Project Smart House

Problem:

Create a program to manage a smart house with the use of object oriented
programming in c# language.

Main Functions

Classes:

Lamp:

Class that models a lamp, with the option of changing its brightness.

EcoLamp:

Class that models an eco friendly lamp,with the option of changing its brightness and its maximum brightness halved to save power. It also has a timer function to make sure the lamp automatically turns off after the selected timer comes to an end.
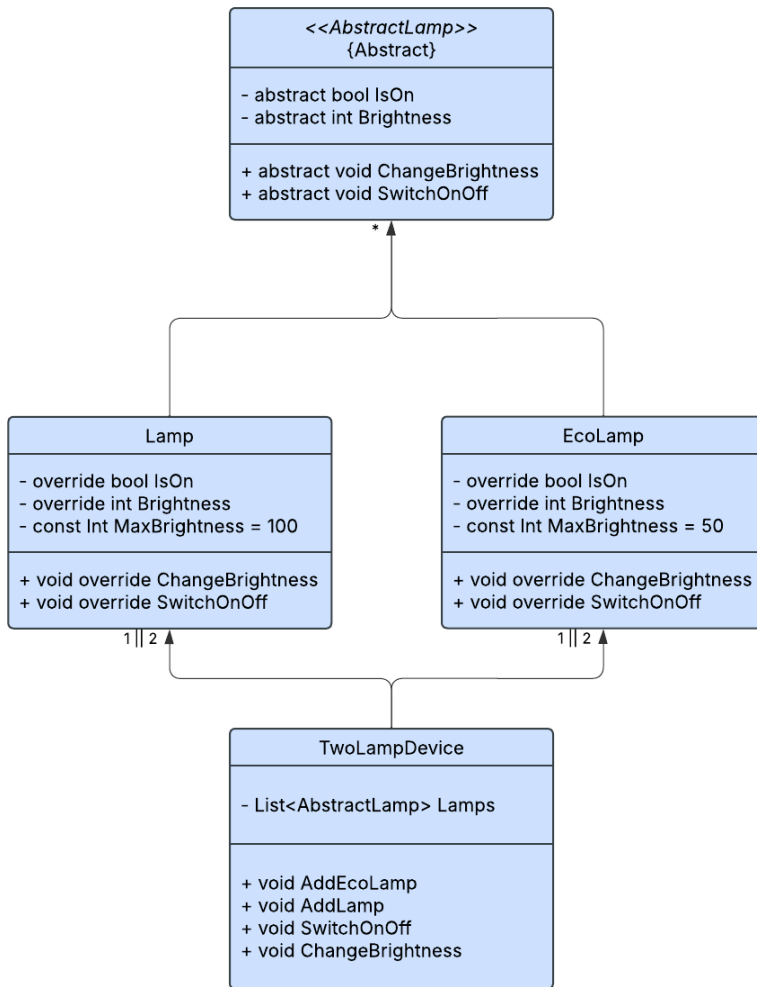
TwoLampDevice:

Class that combines two lamps, which can also be of different types, to turn them on or off and adjust brightness from a single point.

LampsRow:

Class that manages an arbitrary number of Lamps and EcoLamps from a single point. Allows turning on/off and adjusting brightness of: one lamp at a time or all lamps together.

UML

Diagramma delle classi

```
                  ┌──────────────────────────┐
                  │   <<AbstractLamp>>        │
                  │     {Abstract}            │
                  ├──────────────────────────┤
                  │ - abstract bool IsOn      │
                  │ - abstract int Brightness │
                  ├──────────────────────────┤
                  │ + abstract void ChangeBrightness │
                  │ + abstract void SwitchOnOff │
                  └──────────────────────────┘
```

AbstractLamp {Abstract}

- abstract bool IsOn
- abstract int Brightness

+ abstract void ChangeBrightness
+ abstract void SwitchOnOff

Lamp

- override bool IsOn
- override int Brightness
- const Int MaxBrightness = 100

+ void override ChangeBrightness
+ void override SwitchOnOff

EcoLamp

- override bool IsOn
- override int Brightness
- const Int MaxBrightness = 50

+ void override ChangeBrightness
+ void override SwitchOnOff

TwoLampDevice

- List<AbstractLamp> Lamps

+ void AddEcoLamp
+ void AddLamp
+ void SwitchOnOff
+ void ChangeBrightness

Testing

Lamp:

Performed 5 tests. Verified that the Lamp turns on and off when brightness respectively: exceeds the minimum value, equals the minimum value.
Verified that brightness cannot be less than the minimum value or greater than the maximum value.
Verified that brightness cannot be changed if the lamp is off.

EcoLamp:

Performed 5 tests.
Verified that the Lamp turns on when brightness exceeds the minimum value, and turns off when it equal the minimum value.
Verified that brightness cannot be below the minimum or above the maximum value.
Verified that brightness cannot be changed if the lamp is off.

TwoLampDevice:

Performed 13 tests.
Verified that a bulb of any type can be added and that no more than two bulbs can be added.
Verified that they can be turned on and off, and that brightness can be changed only if they are on.