About the Project:

This project which we carried on is the real time project and it will makes our life easier and save environment too. Our Project "**Automatic Water Pump Starter Using Arduino**" is fully **Internet of Things (IOT)** based project and showing trends of next generations. This is embedded with sensors, software, and micro controller **(Arduino)** for the purpose of connecting and exchanging data between them and systems over the internet. This project helps to stop the water wastage due to overflow of tank because it is fully automatic starter and controller. Here, we set the limit for Turn ON and Turn OFF on pump on the basis of water level of Tank which we get from sensor.

Components Required:

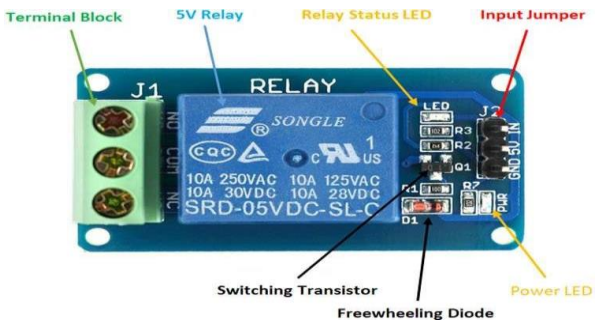
1.) **Arduino Uno**: Arduino or Genuino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

2.) **Ultrasonic Sensor:** An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target).

In order to calculate the distance between the sensor and the object, the sensor measures the time it takes between the emission of the sound by the transmitter to its contact with the receiver. The formula for this calculation is **D = ½ T x C** (where D is the distance, T is the time, and C is the speed of sound ~ 343 meters/second).

3.) **Relay Module:** Relay is an electromechanical device that uses an electric current to open or close the contacts of a switch. The single-channel relay module is much more than just a plain relay, it comprises of components that make switching and connection easier and act as indicators to show if the module is powered and if the relay is active or not. **Single-Channel Relay Module Specifications.**

- Supply voltage – 3.75V to 6V
- Quiescent current: 2mA
- Current when the relay is active: ~70mA
- Relay maximum contact voltage – 250VAC or 30VDC
- Relay maximum current – 10A



4.) **Jumper Wires**: Jumper wires are simply wire that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed.

Working:

Here we place the ultrasonic sensor on top of the tank. Ultrasonic sensor calculates the distance as water level and according to the code if distance is less than or equal to 7cm it switch offs the pump and if the distance is greater than 50cm (which is recommended to be changed according to your need) the relay turn on the pump. (Note :- Ultrasonic sensor is placed at the top hence if the distance increases it means level of water is decreasing and vice-versa.)

Here, we insert our live demonstration video of working please find the link here: https://drive.google.com/file/d/1DXF81P-KvHfMM5tk3T2MqESqM5yhWk3N/view?usp=sharing

Coding Behind The Project:

```
// Automatic WaterPump Starter Using Arduino
// Minor Project 6th Sem
const int trigPin = 10;
const int echoPin = 9;
const int relay = 11;

// defines variables
long duration;
int distance;
int safetyDistance;
void setup() {
pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
pinMode(echoPin, INPUT); // Sets the echoPin as an Input
pinMode(relay, OUTPUT);
Serial.begin(9600); // Starts the serial communication
```

```
}
void loop() {
// Clears the trigPin
digitalWrite(trigPin, LOW);
delay(3000); // Sets the trigPin on HIGH state for 10 micro seconds
digitalWrite(trigPin, HIGH);
delay(3000);
digitalWrite(trigPin, LOW); // Reads the echoPin, returns the sound wave travel time in microseconds
duration = pulseIn(echoPin, HIGH); // Calculating the distance
distance= duration*0.034/2;
safetyDistance = distance;
if (safetyDistance <=7 )
{
digitalWrite(buzzer, LOW);
digitalWrite(relay, HIGH);
}
else {
digitalWrite(buzzer, LOW);
digitalWrite(relay, LOW);
}
// Prints the distance on the Serial Monitor
Serial.print("Distance: ");
Serial.println(distance);
}
```

Conclusion:

We can conclude that there is difference between the theoretical and practical work done. As the scope of understanding will be much more when practical work is done. As we get more knowledge in such a situation where we have great experience doing the practical work.