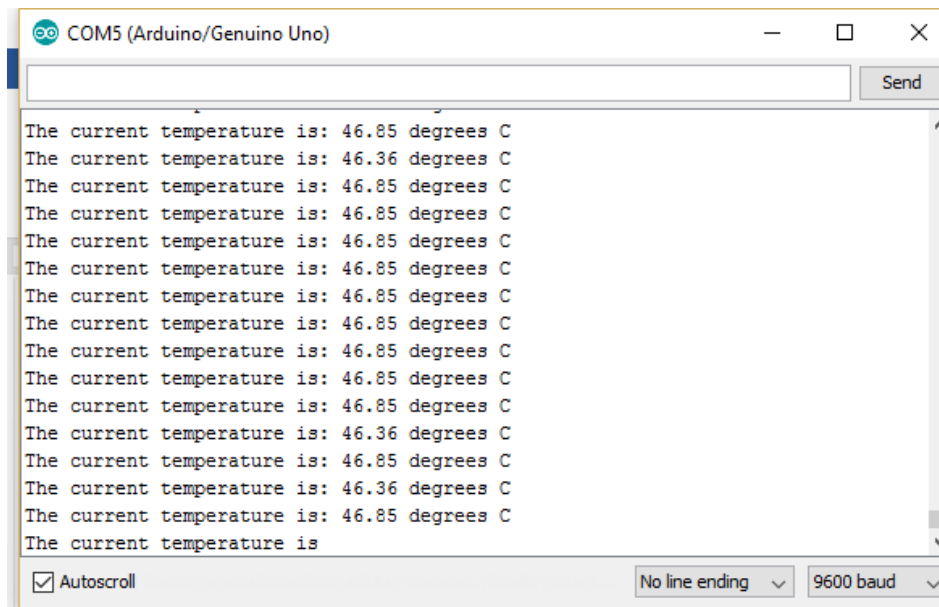
```
  {
```

```

digitalWrite(13, HIGH);    // Turn the LED on (HIGH is the voltage level)
digitalWrite(12, LOW);
}
else{
    digitalWrite(13, LOW);    // Turn the LED off by making the voltage low
    digitalWrite(12, HIGH);
}
}
}

```

### Results from implementation of Code



### ANSWERS

1. The sensor attained a maximum temperature of about 57.10 degree Celsius without the fan.
2. Two reasons for using the transistor instead of the Arduino.
  - The Arduino cannot regulate the 12V required to power the fan, that is, the Arduino can only provide 40mA at 5V on its digital pins.
  - The transistor can control high current and voltage from the power source to the fan. The transistor can act as a digital switch, enabling the Arduino to control loads with higher electrical requirements.

3. This is a result of the dissipation of electrical energy as heat by the constant flow of electrical current through the resistor.
4. Relays are electromechanical devices that use electromagnet to control a pair of movable contacts from an open position to a closed position.

