

1. Introduction

This project implements a Smart Home system using object-oriented design principles in C++. The main focus of my contribution is the Add Device functionality, implemented using the Factory Method design pattern.

2. Design Pattern Used – Factory Method

The Factory Method pattern is used to create different types of devices (Light, Camera, TV) without exposing the creation logic to the client. This improves extensibility and follows the Open–Closed Principle.

3. Implementation

A base abstract class Device is defined. Concrete device classes such as Light, Camera, and TV inherit from it. DeviceFactory decides which concrete device to create based on user input. The abstract Device class defines common attributes such as name and power state. Concrete device classes override the getType() method. The DeviceFactory class creates device objects based on user input.

4. Add Device Functionality

The program allows the user to select the number of devices and the device type from the menu. Devices are created dynamically using the factory and stored in a list.

5. Version Control

Git and GitHub were used to track development. Each step of the implementation was committed separately to show progress.

Output:

```
  C:\Users\This-Pc\OneDrive\Dr X + 
How many devices? 3
Type (L=Light, C=Camera, T=TV): L
light L_1
light L_2
light L_3

-----
Process exited after 23.94 seconds with return value 0
Press any key to continue . . .

Activate Windows
Go to Settings to activate
```

COMITS:

The screenshot shows a GitHub repository page for 'SmartHome-CENG464/include'. The 'Code' tab is selected. On the left, there's a sidebar with 'Files' and a tree view showing 'main' and 'include' folders containing files like Camera.h, Device.h, DeviceFactory.h, Light.h, and TV.h. The main area displays a list of commits:

Name	Last commit message	Last commit date
..		yesterday
Camera.h	Add Camera concrete device	yesterday
Device.h	Add abstract Device base class	yesterday
DeviceFactory.h	Fix includes and add interactive Add Device test	1 hour ago
Light.h	Add Light concrete device	yesterday
TV.h	Add TV concrete device	yesterday

At the bottom right of the page, there's an 'Activate Windows' message: 'Activate Windows Go to Settings to activate Windows.'