SOFT2201

Software Construction and Design 1

THE UNIVERSITY OF SYDNEY

Design Pattern Assignment

Stage 1

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1. ABSTRACT FACTORY

1.1 Description of use

The pool game reads a JSON configuration file to initialized the game. There is a ball reader class and a table reader class, the abstract factory is responsible to create these two classes.

1.2 Advantages

Client can implement the abstract factory according to the types of ball reader and table reader they need.

1.3 Disadvantages

It is hard to decide who is responsible to create the abstract factory.

2. BUILDER

Description of use

The Ball objects and the Table object are created by Ball Builder objects and Table Builder objects. The director pass a builder and a reader to construct Ball or Table object. In each construct method of the director, builder reads the attributes of a ball or a table and construct an object according these attributes.

2.1 Advantages

The builders simply the construction of a table or ball object. The director hides the construction, client can get an object by passing a reader of a specific JSON object and a builder to the director.

2.2 Disadvantages

When the Ball or Table class is modified, the builders need to be re-implemented. For example, for current stage, the configuration JSON object doesn't specify the radius of a ball, if a new attribute is introduced, a new builder and a new director need to be implemented.

3. SINGLETON

3.1 Description of use

To solve the problem: “who to create the factory of builders”, the factory of builder is implemented as a Singleton using lazy initialization. When the client needs the factory, it will be created.

3.2 Advantages

Solved the problem: “who to create the factory of builders” and keep the cohesion high.

3.3 Disadvantages

The use of singleton might increase the coupling of the system as the pool game is developed. The interface of the abstract factory cannot enforce the factory must be implemented as singleton.

4. UML DIAGRAM

Provide a class diagram based on the design patterns mentioned above. Explain the diagram where necessary.