AUTOMATIC WATER TAP

Presented By:

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Problem Statement

Most of the water tap available in the market today are manually controlled. The users must have to use their hand to open or close the water tap and thus the valve of water tap is prone to damage easily when the users always turn strongly to open or close the tap.

This system is not efficient because lots of water is wasted if we forgot to close the water tap. Tap remains open during the time we apply soap or hand-wash and thus water gets wasted. we can see usage of sink only focus on one usage it is all about water.

As there is a direct contact of hand with the tap it increases the chance of spreading communicable diseases by the transfer of pathogens carrying the disease.

In industries also lots of water gets wasted if manually controlled systems are installed.
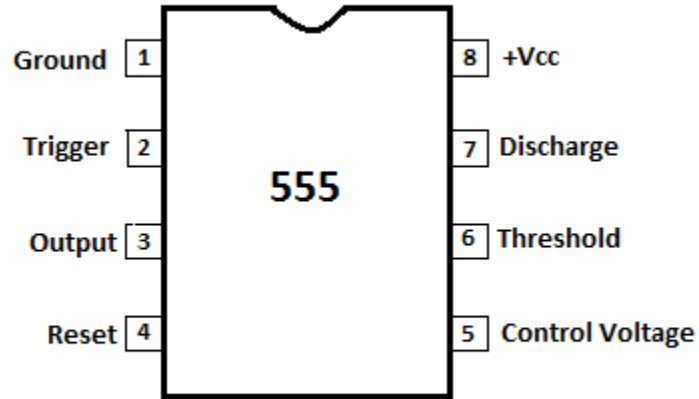
AIM

The objectives of this project are:

1. Change manually operated system of water tap to automatic system water tap.

2. To reduce wastage of water that always occurs at water taps especially in places where water availability is less.

3. To reduce direct contact to the device for prevent from bacteria.

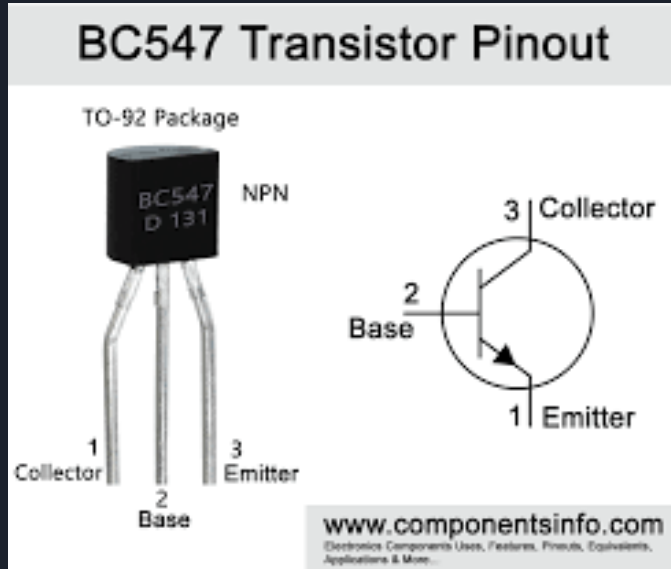# About the Components

PIN DIAGRAM (IC-555)

IC-555 timer

PIN	Name	Purpose
1	GND	Ground reference voltage, low level (0 V)
2	TRIG	OUT is high as long as the trigger low. Output of the timer totally depends upon the amplitude of the external trigger voltage applied to this pin.
3	OUT	This output is driven to approximately 1.7 V below +Vcc, or to GND.
4	RESET	A timing interval may be reset by driving this input to GND, but the timing does not begin again until RESET rises above approximately 0.7 volts. Overrides TRIG which overrides threshold.
5	CTRL	Provides "control" access to the internal voltage divider (by default, 2/3 Vcc).
6	THR	The timing (OUT high) interval ends when the voltage at threshold is greater than that at CTRL (2/3 Vcc if CTRL is open).
7	DIS	Open collector output which may discharge a capacitor between intervals. In phase with output.
8	Vcc	Positive supply voltage, which is usually between 3 and 15 V depending on the variation.

