Doc. Title:	PRD-CS-2025-TITLE-V1.0.0
Doc. reference:	*ITT Blaise Pascal - Cesena*
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TITLE

SMART HOUSE

Sommario

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PROBLEMA

Create a Smart House using class programmation with C# language and working space Visual Studio.
Create a lamp, an ecologic lamp, a device with two lamps and a row of lamps.

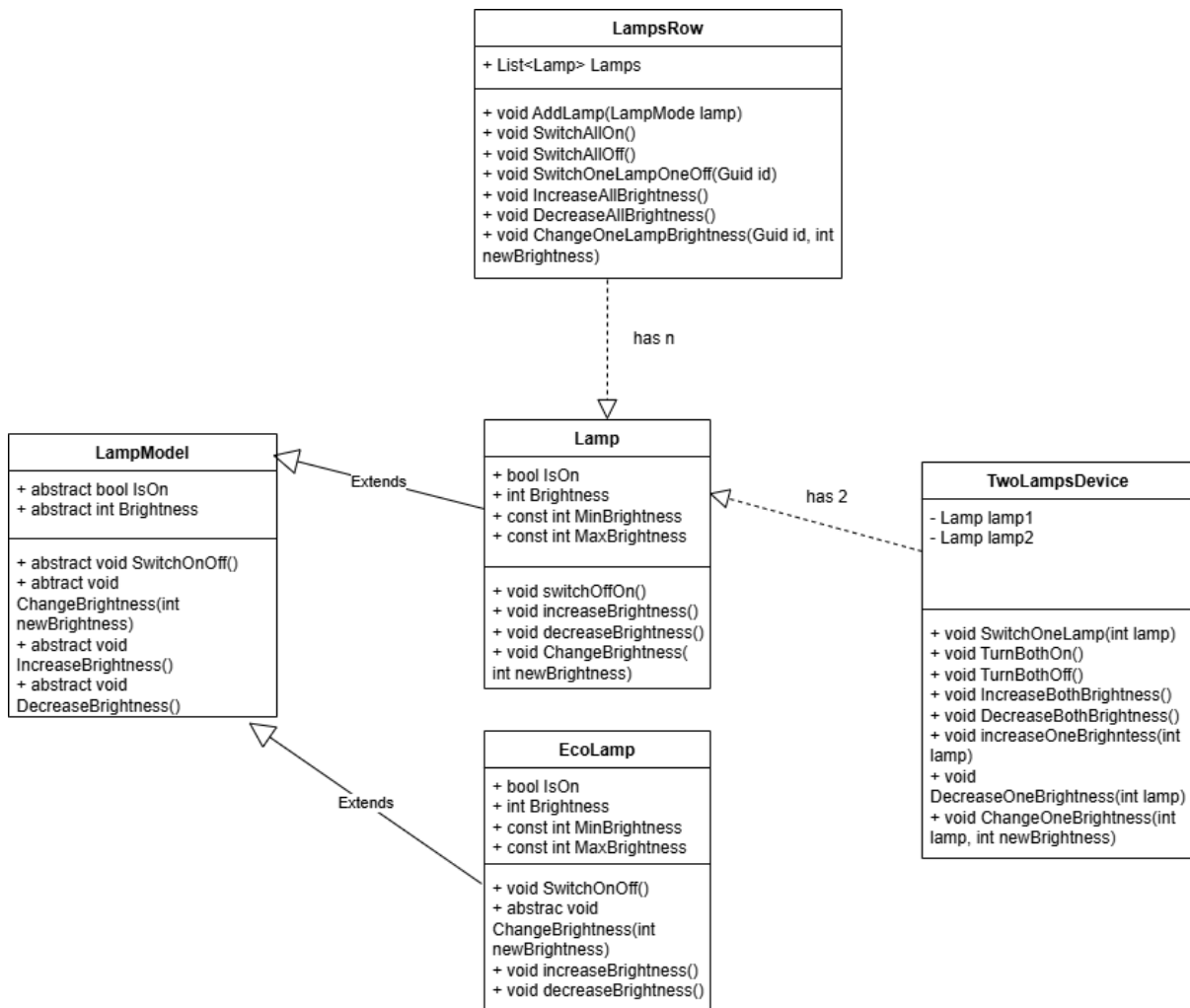| Doc. Title:	PRD-CS-2025-TITLE-V1.0.0
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Funzionalità principali

Lamp

A lamp that can be turned off or on and that can change its brightness by one or a quantity chosen between a specific range. An EcoLamp with the same functionalities as a lamp but with a reduced brightness to reduce electrical consumption. A device with two lamps which can be Eco or not, in the device is possible to change the state of one lamp or change both. Also, it is possible to change the brightness of one lamp and increase or decrease both lamps or only one.LampsRow: a device with a list of lamps. All of the Lamps can be turned off or on together or alone by specifying the ID of one lamp. The same thing can be done with Brightness: can be increased or decreased on every lamp and it is possible to change to a specific value by giving the lamp ID.

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UML

Diagramma delle Classi

LampsRow

+ List<Lamp> Lamps

+ void AddLamp(LampMode lamp)
+ void SwitchAllOn()
+ void SwitchAllOff()
+ void SwitchOneLampOneOff(Guid id)
+ void IncreaseAllBrightness()
+ void DecreaseAllBrightness()
+ void ChangeOneLampBrightness(Guid id, int newBrightness)

has n

LampModel

+ abstract bool IsOn
+ abstract int Brightness

+ abstract void SwitchOnOff()
+ abtract void ChangeBrightness(int newBrightness)
+ abstract void IncreaseBrightness()
+ abstract void DecreaseBrightness()

Extends

Lamp

+ bool IsOn
+ int Brightness
+ const int MinBrightness
+ const int MaxBrightness

+ void switchOffOn()
+ void increaseBrightness()
+ void decreaseBrightness()
+ void ChangeBrightness(int newBrightness)

has 2

TwoLampsDevice

- Lamp lamp1
- Lamp lamp2

+ void SwitchOneLamp(int lamp)
+ void TurnBothOn()
+ void TurnBothOff()
+ void IncreaseBothBrightness()
+ void DecreaseBothBrightness()
+ void increaseOneBrighntess(int lamp)
+ void DecreaseOneBrightness(int lamp)
+ void ChangeOneBrightness(int lamp, int newBrightness)

Extends

EcoLamp

+ bool IsOn
+ int Brightness
+ const int MinBrightness
+ const int MaxBrightness

+ void SwitchOnOff()
+ abstrac void ChangeBrightness(int newBrightness)
+ void increaseBrightness()
+ void decreaseBrightness()

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Testing

The various lamp features that changed the state were tested, as were the various brightness adjustment features, including a possible error when attempting to set an inadmissible brightness level. These tests were also implemented for the Eco-Lamp, but with a brightness error set to match the maximum brightness of the Eco-Lamp. Finally, the various features of the two-lamp device were tested, allowing both lamps to be turned on and off, or to do so for just one lamp of your choice, with a possible error if the chosen lamp was neither the first nor the second. The same was done for the brightness adjustment features for both lamps and for the brightness adjustment of a single lamp, with a possible error if the chosen lamp was neither the first nor the second. Finally, tests were performed to ensure that even if the brightness of both lamps was increased or decreased, it was only increased for the lamps that were not at maximum brightness, or decreased only for the lamps that were not at minimum brightness.