1. **Title: Intelligent Smart Home Lighting System**

Project Description: The app will allow users to control and automate the lighting system of their smart homes based on time, user activity, and environmental conditions. It will provide an intuitive interface where users can set up different lighting scenes (e.g., reading, relaxing, dining) and automate these scenes based on various triggers like time of day, occupancy, or natural light levels. The app will also provide real-time energy consumption feedback to help users make energy-efficient choices. Users can further refine settings by adjusting the brightness and color temperature for different rooms or areas of their home. The system could be integrated with voice assistants like Alexa or Google Home for hands-free control.

Users and Stakeholders: Primary users would be homeowners looking to optimize their home environment and energy usage. Secondary stakeholders could include interior designers, energy consultants, and smart home system integrators interested in providing this app as part of their service.

Problem to Solve: The project would help users automate their lighting system, reduce energy consumption, and improve comfort. By integrating automation and real-time feedback, the app aims to strike a balance between comfort, aesthetic appeal, and energy efficiency.

Workflow: Users can select rooms or areas to configure lighting settings, define triggers and schedules, and monitor energy consumption through a dashboard. A primary interaction loop could involve setting up a scene, testing it in real-time, and refining it based on feedback.

Data Use and Processing: Data will come from smart lighting systems (e.g., Philips Hue, LIFX) using their APIs to get and set lighting states. The app will process user input to automate actions, log energy usage data, and offer optimization suggestions based on historical data.

Results and Presentation: A web or mobile app interface will display a dashboard showing all rooms, lighting states, and energy usage. Real-time data and interactive controls will allow users to manage and optimize their lighting system effortlessly.

2. Title: Adaptive Smart Home Cooling/Heating System

Project Description: This app will manage a smart cooling and heating system in a home based on environmental conditions (e.g., temperature, humidity) and user preferences. It will provide a user-friendly interface to control heating, ventilation, and air conditioning (HVAC) systems, automate schedules, and provide energy consumption data and cost predictions. The system will use predictive algorithms to anticipate temperature changes based on weather forecasts and user habits, ensuring the home is always at a comfortable temperature while minimizing energy use.

Users and Stakeholders: The primary users would be homeowners interested in optimizing their home's thermal comfort and reducing energy costs. Secondary stakeholders could include HVAC system manufacturers and smart home solution providers who want to integrate the app with their systems.

Problem to Solve: The app aims to reduce energy consumption and costs associated with heating and cooling while maintaining thermal comfort. It also aims to provide insights into energy usage patterns to help users make informed decisions.

Workflow: Users can set temperature preferences and schedules for different times and zones of their home. They can view energy usage and cost forecasts, allowing them to adjust settings to optimize comfort and cost. The system will adjust automatically based on user-defined rules and external data.

Data Use and Processing: Data will be sourced from smart thermostats and weather APIs. The app will process this data to adjust settings in real-time and provide predictive analytics on energy usage and costs.

Results and Presentation: The app will present data through a dynamic dashboard where users can visualize current temperatures, energy consumption, and cost forecasts. Interactive graphs will show trends over time, allowing users to understand the impact of their settings.

3. Title: Integrated Smart Home Environment Control System

Project Description: This app will combine both smart lighting and HVAC control systems into one integrated solution. The app will allow users to create holistic "environment scenes" that control both lighting and temperature to suit different activities (e.g., relaxing evening, study mode, hosting guests). It will provide a real-time dashboard

that integrates energy usage across both systems and suggests optimized settings based on user habits and environmental data.

Users and Stakeholders: Primary users are homeowners who want an integrated approach to managing their home's environment for optimal comfort and efficiency. Secondary stakeholders might include smart home integrators and energy management consultants.

Problem to Solve: The app solves the problem of managing multiple smart home systems independently, providing a unified solution for controlling both lighting and climate. It also aims to help users reduce energy consumption across all systems.

Workflow: Users can define comprehensive environment scenes that control lighting and HVAC settings simultaneously. A primary interaction loop would involve creating a scene, setting triggers (time, occupancy, weather), and receiving feedback on comfort and energy usage.

Data Use and Processing: Data would come from APIs of smart lighting and HVAC systems, as well as weather data sources. The app would analyze the combined data to suggest optimal settings and automated controls.

Results and Presentation: The results will be presented on a unified dashboard where users can visualize and control all aspects of their home environment. The interface will offer real-time feedback on both comfort and energy efficiency, encouraging users to create more sustainable settings.