University of Barishal

A Project Report on

PERIPHERAL INTERFACE LAB

Submitted to:

Dr Tania Islam

Assistant Professor

Department of Computer Science of Engineering

University of Barishal

Roll No: 21CSE027

Submitted by

Name: MD. Emon

Year. 3td

Semester. 2td

Session: 2020-21

Department of Computer Science of Engineering

University of Barishal

Course Code: CSE-3208

Submission Date: 15-01-2026

Automatic Hand Wash

Introduction:

Water is a god gifted element of earth.Almost there is ¾ water in our earth .But only 1% of water is fresh which is drinkable for humans. As human beings we should use as little water as we need . In our daily life almost every sector we use a huge amount of water to fulfill our needs. Sometimes we waste water very much. Most of the time we do not close the tap after finishing our needs. As a result , a huge amount of water falls and is wasted. That's why we need to prevent waste water using technology which may fulfill our need to use water with less use . A system which is cheap and perfect to solve this problem. In this perspective, I think of a project for my Peripheral Interface Lab course(CSE-3206) called 'Automatic water tap'.In this project when we need to use water then automatic flow of the water is starting when we clear away our hand after fulfill our need then the flow of the water automatic stop.

Abstraction:

A hardware project which saves water and makes a beautiful life .This project presents the design and implementation of an **Automatic Hand Wash System** that dispenses liquid soap and water automatically when hands are detected near the outlet. The system minimizes physical contact, improves hygiene, and reduces water and soap wastage. A proximity/IR sensor is used to detect the presence of hands, while a transistor-based driver circuit controls a DC pump/solenoid valve powered by a 9V supply. The system is low-cost, energy-efficient, and suitable for public places such as schools, hospitals, and offices.

Objectives

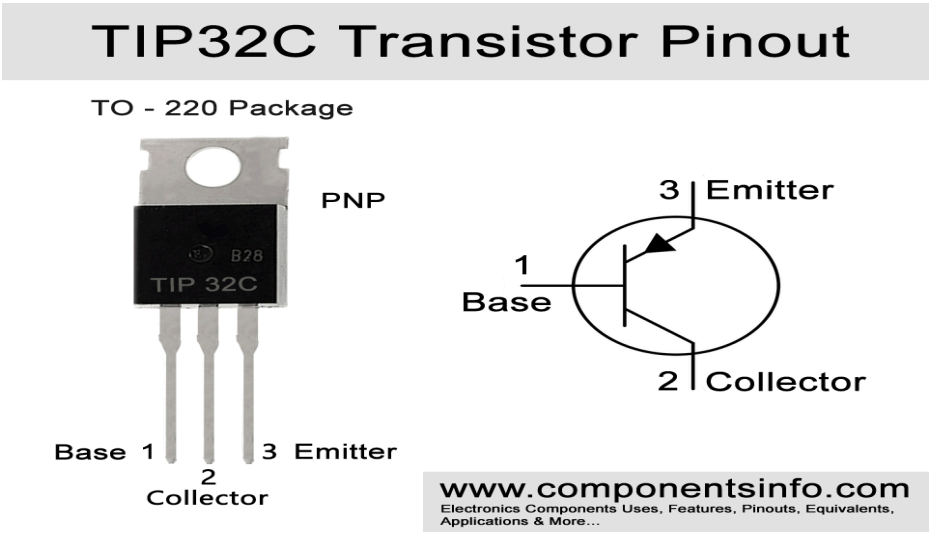
- To design a touchless hand wash system using basic electronic components
- To understand sensor interfacing and switching circuits
- To reduce water and soap wastage through automation
- To improve hygiene by eliminating manual contact

Components:

There are some Electronic components to build the project.Here are the name of the component and picture of the project ,as we can identify correctly to build this project.

