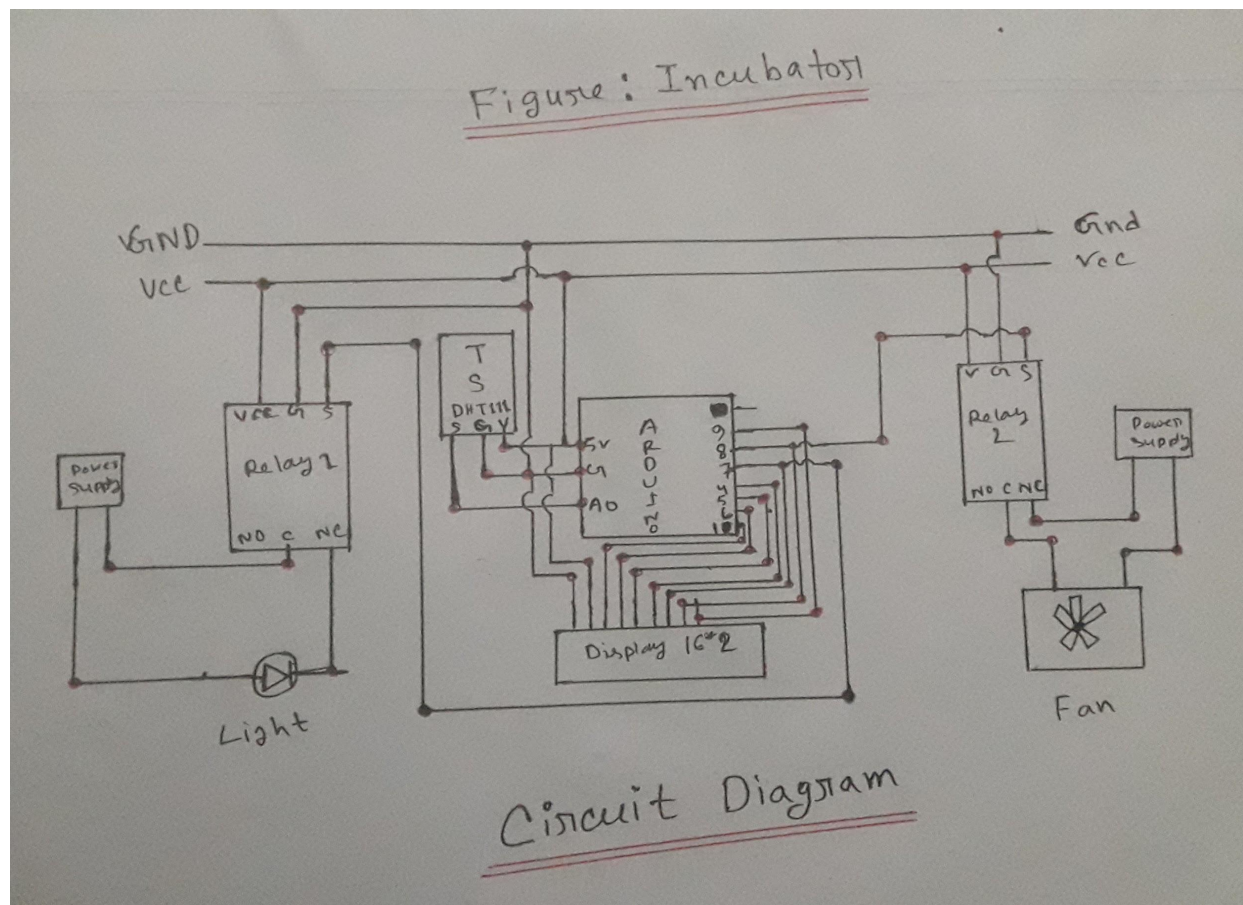# Incubator for Egg Hatching

*Abstract* : We know that an incubator for egg hatching needs a constant temperature and humidity. We can see many types of incubator for egg hatching which needs to operate by someone. Our incubator is fully automated that's why no one needs to operate or supervise. By our incubator we can hatch any types of egg.
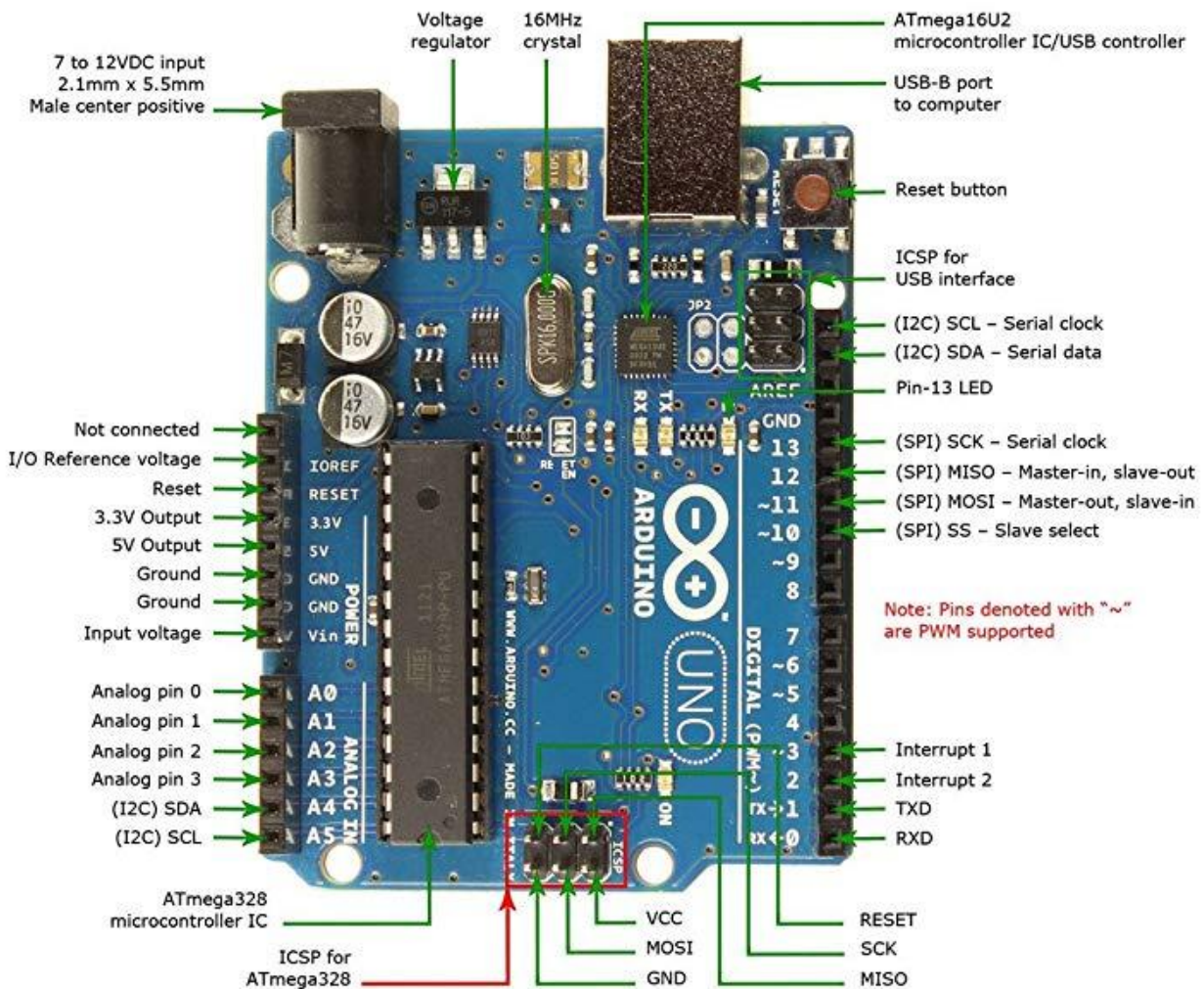
*Introduction* : Incubator means hatching an egg artificially. Our incubator is an automated device that is run by a microcontroller called arduino. We can set any temperature and humidity that an egg needs to hatch. In this device a 60w bulb used for increasing temperature & humidity and the fan is used for reducing the temperature. All these processes are fully automated.

*Circuit Diagram* :



