Day 3 IoT Smart Home System

Client-Server Communication & Data Flow

- Developed a **multi-threaded TCP server** to handle concurrent connections from multiple IoT clients representing individual rooms.

- Each client simulates sensor data generation every 20 seconds, including:

  - Temperature

  - Motion detection

  - Smoke detection

  - Face ID

- Server receives and logs data from each room independently, ensuring scalability and responsiveness.

Shared Memory Integration

- Integrated **System V shared memory** to store the latest sensor data from each room.

- Implemented **per-room data_ready flags** to track updates and enable asynchronous processing.

- Used **mutex synchronization** to ensure safe concurrent access and updates to shared memory.

- Shared memory is structured to support future integration with the **Data Processing & Control Process (DPCP)** for appliance automation.

Build & Execution Automation

- Provided clear compilation and execution instructions for:

  - dcp_server.c (server)

  - iot_client.c (room simulation)

- Enabled flexible testing by allowing any number of clients (1 to 5) to run independently.

- tested system responses on our own.