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.

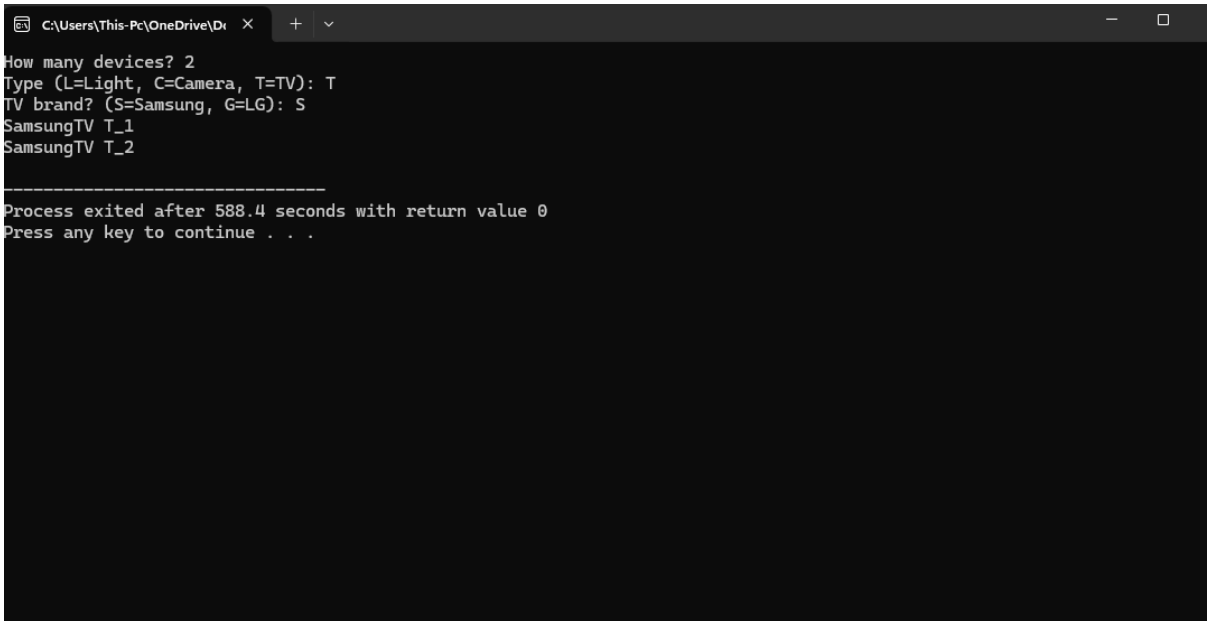
5. Version Control

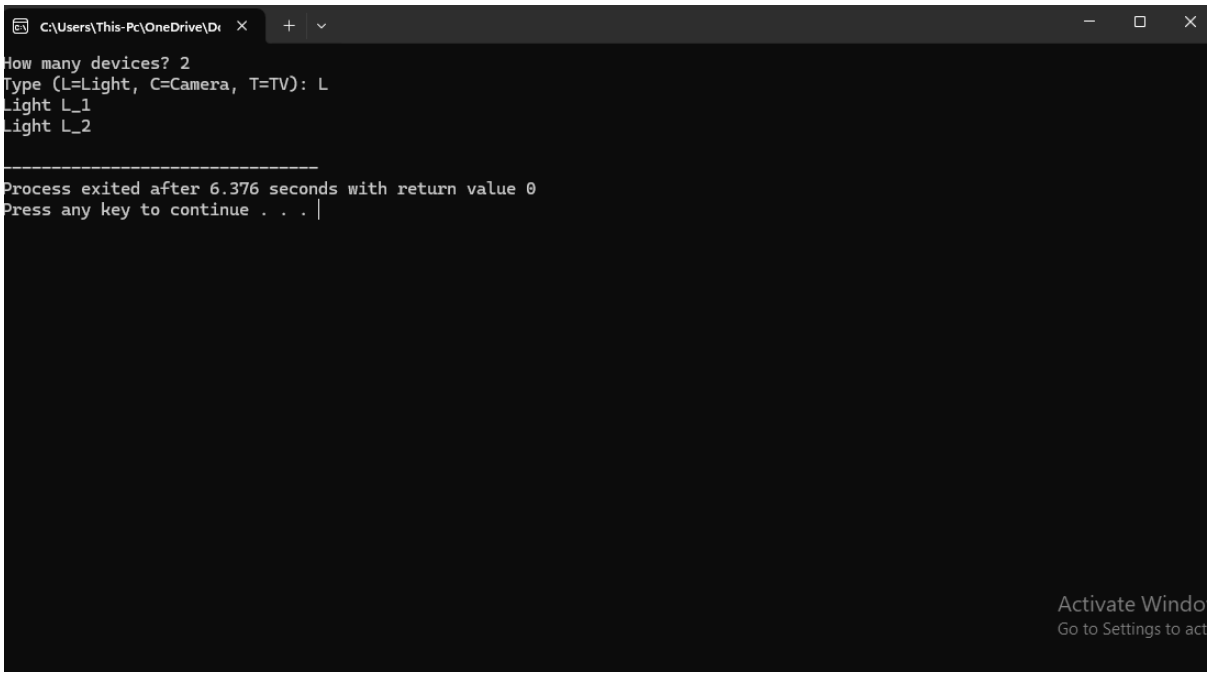
Git and GitHub were used to track development. Each step of the implementation was committed separately to show progress.

6.

The implementation strictly follows the Phase 2 design. The Factory Method pattern described in the design phase was implemented without changing responsibilities. Additional TV brand specialization (SamsungTV and LGTV) was added using inheritance, which is consistent with the design constraints given in the project description.

Output:





Device creation is dynamic

Client (main) does NOT know concrete classes

Factory decides which object to create

TV brands are handled using inheritance

COMMITS:

Commits on Dec 13, 2025

Implement Factory Method for device creation FatoumaToyfik committed 4 days ago		fa149a2
Add DeviceFactory interface FatoumaToyfik committed 4 days ago		51232cd
Add TV concrete device FatoumaToyfik committed 4 days ago		5614ecb
Add Camera concrete device FatoumaToyfik committed 4 days ago		3f5e772
Add Light concrete device FatoumaToyfik committed 4 days ago		f4c4ecd
Add abstract Device base class FatoumaToyfik committed 4 days ago		5b8486d

Commits on Dec 15, 2025

Add midterm report FatoumaToyfik committed 3 days ago		5e056f5
Add program output screenshot FatoumaToyfik committed 3 days ago		b234b36
README.md FatoumaToyfik authored 3 days ago	Verified	7d08785
Add project README FatoumaToyfik committed 3 days ago		c53e742
Fix includes and add interactive Add Device test FatoumaToyfik committed 3 days ago		b4b55c5

Commits on Dec 17, 2025

Update README.md FatoumaToyfik authored 33 minutes ago	Verified	3147809
Add updated output screenshots FatoumaToyfik committed 39 minutes ago		573eea4
Remove old output screenshot FatoumaToyfik committed 1 hour ago		c026aef
Add Samsung/LG TV and update Factory Method FatoumaToyfik committed 1 hour ago		b3ebddf
Add CMake build configuration FatoumaToyfik committed 2 hours ago		a79151f

Commits on Dec 18, 2025

Add updated project report FatoumaToyfik committed 7 minutes ago		d295783
Remove report for update FatoumaToyfik committed 8 minutes ago		82cf737
Remove report for update FatoumaToyfik committed 10 minutes ago		38f7fa4
Add updated project report FatoumaToyfik committed 11 minutes ago		7d98ac6
Remove report for update FatoumaToyfik committed 12 minutes ago		51ec1a4