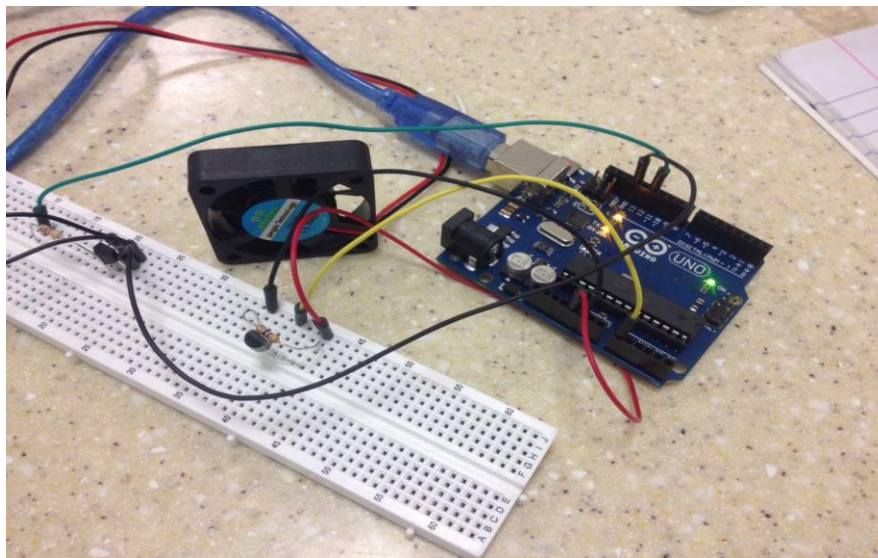
#### Advantages of Relay

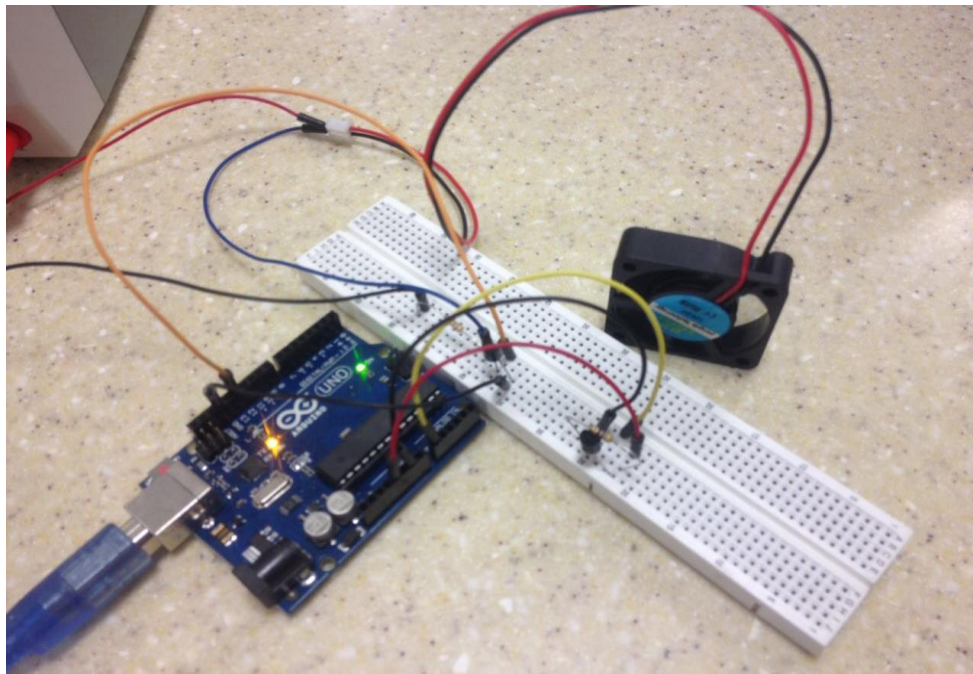
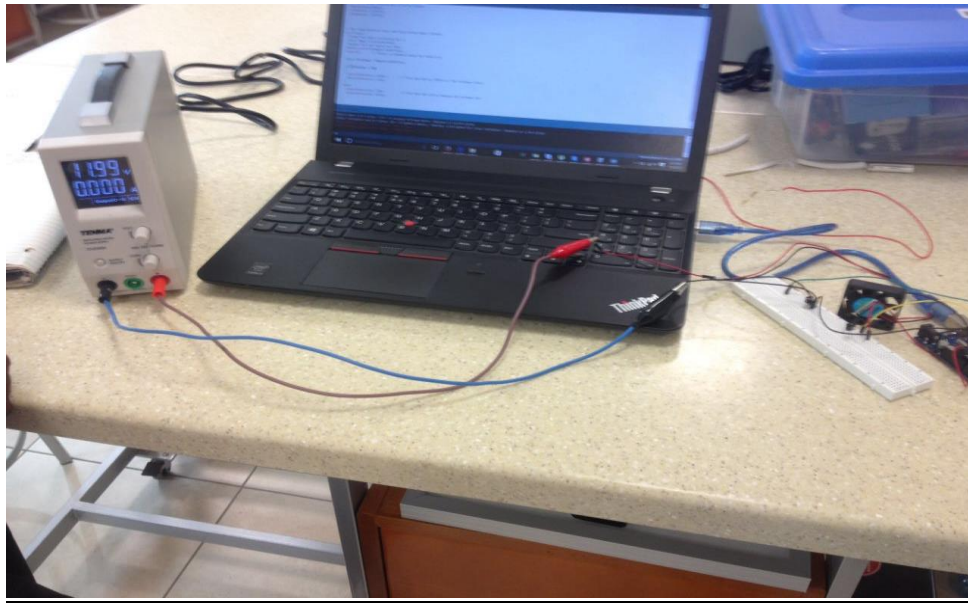
- Unlike transistors which work well with only Direct Current (DC), relays work best with both Alternating current (AC) and Direct Current (DC).
- At extreme temperatures, relays can operate more than a transistor because transistor, which are semiconductors have a limited high temperature of about 95°C and a little below zero degree Celsius.
- The values can be easily set, that is, it does not necessarily require a special programming device is required.

