🚰 Touchless Water Tap System (Arduino Project)

BY-ABHINANDAN RAJ

🧠 Project Overview

The **Touchless Water Tap System** is an automatic water dispensing system that works **without touching the tap** ✋🚫.
When a hand is placed under the tap, water starts flowing automatically 💧.
When the hand is removed, the water stops.

This project improves **hygiene** and helps in **saving water** 🌍.

🧩 Components Used 🔧

Component	Emoji	Purpose
Arduino UNO	🧠	Controls the entire system
Ultrasonic Sensor (HC-SR04)	📡	Detects hand movement
Relay Module (5V)	🔁	Switches the pump ON/OFF
DC Water Pump	💧	Pumps the water
External Battery / Power Adapter	🔋	Supplies power to the pump
Breadboard	🧱	For easy connections
Jumper Wires	🔌	Electrical connections
Water Pipe / Tube	🚿	Water outlet

🔌 Component Connections 🔗

📡 Ultrasonic Sensor to Arduino

- **VCC** → 5V ⚡
- **GND** → GND
- **TRIG** → Digital Pin **9**
- **ECHO** → Digital Pin **10**

🔁 Relay Module to Arduino

- **VCC** → 5V
- **GND** → GND
- **IN** → Digital Pin **8**

💧 Water Pump + Relay + Battery (Important ⚠️)

❌ **Do NOT connect the pump directly to Arduino or breadboard**

Relay Terminal Connections:

- **COM** → One wire of the pump
- **NO (Normally Open)** → Battery **Negative (–)**
- **Other pump wire** → Battery **Positive (+)**

👉 When the relay turns ON, the circuit completes and the pump starts 💦

⚙️ Working Principle 🧪

1️⃣ The ultrasonic sensor continuously measures distance 📏
2️⃣ When a hand comes within **10–15 cm** ✋

3️⃣ Arduino activates the relay 🧠➡️🔁
4️⃣ Relay turns the water pump ON 💧
5️⃣ When the hand is removed
6️⃣ Arduino turns the relay OFF → pump stops 🚫

🧪 Control Logic (Simple)

```
IF hand detected
→ Turn pump ON 💧
ELSE
→ Turn pump OFF 🚫
```

🌟 Advantages ⭐

- 🧼 Touch-free operation (better hygiene)
- 💦 Saves water
- ⚡ Low power consumption
- 🧠 Fully automatic system
- 👶 Easy and safe to use

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