Relay
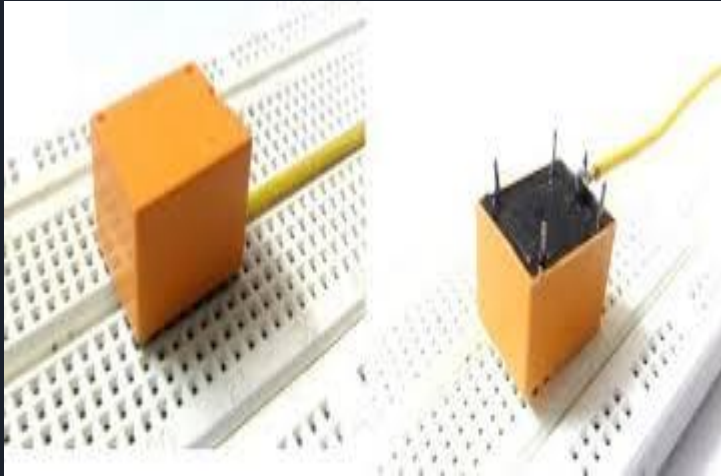
The input section has a coil which generates magnetic field when a small voltage from an electronic circuit is applied to it. This voltage is called the operating voltage. Commonly used relays are available in different configuration of operating voltages like 6V, 9V, 12V, 24V etc. The output section consists of contactors which connect or disconnect mechanically. In a basic relay there are three contactors: normally open (NO), normally closed (NC) and common (COM). At no input state, the COM is connected to NC. When the operating voltage is applied the relay coil gets energized and the COM changes contact to NO RELAY

BC547

BC547 is an NPN bi-polar junction transistor. A transistor, stands for transfer of resistance, is commonly used to amplify current. A small current at its base controls a larger current at collector & emitter terminals.

The transistor terminals require a fixed DC voltage to operate in the desired region of its characteristic curves. This is known as the biasing. For amplification applications, the transistor is biased such that it is partly on for all input conditions. The input signal at base is amplified and taken at the emitter. BC548 is used in common emitter configuration for amplifiers. The voltage divider is the commonly used biasing mode. For switching applications, transistor is biased so that it remains fully on if there is a signal at its base. In the absence of base signal, it gets completely off.

