**⚡ Design Pattern: Strategy Pattern in Smart Energy Optimization Systems**

**🏠 Category:**

Smart Home Devices (e.g., Smart Thermostats, Smart ACs, Smart Lighting Systems)

**🧩 Pattern Name:**

Strategy Pattern

**🧠 Type:**

Behavioral Pattern

**📘 Description:**

The **Strategy Pattern** defines a family of algorithms, encapsulates each one, and makes them interchangeable. It allows the system to choose the best algorithm dynamically at runtime without modifying the client code.

In **smart energy systems**, devices like **smart thermostats, air conditioners, or lighting controllers** can optimize power consumption using different strategies depending on environmental conditions, user preferences, or time of day.

For example:

* During **peak hours**, the system may apply a *Power Saving Strategy*.
* At **night**, it may use a *Comfort Strategy* to maintain a stable temperature.
* When **renewable energy (like solar)** is available, it may switch to a *Green Energy Strategy*.

The system intelligently switches between these strategies to balance **comfort, cost efficiency, and sustainability**.