IoT Simulator Documentation

Part 1: IoT Device Emulation

SmartLight Class

1. Attributes:

- device_id (str): Unique identifier for the smart light.
- status (bool): Indicates whether the light is on or off.
- brightness (int): Current brightness level of the light.

2. Methods:

- turn_on() -> None: Turns on the smart light.
- turn_off() -> None: Turns off the smart light.
- set_brightness(brightness: int) -> None: Sets the brightness level of the light.

Thermostat Class

1. Attributes:

- device_id (str): Unique identifier for the thermostat.
- status (bool): Indicates whether the thermostat is on or off.
- temperature (float): Current temperature setting of the thermostat.

2. Methods:

- turn_on() -> None: Turns on the thermostat.
- turn_off() -> None: Turns off the thermostat.
- set_temperature(temperature: float) -> None: Sets the temperature of the thermostat.

SecurityCamera Class

1. Attributes:

- device_id (str): Unique identifier for the security camera.
- status (bool): Indicates whether the camera is on or off.
- security_status(str): Current security status (e.g., Armed, Disarmed, Detected Motion).

2. Methods:

- turn_on() -> None: Turns on the security camera.
- turn_off() -> None: Turns off the security camera.
- arm() -> None: Arms the security camera.
- disarm() -> None: Disarms the security camera.

Part 2: Central Automation System

AutomationSystem Class

- Attributes:
  - `devices` (list): List to store discovered IoT devices.

-Methods:

  - `discover_device(device) -> None`: Adds a device to the list of discovered devices.
  - `execute_automation_tasks() -> None`: Executes automation tasks based on device types.

Part 3: Monitoring Dashboard

The monitoring dashboard is implemented using Tkinter.

Part 4: Documentation

How to Run the Simulation?

1. Run the `simulate_automation_system()` function in the main script.

Test Case:

```
# Create devices
light1 = SmartLight("LivingRoomLight")
thermostat1 = Thermostat("LivingRoomThermostat")
camera1 = SecurityCamera("FrontDoorCamera")

# Set device properties
light1.set_brightness(75)
thermostat1.set_temperature(23.0)

# Check device properties
assert light1.brightness == 75
assert thermostat1.temperature == 23.0
```