IR SENSOR Module
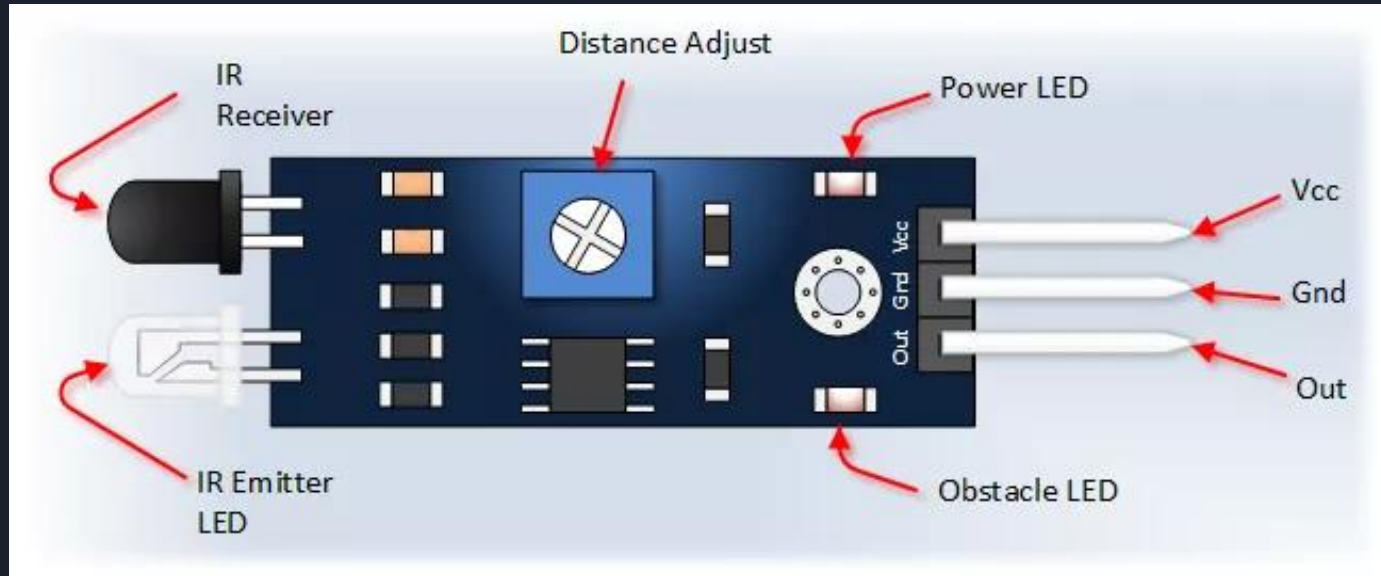
CIRCUIT
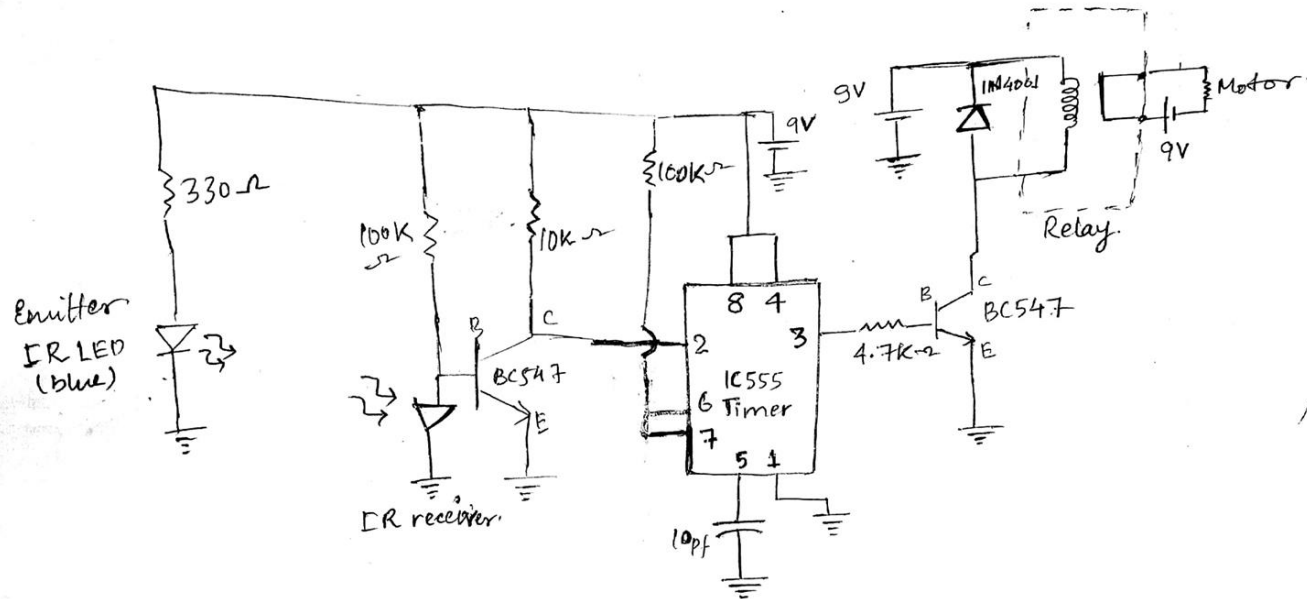
