CSE3009: Internet of Things
J-Component Review 1 Document
IoT Based Water Conservation System

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Objectives
- Making an IoT based water conversation model which can detect water wastage
- Real time updates in case of water wastage and alerts for excessive water wastage.
- Spreading awareness about water shortage and importance of saving water
- Developinig an online dashboard which gives updates in case water is being wasted.
- Developing a community/social media around the platform which can be used to make people aware of how much water each person is wasting and giving rewards/incentives to people who waste least amount of water.

Abstract

Almost 800 million people lack access to clean safe water every day. That's more than two and a half times the population of the United States, where most of us probably waste more water before noon than those people use in a month.

To counter this problem, this project can be of great help. I intend to make an IoT based smart water conservation system. There are some automatic taps which are capable of saving water, but their costs are high and an average family can not afford them, so automation of taps is a problem. So, my idea is to make a device which can be attached to the taps and it will be able to send alerts in case of water wastage, and moreover, an application connected to it where one can keep a track of how much water he/she has wasted.

Along with it, there will be a community/social media around the platform which can be used to make people aw are of how much water each person is wasting and giving rewards/incentives to people who waste least amount of water. Therefore, people who waste least amount of water can get incentives as well as respect in the society and others get inspiration from them.

Principles and Motivation
The device is powered by 3 pillars,
1. **Trust –** The social platform will increase trust and reliability
2. **Innovation –** Innovation powers efficiency
3. **Performance –** Aiming to deliver results that positively affects the current scenario.

Plan
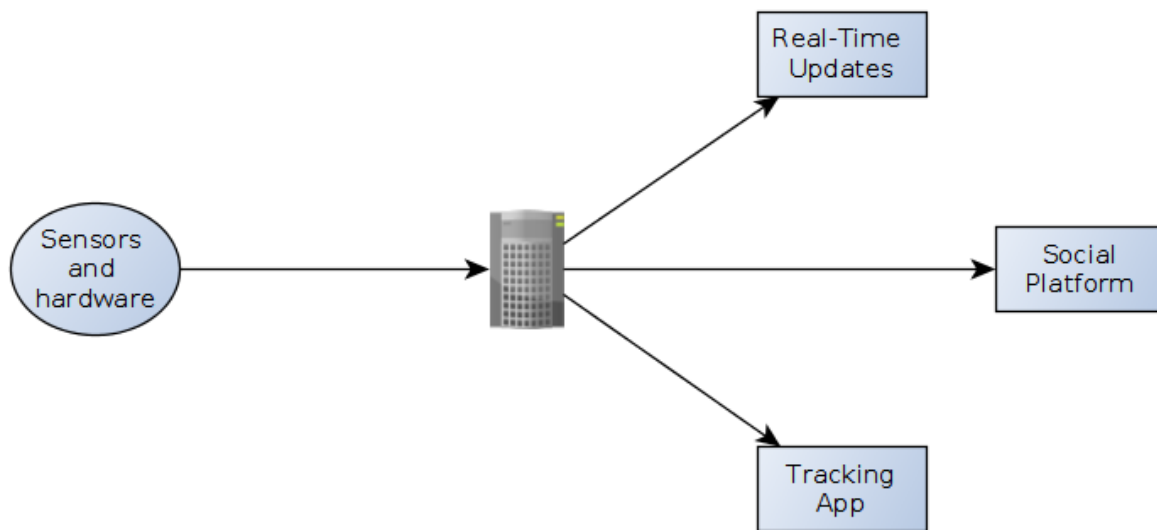
The project consists of 5 main components,

1. **Sensors and Hardware** for getting the inputs and sensing water wastage
2. **Centralized Server** for analysing, maintaining tracking app and updates
3. **Real Time Updates**
4. **Social Platform** (frontend + backend)
5. **Water Wastage Tracking Application** (frontend + backend)

Schedule:

S.No	Task	Date
1.	Collecting Required Hardware	27th July 2018
2.	Finalizing The Circuit Diagram	1st August 2018
3.	Prototype With Hardware	20th August 2018
4.	Data Transfer Between Arduino and PC	27th August 2018
5.	Creating Server As An Interface	7th September 2018
6.	**Software –** Dashboard	To Be Decided
7.	**Software –** Social Platform	To Be Decided

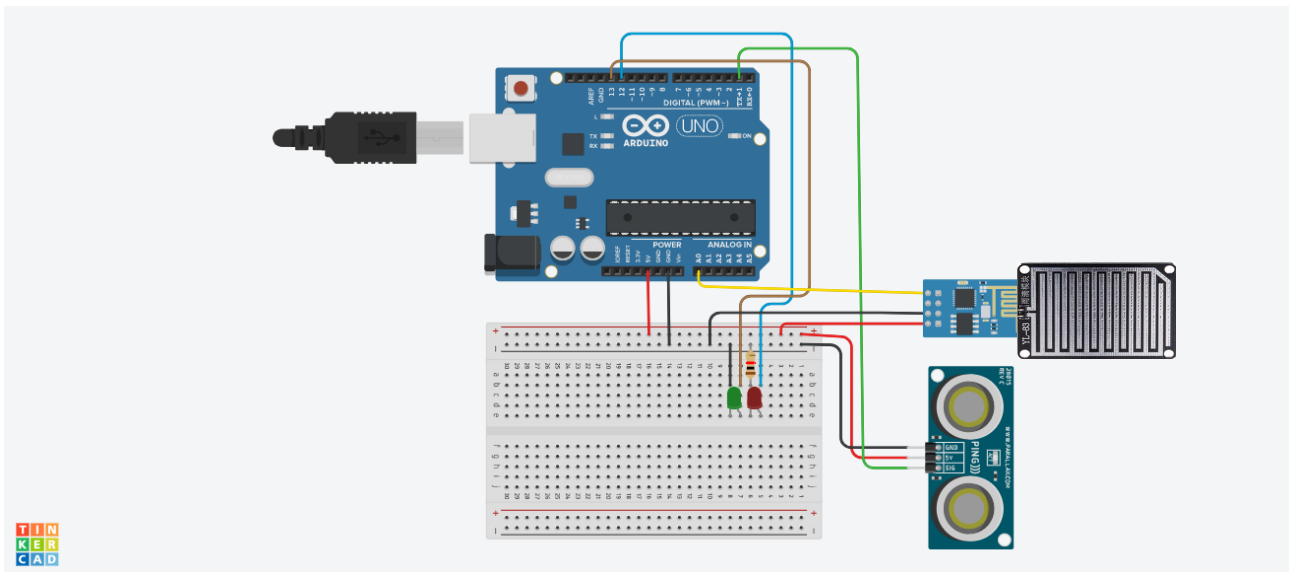# Budget and Components Required (Tentative)

1. Arduino Uno – Rs. 500
2. WiFi/Bluetooth Module – Rs. 300
3. Ultrasonic Distance Sensor – Rs. 100
4. Raindrop Module – Rs. 100
5. Bread Board – Rs. 100
6. Some resistors, LEDs and, jumper cables – Rs. 100 (approx)

