SE 3313 Software Design and Architecture

Decorator Pattern

Lab 4

1 Context

The Decorator Pattern attaches additional responsibilities to an object dynamically. Decorators provide a flexible alternative to subclassing for extending functionality. A Decorator pattern can be used to attach additional responsibilities to an object either statically or dynamically. A Decorator provides an enhanced interface to the original object. In the implementation of this pattern, we prefer composition over an inheritance – so that we can reduce the overhead of subclassing again and again for each decorating element. The recursion involved with this design can be used to decorate our object as many times as we require.

2 Problem Description

In this example, you are making an application for the price calculation of a data center. You are supposed to have a major resource namely the Server, there are two types of servers (NormalCPU, HighEndCPU,) server can additionally be customized with Resources such as BasicGPU, HighEndGPU, LowMemory, HighMemory. Of course each comes in a cost.

- An HighEndCPU type of server costs 0.049468 where as BasicCPU one costs only 0.01484.

- Adding an HighEndGPU costs 0.022890 whereas BasicGPU one costs 0.006867.

- Adding an HighMemory costs 0.003067 whereas LowMemory one costs 0.000920.

3 Measure of Success

You are expected to implement necessary classes for this example using Decorator Pattern. You should implement main method according to example output.

4 Example Output

```
Welcome to the Data Center Configuration Tool!
Select Server Type:
1. High-End CPU
2. Normal CPU
1
Select Memory Type:
1. High Memory
2. Low Memory
1
Select GPU Type:
1. High-End GPU
2. Basic GPU
1
Total Price: $0.07542499999999999
Description: Server with High-End CPU, with High Memory, with High-End GPU
```

Figure 1:

```
Welcome to the Data Center Configuration Tool!
Select Server Type:
1. High-End CPU
2. Normal CPU
2
Select Memory Type:
1. High Memory
2. Low Memory
2
Select GPU Type:
1. High-End GPU
2. Basic GPU
2
Total Price: $0.022627
Description: Server with Normal CPU, with Low Memory, with Basic GPU
```

Figure 2: