Smart Home Security System Using Arduino Mega 2560 and ESP32

# Team Members:

1. 102203137 - Ritvaj Singh
2. 102203812 - Aryan
3. 102203897 – Priyanshu
4. 102217156-Himani
5. 102217089-Himanshi

# Objectives:

* + Develop a comprehensive home security system using Arduino Mega 2560 and ESP32.
  + Detect motion, smoke, and temperature anomalies using sensors.
  + Provide real-time alerts and notifications via Wi-Fi for enhanced security.
  + Ensure access control through RFID authentication.
  + Incorporate a buzzer for immediate audible warnings and display system status on an LCD screen.

# Need Analysis:

* + Growing Demand for Home Security: The rise in home invasions and safety concerns highlights the need for robust security systems.
  + Cost-Effective Solution: Traditional security systems can be expensive; this project offers an affordable alternative.
  + Automation and Alerts: Remote monitoring and instant alerts via Wi-Fi enhance the user's response time to potential threats.
  + Environmental Safety: Smoke and temperature detection ensure safety against fire hazards.
  + User Convenience: RFID authentication simplifies user access control.

# Working Methodology:

1. System Components:
   * Sensors: IR sensor for motion detection, smoke detector for fire alerts, and temperature sensor for environmental monitoring.
   * Modules: RFID for access control and ESP32 for remote communication.
   * Buzzer: Triggers audible alerts during anomalies.
   * LCD Display: Displays real-time system status and notifications.
2. Integration and Functionality:
   * Arduino Mega 2560: Acts as the main controller for all sensors and modules, with ample I/O pins for multiple connections.
   * ESP32: Connects to Wi-Fi for sending alerts to a mobile device or web interface.
   * Sensors: Continuously monitor the environment and send data to the Arduino Mega.
   * Alarm System: Activates the buzzer and displays relevant warnings on the LCD screen.
   * RFID Authentication: Grants access to authorized users by reading RFID cards.
3. Output and Alerts:
   * Displays temperature and system status on the LCD.
   * Sends alerts via Wi-Fi for detected threats.
   * Activates a buzzer for immediate warnings.