The main objective of this project is to design and build a smart egg incubator using Arduino. Incubation is the process by which certain oviparous animals hatch their eggs. Controlling the temperature and humidity level inside the incubator is really important. Here in this project, an incandescent bulb will provide sufficient heat and a DC fan will circulate the heat all around the eggs inside the incubator. The temperature inside the incubator has to be a constant value, so a temperature sensor will be placed inside the incubator for monitoring the temperature inside the incubator. If the temperature is high, the bulb will be turned off until it reaches the required value. To maintain the humidity inside the incubator, a jar of water will be places inside the incubator and a water level sensor will check the amount of water inside the jar. If the amount of water is insufficient, the jar will get refilled. Also, an LCD will display the temperature level inside the incubator

We build this project on Arduino Uno - an open-source electronics platform based on easy-to-use hardware and software. Arduino board senses the environment by receiving inputs from many sensors, and affects its surroundings by controlling various actuators. The Arduino board is programmed by writing code in the Arduino programming language and by using the Arduino Integrated Development Environment. Unlike most other programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board - you can simply use a USB cable.

The main components used in this project are:

* **Arduino Uno Microcontroller board** based on the Microchip ATmega328P microcontroller is used in this project. This board also consists of other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. Arduino Uno has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins, a USB connection, a Power barrel jack, an ICSP header and a reset button.
* **Water level sensors** are used to detect the level of substances that can flow. Such substances include liquids, slurries, granular material and powders. Such measurements can be used to determine the number of materials within a closed container or the flow of water in open channels.
* **Servo Motor** is low speed and high torque motor. It has four main components - a DC motor, a gearbox, a potentiometer and a control circuit. It is controlled by sending a series of pulses through the signal line.
* **LM35** is a precision centigrade temperature sensor. The output voltage of the sensor is directly proportional to the temperature in centigrade. LM35 can be used in the range of -550C to +1500C with +/- 0.750C accuracy.
* **DC fan** is an apparatus with rotating blades that creates a current of air for cooling or ventilation. Typical voltage values for DC fans are, 5V, 12V, 24V and 48V.
* **Liquid Crystal Display (LCD):** The JHD162A 16×2 LCD module used here is based on the HD44780 driver from Hitachi. It can display 2 lines of 16 characters each. The JHD162A has 16 pins and can be operated in 4-bit mode or 8-bit mode.