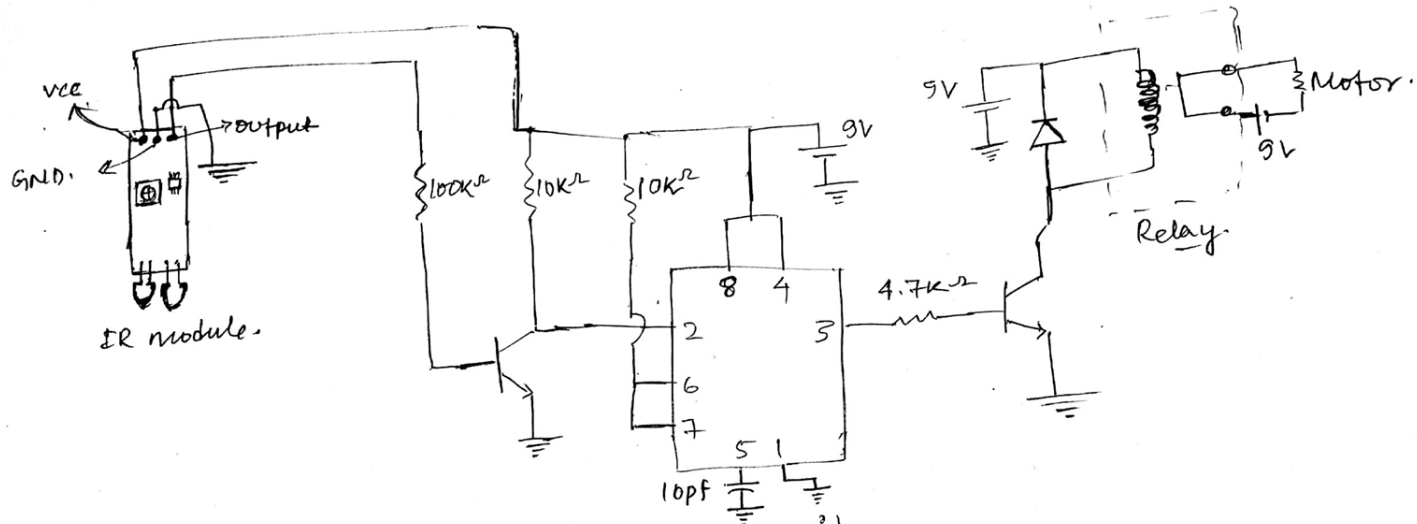Circuit.   Water-Tap Control using IR sensor.

