**Smart Class Attendance System**

**Background:**

University classrooms often face problems with inaccurate attendance tracking. Current systems allow students to “scan in” for their absent friends or leave the classroom midway but still be marked as present. This creates unreliable records and reduces accountability, making it harder for lecturers to ensure genuine student participation. With the availability of affordable IoT devices, RFID technology, and sensors, there is an opportunity to build a smarter attendance system that ensures fairness and accuracy.

**The Problem:**

Universities lack a reliable system to ensure that only students who are physically present and who remain until the end of class are marked present. The current methods are vulnerable to cheating, leading to false attendance data.

**What the Solution Must Solve:**

**Develop a Smart Class Attendance System that uses RFID and IoT to accurately record attendance. The system must ensure that:**

* Students physically enter the classroom after scanning their ID.
* Students remain in class until the end (must scan again to exit).
* Attendance data is logged and easily accessible for lecturers or integrated into the university’s database.

**Examples of Features or Use Cases:**

* RFID Reader: Scans student cards to log entry and exit.
* Ultrasonic Sensor: Detects if a student actually passes through the door after scanning to prevent cheating.
* ESP8266 Microcontroller: Processes attendance data and uploads it through IoT.
* LCD Display & Buzzer: Provide real-time feedback on scan validity.
* Data Logging: Stores student name, ID, entry time, and exit time in Excel, with potential integration into the university’s system.

**The Solution Should Be:**

* Hardware-based: A functional IoT prototype deployable at classroom doors.
* Interactive: Provides real-time scan feedback via buzzer and LCD.
* Scalable: Can be expanded across multiple classrooms and integrated into campus systems.
* Reliable: Prevents fraudulent attendance logging and ensures students are present for the full class duration.

physically attend and remain in class until the end.

* **What We Use (Components)**
  + **Microcontroller**: ESP8266
  + **Sensors**: RFID Reader + Ultrasonic Sensor
  + **Output Devices**: LCD Display, Buzzer
* **Output**
  + Records student **Name, ID, Entry Time, Exit Time**.
  + Data stored in **Excel** (can also be integrated into university systems via IoT).
  + Provides **real-time, accurate attendance monitoring** and prevents cheating.