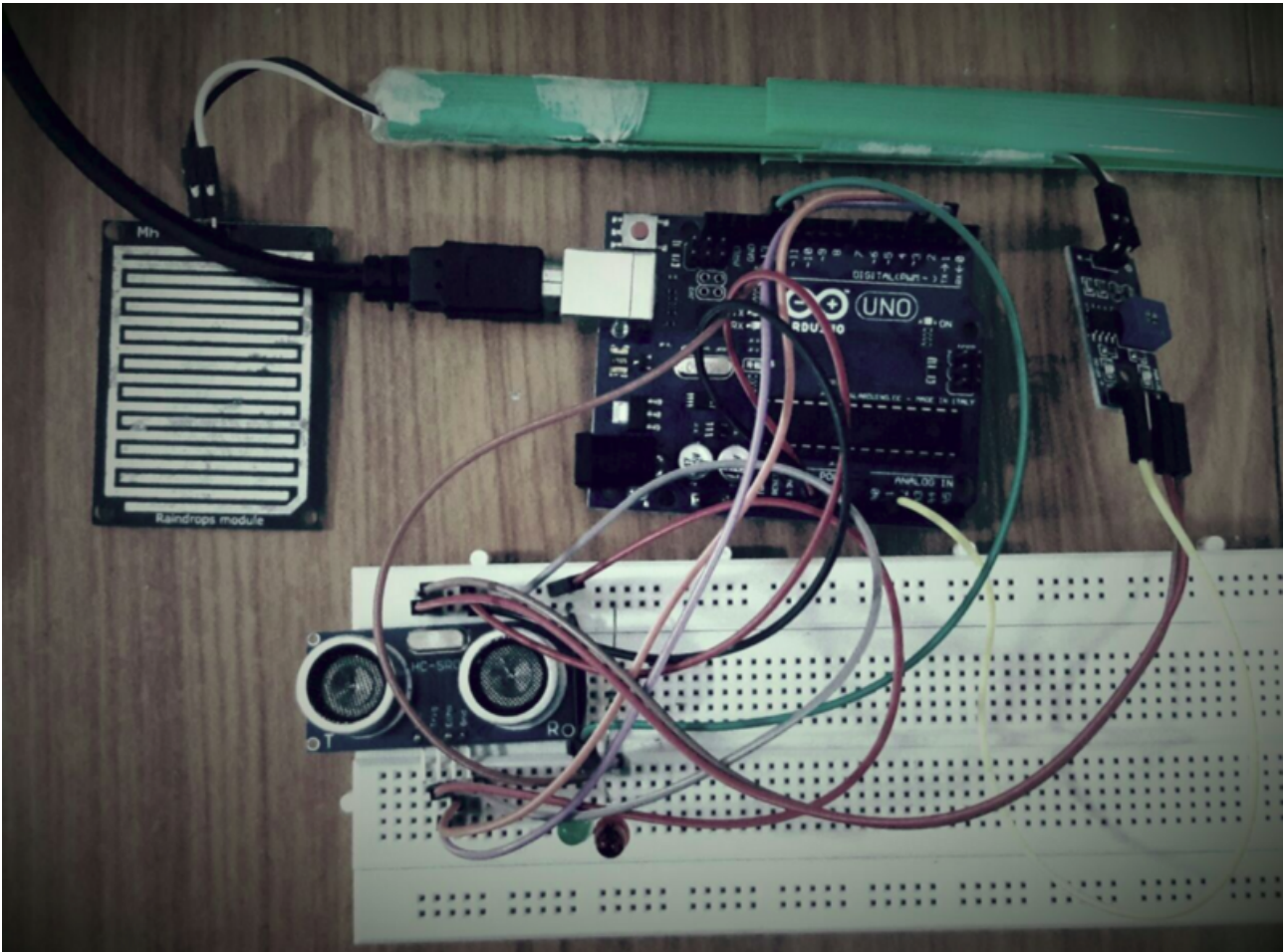**Total – Rs. 1200 /-**

Role Of Team Members

Team of 1 member only, no work distribution.

Circuit Diagram:

(Tentative Circuit Diagram Created Using https://www.tinkercad.com/)

Picture Of Hardware Prototype

# Components Used and Functionality:

1. Arduino

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and

interactive objects that can sense and control objects in the physical and digital world.

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or Breadboards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

2. Bread Board
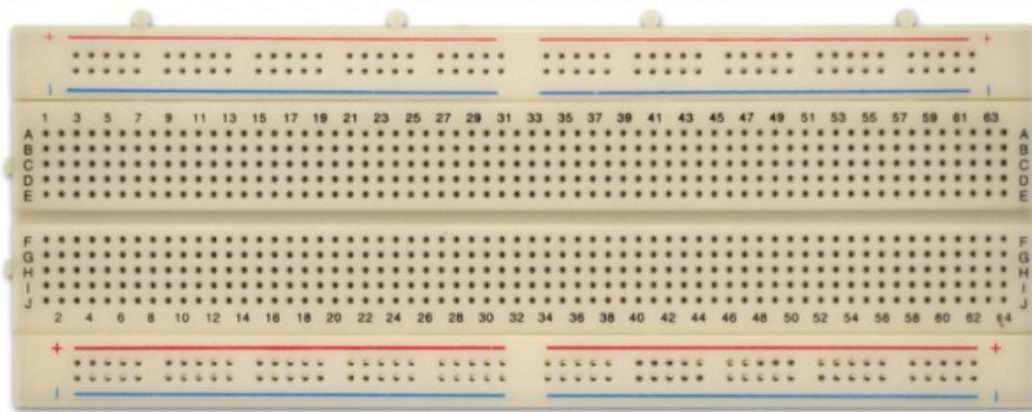
A breadboard is a construction base for prototyping of electronics. Because the solderless breadboard does not require soldering, it is reusable. This makes it easy to use for creating temporary prototypes and experimenting with circuit design. For this reason, solderless breadboards are also popular with students and in technological education.

3. Light Emitting Diode (LED)

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated.

