Class Project 1

CIS 476/566 Software Architecture and Design patterns

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Due: 02/20/2023

An electronic company specializes in manufacturing devices such as smartphones, tablet, laptops, and smartwatches (4 factories for the abstract factory pattern, 3 main products). Each device has different components. Suppose you are writing a program to test the components of the devices. The components we are interested in are displays, batteries, and processors (the 3 products, per one factory each product relates to the 4 factories ex. Display is produced 4 times for each factory). These components are different in different device. Each device has its own program for testing these components. To know which test to run, you will need to instantiate objects that correspond to each one of the components. (around 20 classes for the UML diagram)

We assume that device to be tested are stored in a configuration file (text file). Because this situation fits the Abstract Factory pattern so well, you can use that pattern to organize the creation of objects that correspond to each device. You will also need to use the variation of singleton pattern to ensure that at most two instances of each device in each test run. Please note finishing running all devices specified in the configuration file is considered as one test run.

Here is an example of the configuration file content. You can create your own.

Smartphone

Smartwatch

Laptop

Smartwatch

Laptop

Tablet

Laptop

Smartwatch

Smartphone

Tablet

Questions

1) Give the UML diagram. You should integrate singleton into abstract factory pattern.

2) Give the code (in any language) based on the UML class diagram given in 1). As output, you need to display three different messages (e.g., “Display Smartphone”, Battery Smartphone”, and “Processor Smartphone”) for the device specified in configuration file. You should give a warning message if the same device is asked to run more than twice.

3) Zip your UML diagram, source code, output screen shot in one .zip file and upload to class project I folder in Canvas before due.

