Aim

To design and simulate a battery charging system using energy generated from a solar panel in Cisco Packet Tracer, implementing an Industrial Internet of Things (IIoT) concept to monitor and control the process.

Problem Statement

Design and set up a system in Cisco Packet Tracer that simulates the charging of a battery using energy generated from a solar panel. The system should include proper components to enable monitoring of voltage and charging status, and demonstrate energy flow management using IIoT principles.

Scope of the Solution

- Simulation of renewable energy-based battery charging system.
- Real-time monitoring of energy generation and battery status through IIoT concepts.
- Demonstration of system automation for energy efficiency.
- Practical exposure to industrial protocols and simulation tools such as Cisco Packet Tracer.
- Visualization of the interaction between hardware components and software controllers.

Required Components to Develop Solution

Hardware Components:

- Solar Panel (simulated in Cisco Packet Tracer)
- Battery
- Sensors (Voltage sensor to measure battery voltage)
- IoT Gateway (for communication in IIoT setup)
- Microcontroller (for process control)
- Load (Resistive or system load to simulate power consumption)

Software Components:

- **IDE Name:** Cisco Packet Tracer
- **Software:** Cisco Packet Tracer (Version 8.x recommended for latest features)
- Operating System: Windows/Linux/macOS (depending on your environment)

Development Tools:

- TinkerCad or Fritzing (optional for circuit prototyping, but Cisco Packet Tracer is used primarily)

- IoT Dashboard in Cisco Packet Tracer to monitor real-time data.
- Simulation Controller (for running the automation scenario)