#### Disadvantages of Relay

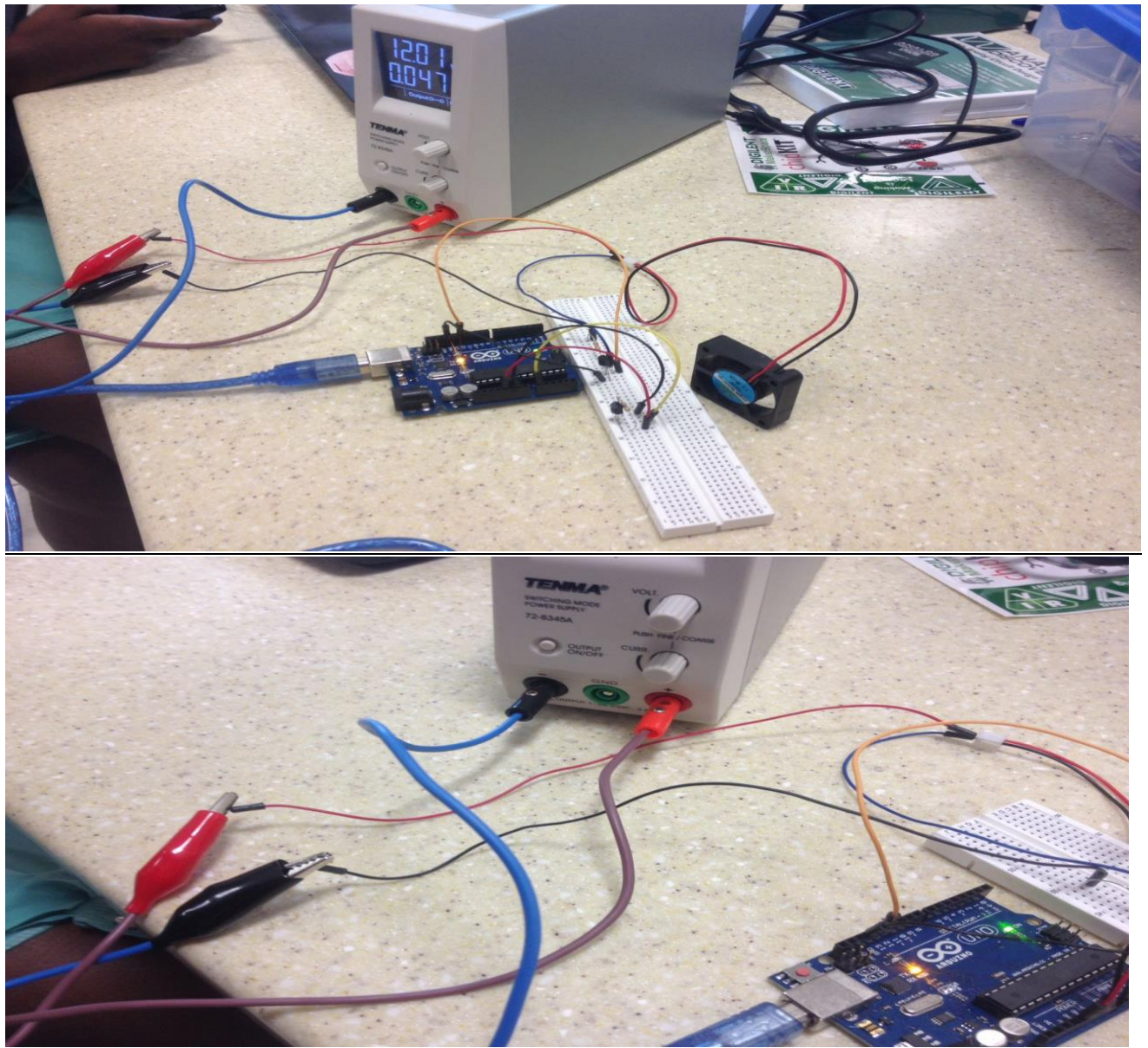
- Relays are electromagnetic and therefore cause electromagnetic interference sometimes in devices.
- Relay operate at a slower rate compared to transistors.
- Relays are not multifunctional, that is, one relay can perform only one function.
- Relays need periodical calibration and testing.

#### Pictures of the setup









### Reference

<http://www.instructables.com/answers/Benefits-between-using-a-Relay-or-Transistor/>

<http://www.electrotechnik.net/2015/07/advantages-and-disadvantages-of-electro.html>