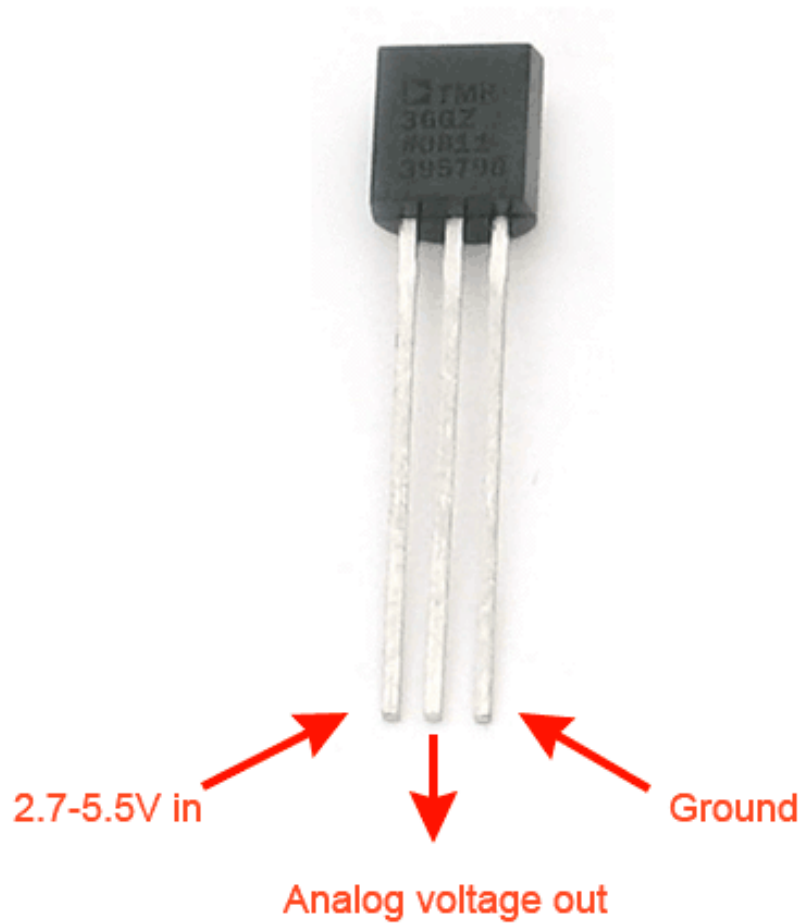


**Hardware:**

1. 3 female/male wires
2. TMP36 sensor
3. BBG with Zen Cape
4. breadboard

**Wiring:**



From TMP36 sensor, there are three pins. The first one (count from the left) needs to be connected to power. The second connects to the analog pin. The third one should connect to ground.

1. Insert the sensor onto the breadboard at an arbitrary column (any one from a to j and all pins should sit at the same column). For this tutorial, my sensor sits at column b where the first pin is at row 16; second pin at row 17; last pin at row 18.
2. Use one female/male wire with one end connects at column e row 16 while the other end connects to P9 (Pin 3/VDD\_3V3) of cape expansion headers.
3. Use one female/male wire with one end connects at column e row 17 while the other end connects to P9 (Pin 40/AIN1) of cape expansion headers.
4. Use the last female/male wire with one end connects at column row 18 while the other end connects to P9 (Pin 34/GNDA\_ADC) of cape expansion headers.

### Software Instruction:

1. Enable ADC from Zen Caple  

```
# echo BB-ADC > /sys/devices/platform/bone_capemgr/slots  
# cat /sys/devices/platform/bone_capemgr/slots  
0: PF---- -1  
1: PF---- -1  
2: PF---- -1  
3: PF---- -1  
4: P-O-L- 0 Override Board Name,00A0,Override Manuf,univ-emmc  
5: P-O-L- 1 Override Board Name,00A0,Override Manuf,BB-ADC
```
2. Read the values from P9 (Pin 40/AIN1)  
(there may be up to 3 seconds delay where the kernel try to create a symbolic link for iio:device0)

```
# while true; do cat /sys/bus/iio/devices/iio\:device0/in_voltage1_raw; sleep 1; done  
1607  
1628  
1632  
1618  
1631  
1627  
1630  
1613  
1626  
1623  
1619  
1626
```

(values may be fluctuated a bit for a period of time until they get stabled)

### Temperature Calculation:

1. covert the analog value into voltage (V) using the following formula  
$$\text{voltage} = (\text{value} / \text{max}) * 1.8$$
2. covert the voltage (V) into temperature (°C)  
$$\text{temperature} = (1000 * \text{voltage} - 1500) / 10$$

**References:**

A2D guide from course website

<https://learn.adafruit.com/tmp36-temperature-sensor/overview>