fig. Modified circuit.

Working

When we put our hands between IR LED and IR sensor, the relay energizes to make the solenoid open up the valve and water flows out of the tap.

Here, the operational mode of the 555 is as astable multivibrator. An astable multivibrator is simply an oscillator. The astable multivibrator generates a continuous stream of rectangular off-on pulses that switch between two voltage levels. The frequency of the pulses and their duty cycle are dependent upon the RC network values.

ARRANGEMENT OF THE PROJECT
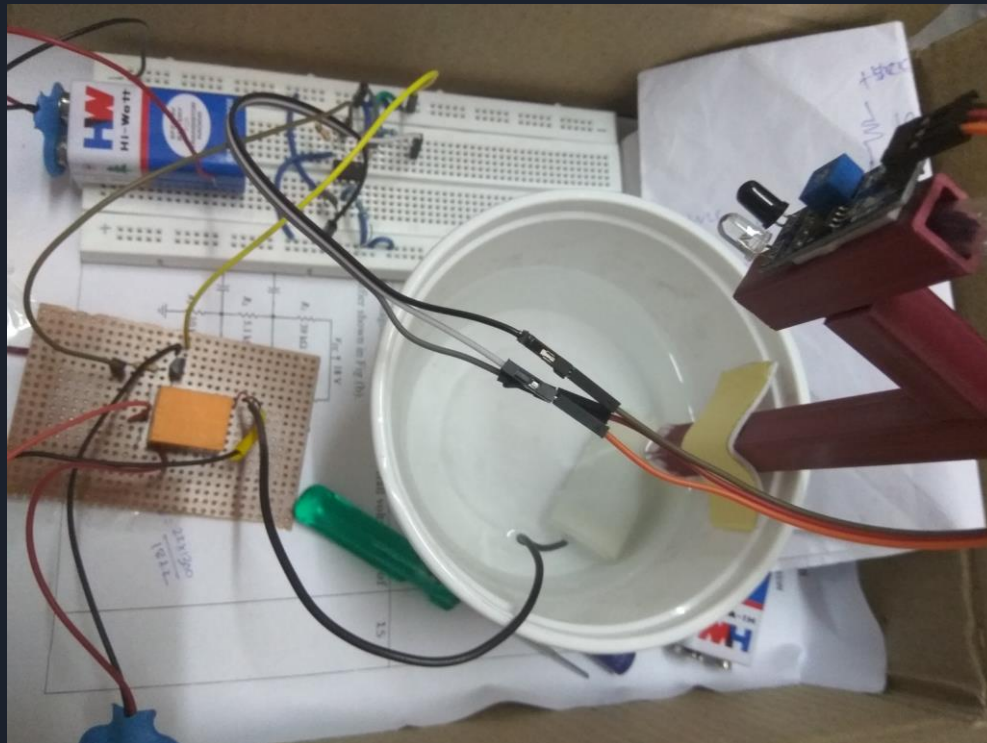
LIMITATIONS

❏ Automatic water taps consumes electrical energy. If installed on large scale then it may consume a large amount of energy.

❏ If there is a **power cut**, mains operated sensor taps will not work.

❏ Hands free taps work with an **infrared sensor**. This widget may have problems with reflective surfaces and extremely bright colours.

❏ It may not function properly in sunlight due to the infrared radiations coming from sun.

Conclusion

The aim of our project was to make a device that will help in reducing the wastage of water.
We completed this project by applying the principles of IR sensor, that emits infrared radiations in order to sense some aspects of the surroundings and we amplified the signals sent by IR obstacle sensor using BJT transistor(BC547).
We have achieved our aim, to build the Automatic washbasin tap controller.

Automatic Water Tap

Amish Shrivastava, Mrinmay Date, Nakul Singh

ABSTRACT:

The objective of the project is to change manually operated system of water tap to automatic system water tap and to reduce wastage of water. This problem can be solved if we design a system which is automatic and the water is utilized when it needed. So we came up with an automatic tap control system which is based on IR radiations.
We obtained the circuit diagram and the project is also ready as we desired. It has limitations but it can be rectified.

INTRODUCTION:

Most of the water tap available in the market today are manually controlled.

The users must have to use their hand to open or close the water tap and thus the valve of water tap is prone to damage easily when the users always turn strongly to open or close the tap. This system is not efficient because lots of water is wasted if we forgot to close the water tap. Tap remains open during the time we apply soap or hand-wash and thus water gets wasted. We can see usage of sink only focus on one usage it is all about water.

As there is a direct contact of hand with the tap it increases the chance of spreading communicable diseases by the transfer of pathogens carrying the disease.

In industries also lots of water gets wasted if manually controlled systems are installed.

So this project is about how to control the water so that it will not be wasted plus it will make for lifestyle easier that is it should be easily accessible.

So here, in our project we have used the feature of IR radiation and some analog components to implement this idea.

The report begins with the little description of the components used then the circuits diagram and it's working.

METHODS:

The aim of this project is to design an Automatic Wash Basin Tap Controller using 555 t imer, IR LED and infrared sensor. The overall module should be miniature to allow portability. It has the following features.

