Software System Analysis and Design

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Lab10: Singleton, Factory, Builder

Recap

1. What is SOLID?
2. What is Open-Closed Principle?
3. What is Dependency Inversion principle?
4. What is the advantage of Dependency Inversion Principle?

Discussion

1. What are designs patterns?
2. What are the types of design patterns? Give an example for each.
3. Can we apply design patterns to procedural programming?
4. What is Singleton pattern ? give examples of use case
5. What is Builder pattern? How is it different from Factory Pattern?
6. What is the difference between a static class and Singleton pattern?

Exercise 1 (1/2)

Answer **True** or **False**

1. Using synchronization techniques in Singleton allows to solve multithreading problems when they try to access the instance.
2. Factory pattern is not used in Java JDK functions.
3. Factory pattern is used when there is inheritance or implementation of a common interface.
4. Factory pattern allows clients to use objects without knowing anything about their creation.
5. Builder pattern is limited when it comes to adding new properties to the class.

Exercise 1 (2/2)

7. Name some of the design patterns which are used in Java JDK.
8. What is the difference between SOLID principles and Design Patterns?
9. Mention one advantage of factory pattern.
10. What problem does Builder pattern solve?
11. What would happen if we do not use a synchronization method for returning singleton in a multi-threaded environment?

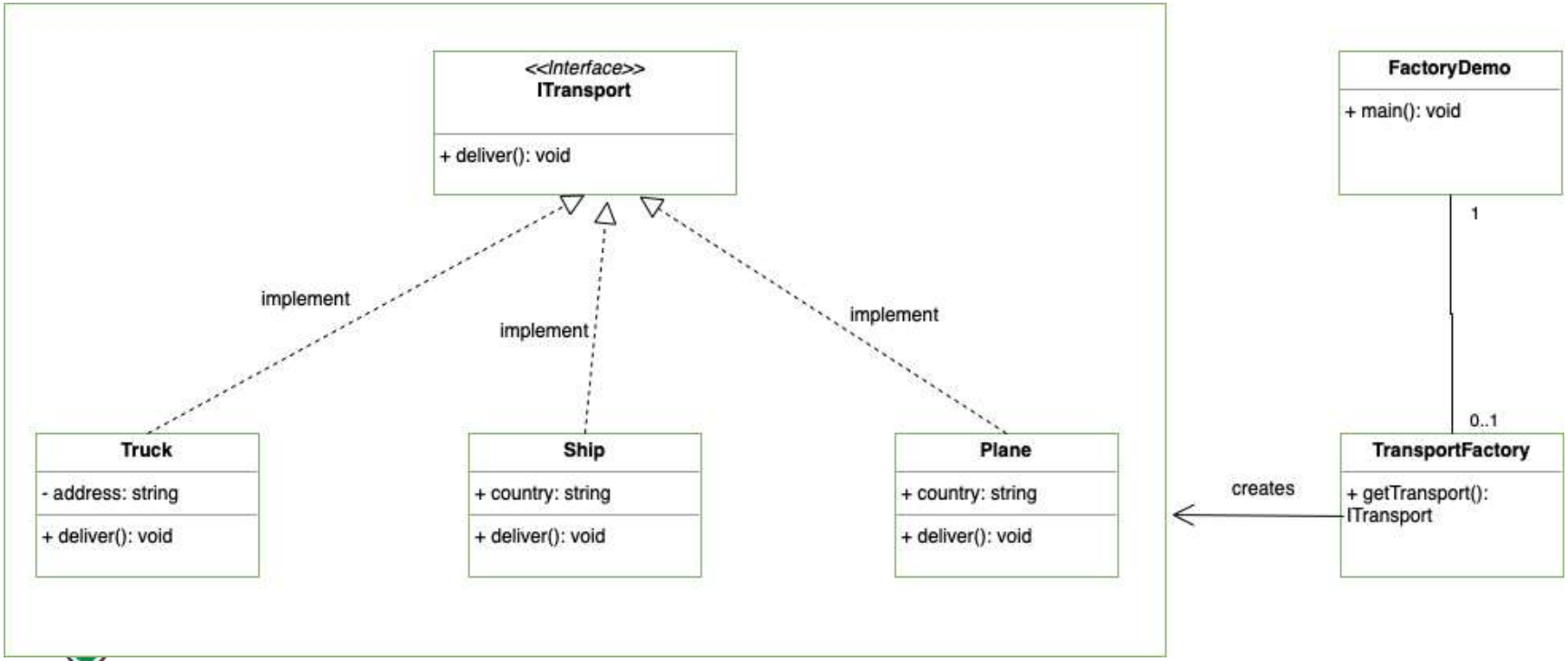
Exercise 2

A developer is asked to implement an SQL database connectivity class (***open connection to db***, ***closes connection to DB***) and he should make the necessary optimizations in such a way not to overwhelm the application with unnecessary connections.

According to this requirement, implement this class using the most suitable design pattern by completing **this code**.

Exercise 3

The diagram below represents a ***factory pattern***. Implement it



Exercise 4

We wish to create a garden which has several Sakura trees, several oak trees, orchid flowers, roses, and several benches spread in it. Also, this garden has also a given perimeter, and a surface. It also contains a lake,and the lake has a perimeter, and it contains fish. In the future, there is a possibility to add new plants/trees.

Is ***Builder pattern*** the most suitable to use? Why?

implement the solution using the right pattern.

Thank you! :)
Questions?