4. Resistor
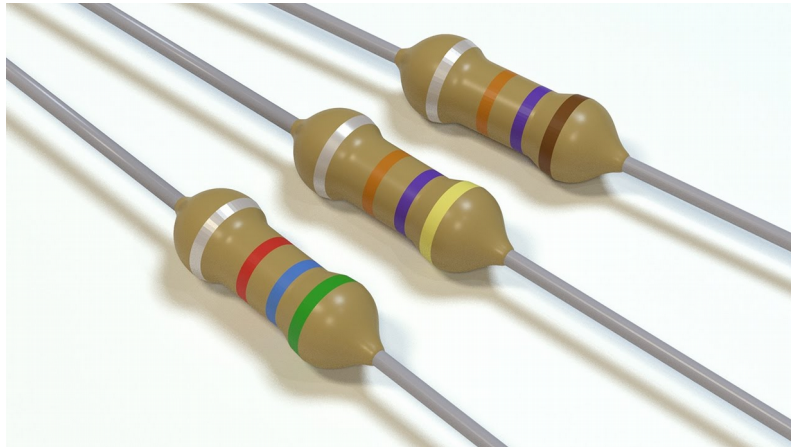
A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

In this project resistor has been used to prevent excess current flow through LED.

5. Jumper Wires
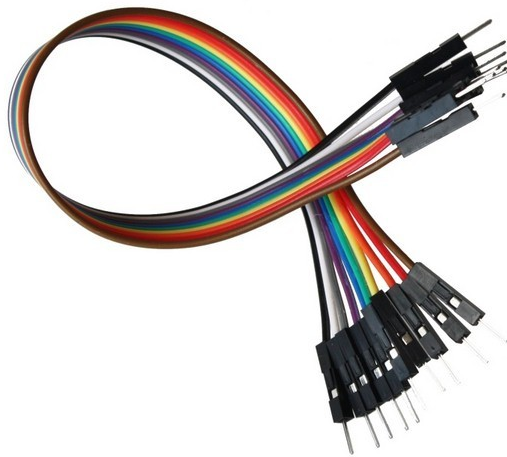
A jump wire (also known as jumper, jumper wire, jumper cable, DuPont wire, or DuPont cable – named for one manufacturer of them) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

## 6. WiFi Module (ESP8266) or Bluetooth Module
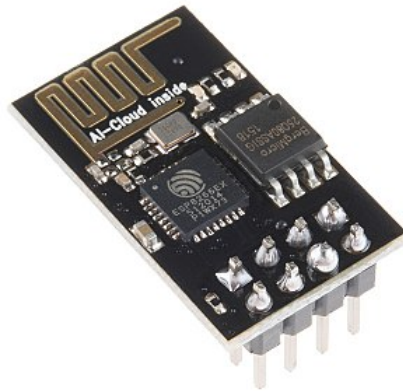
This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands.

6. Ultrasonic Sensor
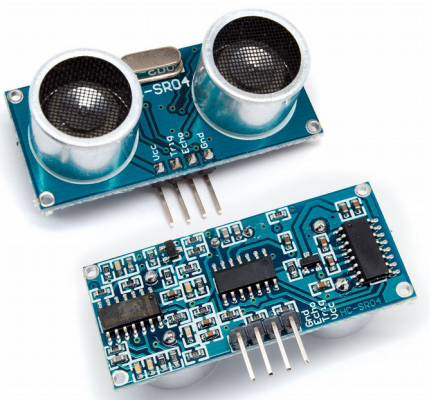
Ultrasonic transducers or ultrasonic sensors are a type of acoustic sensor divided into three broad categories: transmitters, receivers and transceivers. Transmitters convert electrical signals into ultrasound, receivers convert ultrasound into electrical signals, and transceivers can both transmit and receive ultrasound.
They can be used to measure distance of objects.

7. Raindrop Module
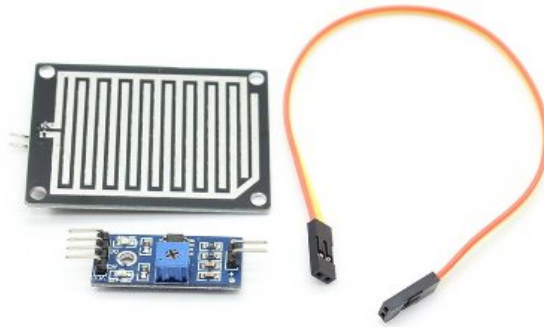
The rain sensor module is an easy tool for rain detection. It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity.

Expected Outcome:

1. Correct reading of Tap On or Tap Off

2. Displaying correct state on the dashboard.

3. A platform where people can communicate about how much water others waste and discuss about importance of water conservation.

4. Real time updates through message or email in case of water wastage.