Waterproof Temperature Detection IoT System

(Using DS18B20 Waterproof Temperature Sensor and Arduino)

Project Description

This project presents a waterproof temperature detection system using the **DS18B20 digital temperature sensor** and **Arduino Uno**. The system is capable of monitoring temperature accurately in **wet or harsh environments** such as water tanks, pipelines, industrial setups, and outdoor conditions.

This project is ideal for IoT-based environmental monitoring where waterproof and reliable temperature sensing is required.

Components Used

- **Arduino Uno** – Main microcontroller board
- **DS18B20 Waterproof Temperature Sensor** – For accurate and waterproof temperature measurement
- **4.7kΩ Resistor** – Pull-up resistor required for sensor data line
- **LCD Display (16x2 with I2C)** *(Optional)* – To display temperature readings
- **Jumper Wires** – For electrical connections
- **Breadboard** – For prototyping
- **5V Power Supply / USB Cable** – To power the Arduino

Working Principle

- The **DS18B20 sensor** measures temperature in degrees Celsius using its **1-Wire digital communication** protocol.
- A **pull-up resistor** (typically 4.7kΩ) is connected between the data line and VCC to ensure proper communication.
- The **Arduino Uno** reads the temperature values from the DS18B20 sensor using the **OneWire** and **DallasTemperature** libraries.
- The temperature can be displayed on a **serial monitor** or optionally shown on an **LCD screen**.

- The system reads and updates temperature at regular intervals and can be extended to send data over Wi-Fi or GSM.

Key Features

- **Waterproof sensor** enables temperature detection in liquids or humid areas
- Accurate and reliable digital readings
- Suitable for long cable installations (sensor can be placed far from Arduino)
- Extendable to IoT (e.g., with Wi-Fi or Bluetooth modules)
- Can log or send data for analysis or remote monitoring

Applications

- Water tank or aquarium temperature monitoring
- Soil and environmental monitoring in agriculture
- Industrial and HVAC systems
- Outdoor temperature logging
- Smart home and weather station applications

Power Supply Notes

- Arduino is powered via **5V USB** or **external adapter**.
- DS18B20 operates safely at **3.0V to 5.5V**.
- Always use a **4.7kΩ resistor** between the data and VCC lines for stable communication.