- Easy to use

- Economical

- Compact and portable

The main advantage of this device is its miniature size and satisfactory performance, considering its low cost and small size.
As of now we have designed the circuit on breadboard.
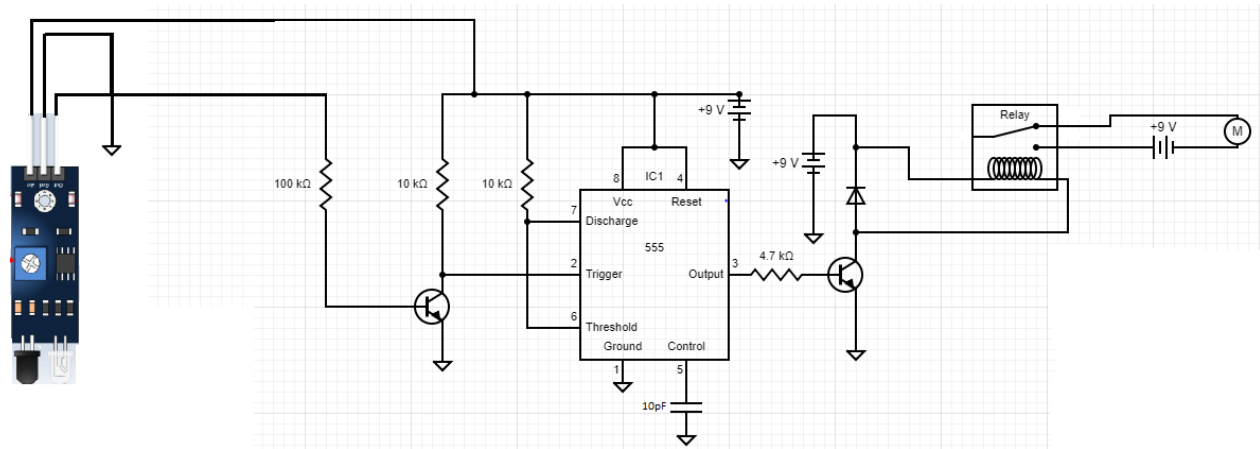But the same can be implemented on the PCB.

CONSTRUCTION OF CIRCUIT

The circuit is easy to assemble using the circuit diagram given below. Major components are IC555 timer, IR sensor, BJT transistor, motor, relay, resistors and capacitors of the given .
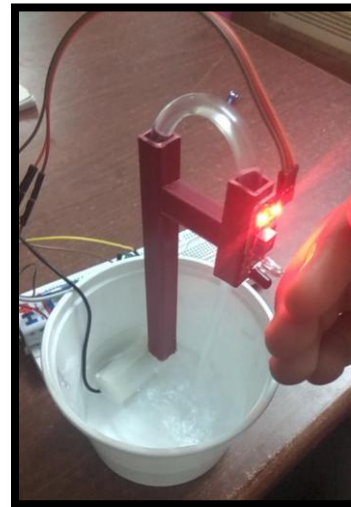
PROJECT ARRANGEMNT:

CIRCUIT DIAGRAM:

WORKING MODEL:

1. IC-555:

555 timer is used in almost every electronic circuit today. For a 555 timer working as a <u>flip flop</u> or as a multi-vibrator, it has a particular set of configurations. Some of the major features of the 555 timer wouldbe,

- It operates from a wide range of power ranging from +5 Volts to +18 Volts supply voltage.
- Sinking or sourcing

  200 mA of load current.
- The external components should

Be selected properly so that the timing intervals canbe made into several minutes along with the frequencies exceeding several hundredkilohertz.

