

Lab Statement

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Disclaimer

This lab is based on Inheritance concepts. The last lab on inheritance was meant to give you an idea about how inheritance works. Today's lab introduces the concept of interfaces.

READ THE JAVADOC CAREFULLY .

Introduction

This lab you are going to build a Building this time with different types of rooms. In the previous labs, you have already built stuff such as a room using primitives such as Rectangle, Triangle. Now, you have to adhere to Inheritance concepts in order to tackle the same problem effectively.

The main classes are **Room**, **Washroom**, **LivingRoom**, **BedRoom** and **Bed**. There are 2 interfaces that you would have to define as well namely **IRoom**, **IOperatingCost**.

In our problem, you have design a set of rooms that you might commonly find in a house. But you will see how to use Inheritance and Interfaces effectively to achieve this.

There are 3 types of rooms:

- Living Room
- Wash Room
- Bed Room

All these classes extend an abstract class called **Room** which has some common functionality for all room types.

All rooms have 2 types of costs associated with them:

- **Operating Cost aka Bill** : Cost of operating the room. This might include electricity bill, water bill etc.
- **Build Cost**: Cost of construction of the room.

Class Design

Room Class

The class implements the **IRoom** interface which defines Room functions. This **abstract** class defines the common fields and functions that any room might have such as width, length, height. The **getBill()** function has been made abstract as each type of room might have a different way of bill computation.

LivingRoom Class

The class implements the **IOperatingCost** interface which declares the **use()** method. The living room has a TV and is associated to a **tvState** boolean variable which tells us if the TV is **ON** or **OFF**. It can use the TV using the **use()** method. Turning on the TV adds some cost to the **electricityBill** of the room.

Washroom Class

The class implements the **IOperatingCost** interface which declares the **use()** method. The washroom is associated with some real life plumbing fixtures like Shower and Wash Basin. Using them would contribute to the **waterBill** of the room.

Bed Class (Already Provided)

This class represents a bed. It has a bed material property. The bed has some building cost associated with it but doesn't have any operating cost.

Bedroom Class

The class implements the **IOperatingCost** interface which declares the **use()** method. The bedroom has 2 boolean variables:

- **sleepState** : True if the person is sleeping else it is false.
- **acState** : True if the AC is switched on, else it is false.

Calling the **use()** function for AC adds to the electricity bill of the room.

Test Cases

Test Case Description	Marks
Construction of both interfaces	2
Working of abstract class Room	2
Working of class LivingRoom	2
Working of class WashRoom	2
Working of class Bedroom	2

Submission

It is recommended that you start solving the lab in the order of test cases. The first two test cases are crucial as the next three cases depend on these two cases.

AGAIN READ THE JAVADOC CAREFULLY .