Circuit Diagram

➢➢ **Arduino**



Voltage regulator · 16MHz crystal · ATmega16U2 microcontroller IC/USB controller · 7 to 12VDC input 2.1mm x 5.5mm Male center positive · USB-B port to computer · Reset button · ICSP for USB interface · (I2C) SCL – Serial clock · (I2C) SDA – Serial data · Pin-13 LED · Not connected · I/O Reference voltage · Reset · 3.3V Output · 5V Output · Ground · Ground · Input voltage · (SPI) SCK – Serial clock · (SPI) MISO – Master-in, slave-out · (SPI) MOSI – Master-out, slave-in · (SPI) SS – Slave select · Note: Pins denoted with "~" are PWM supported · Analog pin 0 · Analog pin 1 · Analog pin 2 · Analog pin 3 · (I2C) SDA · (I2C) SCL · Interrupt 1 · Interrupt 2 · TXD · RXD · ATmega328 microcontroller IC · ICSP for ATmega328 · VCC · MOSI · GND · RESET · SCK · MISO
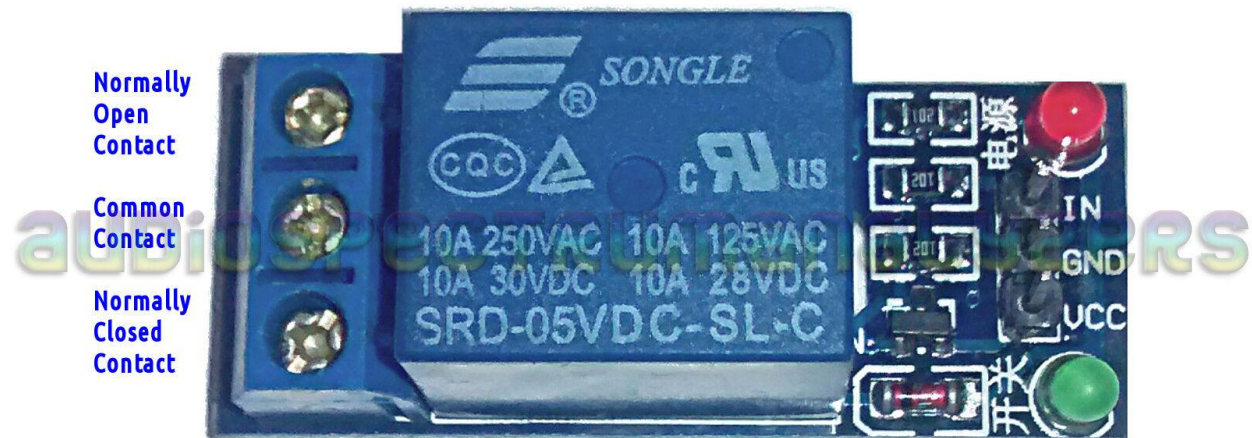
This microcontroller is used to control the whole system. These controller is based on a microchip ATMega328T. It has been used for receive data and operate the components.