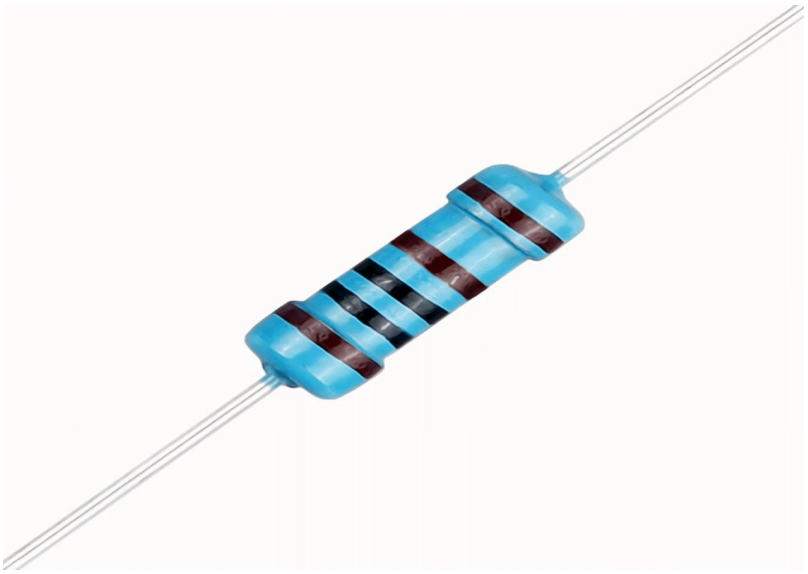
Proximetry sensor

Transistor Tip32A:



Mini DC pump(3-9v):

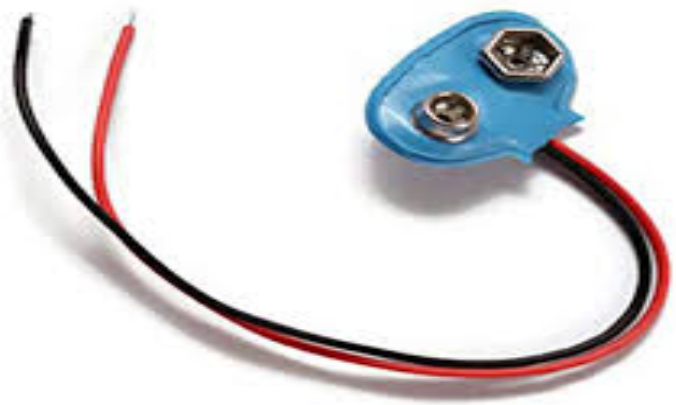
Resistance Kit(1k-ohm):



Transparent Pipe:

9V battery:

Battery connection plaque cable:



Female jumper cable:

Water jar:

Procedure of the project:

1.First of all we should add the transparent pipe into the mini DC pump.

2. Then we connect the base from the TIP32 transistor into the output port of the proximetry sensor with 1k-ohm resistance .

3.Then we added both the negative cable from the dc pump and negative cable from the battery.

4.Then we added those joined cables with the ground of the proximetry sensor.

5.Add the positive cable of the dc pump with the collector of the transistor.

6.Add the positive cable of the battery with the emitter of the transistor.

7.Last of all ,we added the Vcc cable from the proximetry sensor to the emitter of the transistor.

8. Then we need to set up the pipe ,sensor and transistor with glue.

9.Put the water on the plastic jar and set up all those things.

10.Now, connect the positive and negative cabe with the battery.

Output of the project:

