**Internet of Things: Project 1**

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**Links**

* **Trello Page:** https://trello.com/invite/b/67d24f2ee07c322472b0537f/ATTI5f86fd654f406a384f2e1b037c80451e30BFC77A/iot-projects
* **GitHub Team Page:** https://eur06.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2FKrystian779%2FIOTProject2025&data=05%7C02%7CS00272858%40atu.ie%7Cb3b6814bde784ac9760208dd622c965d%7C4785554500bb4800a65fe79104ec0fc4%7C0%7C0%7C638774665825859687%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=2ZKnKuO8OIc7gK551uTP77t2%2B7kcKWoTicTRL%2FaF6fU%3D&reserved=0
* **Data Sources & Analysis Plan:** [Insert Link]

**Outline of the Problem to be Solved**

Many temperature sensors struggle with accuracy due to environmental interference, sensor limitations, and power fluctuations. The challenge is to design a temperature reader that provides precise and consistent readings in different environments, including indoor, outdoor, and industrial settings.

**Key Issues:**

1. **Sensor Accuracy & Calibration:** Temperature sensors can be affected by humidity, airflow, or incorrect placement, leading to inaccurate readings.
2. **Power Stability:** Inconsistent power supply can affect the performance of the temperature sensor, leading to fluctuating readings.
3. **Data Logging & Storage:** Temperature readings need to be recorded efficiently for later analysis. The challenge is deciding whether to store data locally (SD card) or remotely (cloud-based storage).
4. **Display & Accessibility:** Users need to access temperature data in real-time. Choosing an appropriate display method (LCD, OLED, web dashboard, or mobile app) is a challenge.
5. **Wireless Connectivity (Optional):** Implementing Wi-Fi or Bluetooth to send temperature readings remotely without affecting battery life.

**References**

1. https://forum.arduino.cc/t/how-accurate-is-my-temperature-sensor/648453
2. https://forum.arduino.cc/t/accurate-temperature-sensor/1054999

**Summary of the Project Solution**

### **Overview**

The proposed solution is an **Arduino-based temperature reader** designed to measure and display temperature readings accurately. The system leverages **temperature sensors, an Arduino microcontroller, and a user-friendly display interface** to provide real-time temperature monitoring. This project addresses the need for a **reliable, cost-effective, and easily deployable temperature monitoring system** for various applications, including home automation, industrial monitoring, and environmental data collection.

1. **Accurate Temperature Sensing**

Utilizes a **high-precision temperature sensor** such as the DHT11 which we are using for our project

Ensures **real-time data acquisition** with minimal response delay.

1. **User-Friendly Display and Output**

Temperature readings are displayed on an **LCD screen** or **OLED display**, ensuring clear visibility.

Optional integration with **LED indicators or buzzer alerts** for predefined temperature thresholds.

1. **Compact and Scalable Design**
   * The solution is **lightweight, portable, and easy to deploy** in various environments.
   * Can be enhanced with additional sensors or modules for **humidity, pressure, or IoT capabilities**.

**List of Project Requirements**

1. Working code
2. A display to show current temperature
3. Stable power supply
4. Must use Arduino
5. Must accurately display temperature
6. Must not use too much power

**Initial Design**

* **Sketches of the Proposed Device**
* **Proposed Code Design**
* **Proposed Hardware Setup**
* **Description of APIs & Data Processing**

**Description of Data & Data Management Plan**

* **Generated Data**
* **Datasets or APIs Used**
* **Storage & Management Strategy**

**Implementation Plan**

* **Equipment Needed**
* **Parts List**
* **APIs to be Used**
* **Code Samples**
* **Screenshots/Photos/Diagrams**

**Testing Approach**

* **Planned Software & Hardware Testing**
* **Evidence of Tests Conducted**

**Security Analysis**

[Discuss security measures implemented to prevent vulnerabilities.]

**Future Improvements & Next Steps**

[Provide insights into how the project could be further developed and improved.]