### Spring Core - Smart Home Lighting System Application

**Important Instructions:**

* Please read the document thoroughly before you code.
* Import the given skeleton code into your Eclipse.
* Do not change the Skeleton code or the package structure, method names, variable names, return types, exception clauses, access specifiers, etc.
* You can create any number of private methods inside the given class.
* You can test your code from the main() method of the program.
* Using Spring Core, develop the application using annotation.

**Time: 1 hour**

**Assessment Coverage:**

* **Classes, Objects, and Constructor Injection with Annotations**

The application created should be a demo of how to test LED and Incandescent lighting systems in a smart home setting. The ambiance and efficiency of the home lighting are totally dependent on the type of lighting system fixed or injected. So, the application will analyze the lighting system's performance by injecting an LED or Incandescent system at runtime using annotations.

**Skeleton File for Development:**

Import the below-attached skeleton code into your Eclipse project and implement the required functionalities.



**Technical Requirements:**

You are required to develop an App following the below conditions.

**Step 1:** Create an abstract class **LightingSystem** with the below-mentioned public methods:

**Variables:**luminosity of type int, energyConsumption of type int, type of type String

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Access Specifier/ Modifier** | **Method Name** | **Input Parameters** | **Output Parameters** | **Logic** |
| public abstract | getEfficiencyRating | nil | int | This method should be implemented by subclass and calculate the efficiency rating |

**Step 2:** Create class **LEDLighting** which extends **LightingSystem** and give implementation for **getEfficiencyRating** method by using the below formula and return the efficiency rating.

**efficiencyRating = luminosity / energyConsumption**

Annotate LEDLighting class with the appropriate annotations to make it a bean and use appropriate annotations above the attributes to injectvalues like **luminosity=1600, energyConsumption=10, type=led.**

**Step 3:** Create class **IncandescentLighting** which extends **LightingSystem** and give implementation for **getEfficiencyRating** method by using the below formula and return the efficiency rating.

**efficiencyRating = luminosity / energyConsumption**

Annotate IncandescentLighting class with the appropriate annotations to make it a bean and use appropriate annotations above the attributes to injectvalues like **inject luminosity=600, energyConsumption=60, type=incandescent.**

**Step 4:** Create class **SmartHome** which has the following methods and variables.

**Variables:**

name of type String, lightingSystem of type LightingSystem

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Method Name** | **Input Parameters** | **Output Parameters** | **Logic** |
|  | getReport | nil | nil | This method should display the name of the home, lighting system type, and efficiency rating |
| **Constructor** | SmartHome | String name, LightingSystem lightingSystem | NA | This parameterized constructor takes name and LightingSystem object which should be injected using annotations |

**Step 5:** In the **ApplicationConfig** class, use Java-based configuration to define beans for your application. Define ledHome and incandescentHome methods to create SmartHome beans with specific lighting systems:

Define a bean named **ledHome** that creates a SmartHome instance named "Eco Friendly House" and automatically injects the LEDLighting system.

Define a bean named **incandescentHome t**hat creates a SmartHome instance named "Classic Beauty Home" and automatically injects the IncandescentLighting system.

|  |  |  |  |
| --- | --- | --- | --- |
| **Method Name** | **Input Parameters** | **Output Parameters** | **Logic** |
| ledHome | LEDLighting lightingSystem | SmartHome | This method should create SmartHome object with name “Eco Friendly House” and injects LEDLighting |
| incandescentHome | IncandescentLighting lightingSystem | SmartHome | This method should create SmartHome object with name “Eco Friendly House” and injects IncandescentLighting |

**General Design Constraints:**

Ensure that all the Java Coding Standards are followed.

Assume that the method inputs are valid always, hence exceptional blocks are not needed to be included in the development.

**Sample Input Output 1:**

Select option

1.LED Lighting

2.Incandescent Lighting

**1**

Eco Friendly House with LED lighting gives an efficiency rating of 160

**Sample Input Output 2:**

Select option

1.LED Lighting

2.Incandescent Lighting

**2**

Classic Beauty Home with incandescent lighting gives an efficiency rating of 10