Day 4S – IOT Based Smart Home System (25 Oct 2025)

Abhishek – Data Communication Process (DCP) & Sensor Simulation

- Developed the **DCP module** to simulate five types of sensors (Temperature, Light, Gas, Motion, etc.) using multithreaded architecture.
- Implemented **randomized sensor value generation** and periodic updates to shared memory.
- Established **TCP socket communication** to send sensor data to the server in a structured format.
- Integrated **named semaphores** (`SEM_DCP`, `SEM_DPCP`) for synchronization with the DPCP module.
- Ensured proper memory allocation, thread safety, and logging for each sensor thread.

Basavanth – Server Module & Shared Memory Integration

- Built a **multithreaded TCP server** capable of handling multiple sensor and actuator clients concurrently.
- Parsed incoming sensor and actuator data and updated the **shared memory** using `pthread_mutex` for thread-safe access.
- Designed clear **console logs** for real-time monitoring of sensor and actuator activity.
- Handled **socket setup**, including `SO_REUSEADDR`, error handling, and dynamic thread creation.
- Ensured robust memory management and clean disconnection handling for each client.

Krishna – UI Dashboard, Automation Script & Build System

- Designed a **color-coded terminal UI dashboard** using ANSI escape codes to display sensor and actuator data in a structured table format.

- Created a **Bash launcher script** to automate the build and launch of all system components across multiple terminals with styled output and status messages.
- Enhanced the **Makefile** with modular build targets (`server`, `dcp`, `dpcp`, `ui`) and added `clean` and `run` commands for streamlined development.
- Implemented **terminal emulator detection** and interactive prompts for user-friendly system startup.
- Added visual polish and user guidance to improve the developer and demo experience.