- The duty cycle of the timer isadjustable.
- Also, the maximum power dissipation per package is 600 mW and its trigger and reset inputs has logic compatibility
- The 555 generally operates in 3 modes:

1. A-stable

2. Mono-stable

3. Bi-stable modes.
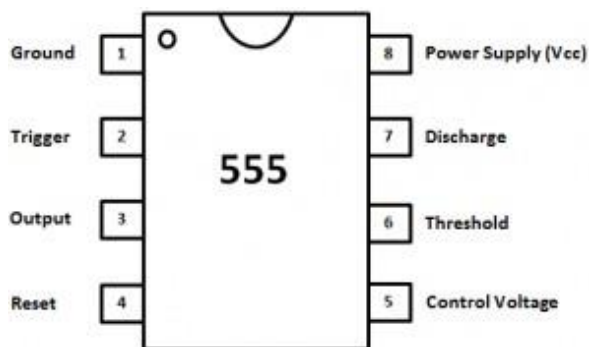
2. RELAY:

The input section has a coil which generates magnetic field when a small voltage from an electronic circuit is applied to it. This voltage is called the operating voltage. Commonly used relays are available in different configuration of operating voltages like 6V, 9V, 12V, 24V etc. The output section consists of contactors which

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In a basic relay there are three contactors: normally open (NO), normally closed (NC) and common (COM). At no input state, the COM is connected to NC. When the operating voltage is applied the relay coil gets energized and the COM changes contact to NO RELAY

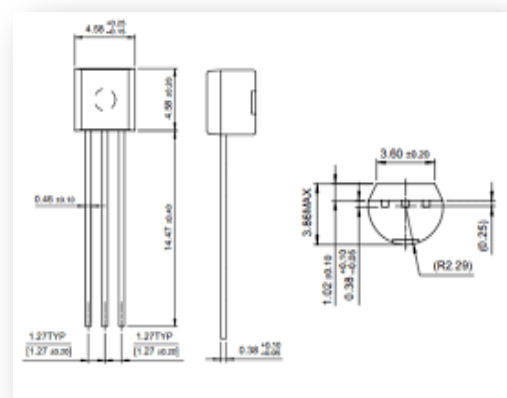

An Electromagnetic Relay
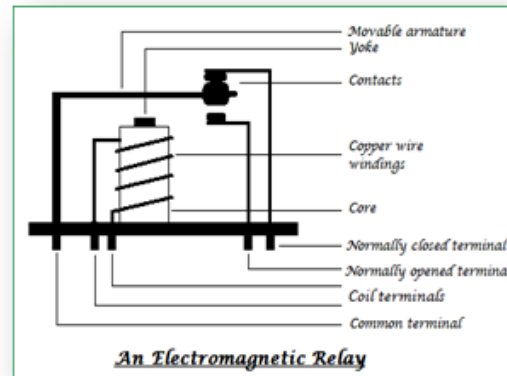
3. BC-547:

It is an NPN bi-polar junction transistor. A transistor, stands for transfer of resistance, is commonly used to amplify current. A small current at its base controls a larger current at collector & emitter terminals.

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For switching applications, transistor is biased so that it remains fully on if there is a signal at its base. In the absence of base signal, itgets completely off.

WORKING:

When we put our hands between IR LED and IR sensor, the relay energizes to make the solenoid open up the valve and water flows out of the tap. The IR rays emitted continuously by the transmitter fall on the receiver.

 As soon as an obstacle comes in between the receiver and the transmitter, interrupting the IR rays, the output of the IR sensor goes low momentarily to trigger the timer circuit in the receiver and water comes out for eleven seconds through the tap. When IR rays falling on the receiver are interrupted, the sensor output goes low momentarily to trigger timer. The output of the timer goes high for eleven seconds and the relay drives the solenoid. During this time period, energization of the solenoid lifts up the valve fitted in the pipe to let water flow out of the tap. Solenoid valves used specifically for this purpose.

LIMITATIONS:
Automatic water taps consumes electrical energy. If installed on large scale then it may consume a large amount of energy.
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ACKNOWLEGMENT:

We thank Prof. Arun k. for the encouragement of the work and also giving us the opportunity to perform and present our work in front of all. We also thank our seniors for helping us to rectify the problems and his guidance.

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