**Temperature and humidity detector:**

**High Level Requirements:**

Because of the machine or the circuit is going to be use as in home appliances, travelling, industries, nuclear bombs, Auto Robotics, Labs, or even in travel through space so how This device can be or going to used in such places.

* In home appliances the goal is to maintain the room temperature and humidity level where this device can be used as a indicator or to addition ac will turn on and off with the help of addition circuitory.
* In travelling the major issue in airplane is temperature and humidity which will result as vomiting and headache of the peoples, so there also we can measure and balance the environment with the help of this Circuit.
* In Research labs like chemical labs, biometric lab this device is more useful that we thought because some of the chemical, acid or virus needs a exact limit of temperature gap and without this device the survival of the labs for research is not possible.
* In industries like in big company plants where very big amount of manufacturing is going on and where big amount of snacks and basic home appliance is manufacturing there these kind of device is must to use to avoide lots of money waste.
* In nuclear bomb and nuclear reactor plants generates plenty of heat and can be turned into a huge disaster so to avoid such disaster temperature and humidity sensor are must be use and there we can’t avoid to do any mistakes with temperature or thousands of people are going to suffer and for years we can’t repair those mistakes with new birth child to old aged peoples.
* ISRO mars rover and recently launched NASA solar probe is the example of auto robotics and also is the example of what embedded devices can do so far we can achive with the help of the devices like temperature and humidity sensors.
* Last but not least is the point of carry human through space with the help of these devices and automation . and to make planatory species these sensor become major and basic needs of humans and they can perform as per needs.

**Low level recuirements:**

Here we came to technical aspects form device and to see how and what this device and perform

**Advantages or benefits of thermocouple:**

* Very wide temperature range about -200oC to +2500oC
* Fast response time
* They are a simple construction
* Low initial cost
* Durable
* Easy to read has a clear screen and good scale
* Quick response for any temperature changes
* Precision accuracy in temperature measurement
* It is not easily broken good durability
* Good to be used temperature variation measurement with below 1 cm distance range
* Available in small sheath sizes
* Not required bridge circuit
* Good accuracy
* Does not required bridge circuit
* Good reproducibility
* High-speed response
* They are rugged
* They are a self-power active device

**Disadvantages  or drawback of thermocouple:**

* Not as stable as RTD
* Recalibration is difficult
* More susceptible to RFI/EMI
* They are nonlinear
* It is used for only temperature measurement only
* They have a low output voltage
* Less sensitivity
* They require a reference for operation
* The stray voltage pick up is possible
* As output voltage is very small so it needs amplification
* Decreased accuracy comparing to RTD
* Difficult to verify
* Require expensive TC wire from the sensor to recording device
* The cold junction and lead compensation is essential