**➤➤ Sensor (DHT11)**
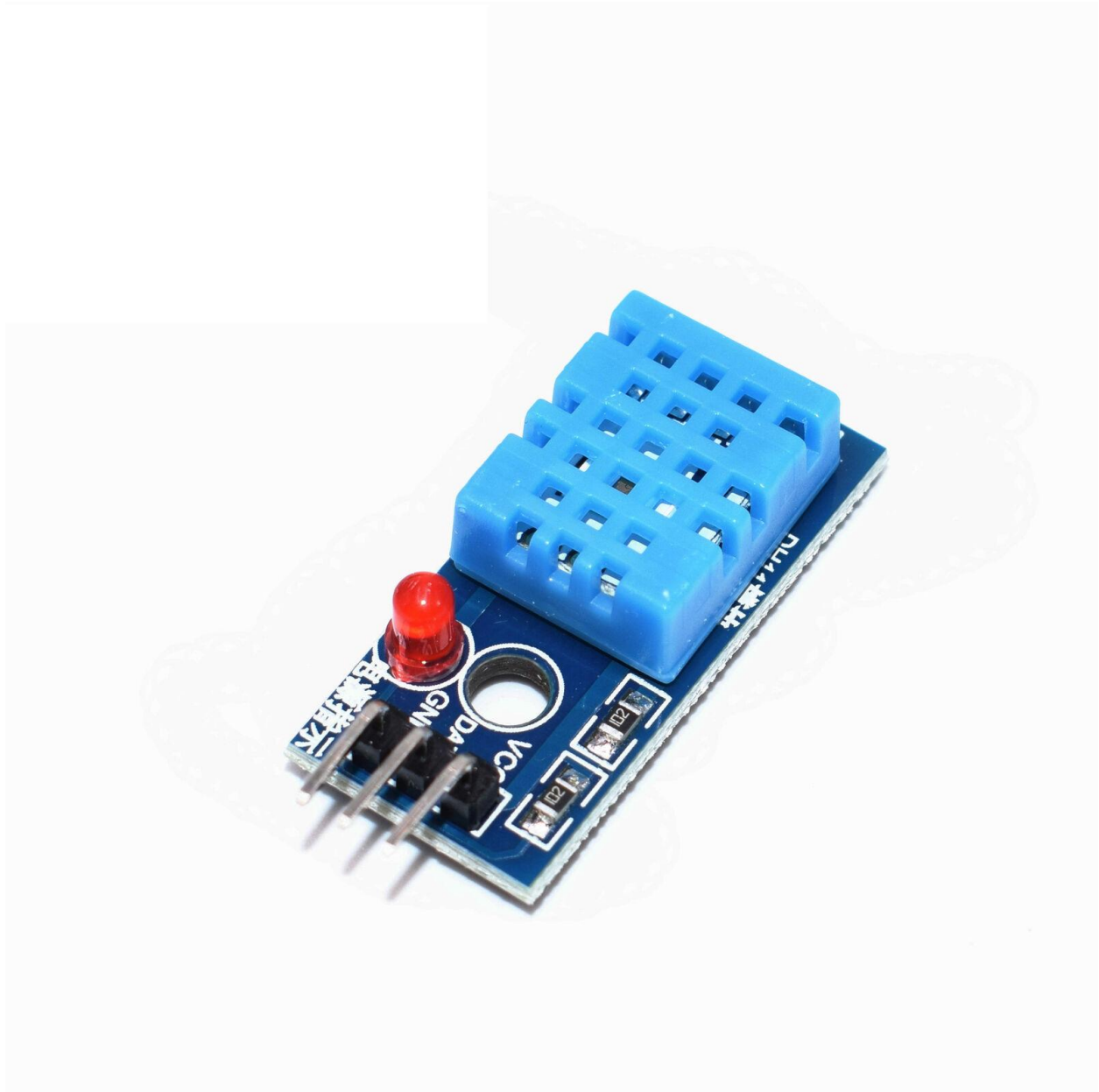


This sensor called DHT11 is used for reads the temperature and the humidity. These sensor helps us by giving the information of temperature and humidity by which we can know the temperature and the humidity that's why we can see that our temperature and humidity is according to our required value.

**➤➤ Relay Module**



Normally
Open
Contact

Common
Contact

Normally
Closed
Contact

SONGLE

10A 250VAC  10A 125VAC
10A 30VDC  10A 28VDC

SRD-05VDC-SL-C

IN
GND
VCC

This module is used for switching the components which maintain our temperature and humidity. We used relay module because we sent data when we need to switch the components by using only relay it is not possible.

**➤➤ Bulb & Fan**



The bulb and fan is used for controlling the temperature and humidity. The bulb changes the value of temperature and humidity. The fan is used for reducing the temperature. It is better to use an electric heater instead of bulb but for small hatchery or low budget incubator is enough.

**➤➤ LCD Display**



The display works for show the temperature and humidity. So we can know our temperature and humidity is exact to our required value. We used the display shield because it is easy to place on arduino.

## ➤➤ Arduino Software

```
egg_project§

#include <LiquidCrystal.h>

#include <DHT.h>

#include "DHT.h"
//LCD pin to Arduino
const int pin_RS = 8;
const int pin_EN = 9;
const int pin_d4 = 4;
const int pin_d5 = 5;
const int pin_d6 = 6;
const int pin_d7 = 7;
const int pin_BL = 10;
LiquidCrystal lcd( pin_RS,  pin_EN,  pin_d4,  pin_d5,  pin_d6,  pin_d7);
int L= 7;
int F= 8;
#define DHTPIN A0     // what pin we're connected to

#define DHTTYPE DHT11   // we are using the DHT11 sensor


DHT dht(DHTPIN, DHTTYPE);

void setup()
{
  Serial.begin(9600);
  for (int DigitalPin = 7; DigitalPin <= 8; DigitalPin++)
  {
  pinMode(DigitalPin, OUTPUT);
  }
  lcd.begin(16,2);  //16 by 2 character display

dht.begin();
}
```

By using this software we coded the microcontroller, to maintain the automatic process.

*Working Process* : The arduino uno is used as microcontroller. The sensor DHT11 is used for reading the temperature & humidity. The LCD Display is used to show the value of temperature and humidity.

The sensor read the value of temperature & humidity and send the data to microcontroller. Then the microcontroller send the command to bulb which is used as a heater and the fan to maintain the temperature and humidity through relay module by switching. The display show the exact value of temperature and humidity which exist in the incubator.

***Expected Outcomes & Limitation*** : Our country is a developing country and such kind of students like us do not have such money to build an incubator in large sector. For a medium level of egg hatching instrument like our incubator is appropriate for students like us. It will be more efficient if we used an electric heater instead of bulb. For a large egg hatching firm our incubator is not appropriate. Though we made a prototype, if we get proper funding we can use this automation system in large sector. The procedure of our automatic system is comparatively cheaper than any industrial incubator. As we say if we get proper funding and support we believe our incubator will more efficient and easy to use. No person has to supervise all the time though it is an automatic system. So it is comparatively more comfortable and low cost project.

***Conclusion*** : This is the era of IoT and automation. Our incubator is fully automated that no one needs to control or supervise all the time. It will save our time and harvest. Though it has some limitations but it can be solved by support and funding.