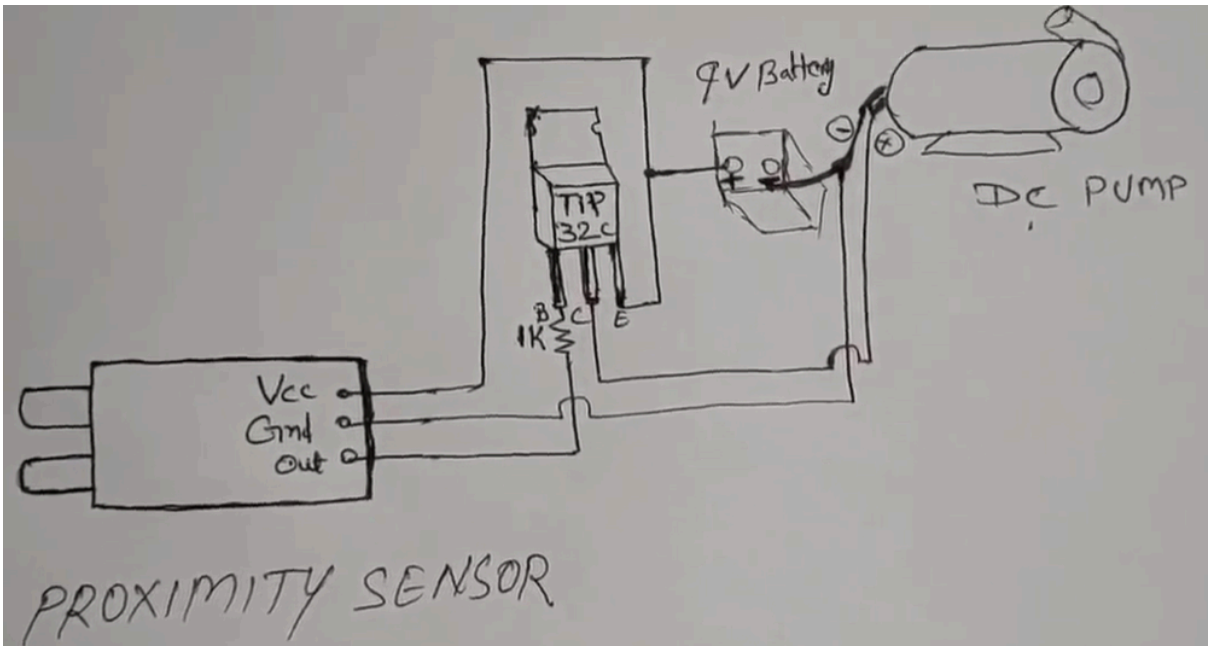
When one needs to wash his/her hand then he/she takes away the hand and automatically water put/came to his/her hand.

When he/she withdraws his/her hand then automatically stops the pump .

Circuit Description

The IR/proximity sensor continuously emits infrared light and detects reflections from nearby objects (hands). When hands are placed near the sensor, its output changes state. This output is fed to the base of the TIP32A PNP transistor through a 1kΩ resistor, which limits the base current.

When the sensor output goes LOW/HIGH (depending on sensor logic), the transistor becomes active and allows current to flow from emitter to collector, thereby powering the DC pump. A flyback diode (1N4007) is connected across the pump to protect the transistor from back EMF generated by the motor.



Description:

1.Pump:Actually, It is a converter of converting via a motor of the energy of electrical into rotation of mechanical.

2.Proximetry sensor: Detect any physical object/obstacle without connection.

3.Battery:It causes electrochemical reactions and converts or turns laid in chemical energy

4.Transistor:It is made by a semiconductor,behaving like a switch(that means ON and OFF).

Working Principle

1. Power is supplied to the circuit using a 9V battery.
2. The sensor remains idle when no object is detected.
3. When hands are placed near the sensor, it generates a control signal.
4. The transistor amplifies the sensor signal and switches ON the pump.
5. Water/soap is dispensed automatically.
6. Once hands are removed, the sensor output returns to normal and the pump turns OFF.

Motive of the Project:

As it is a project for the Peripheral Interface Lab , my main target of this project is to solve one real life problem.And my motive is to make smarter washrooms with low cost water for my university. Secondly, our department has a water-purifier ,but most of the time the water falls on the floor .That makes sure to choose my project very much.

Applications

Public washrooms

Hospitals and clinics

Schools and universities

Restaurants and shopping malls

Smart home sanitation systems

Advantages

- Touchless operation improves hygiene
- Reduces water and soap wastage
- Simple and low-cost design
- Easy to install and maintain

Limitations

- Limited sensing range
- Battery-powered system requires frequent replacement
- Not suitable for high-pressure water systems without relays

Future Improvements

- Use of microcontroller (Arduino/PIC) for timing control
- Integration of dual pumps (water + soap)
- Use of rechargeable power supply
- Adding LED/LCD status indicators
- IoT-based usage monitoring

Conclusion:

At last I can say that it is a wonderful project to save water and make our life much easier and smarter. In the course of Peripheral Interface Lab it can be a mini sensor based project . It is very useful for the washroom in the place of home,office,school, college, university, medical,bank etc. It can be used to make sense and understand the components of the project and its uses.