

Design Pattern: Singleton

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May 9, 2014

1 Pattern Description

The *singleton design pattern* [1] provides means to ensure that only one instance of a class is created, and that there exists a global point of access to that instance. This is especially useful when exactly one instance of an object is required to coordinate actions throughout a system. A singleton is implemented by creating a class with a method that creates a new instance of a class if one does not exist, and otherwise returns a reference to the existing instance. The constructor of the class should be private to ensure that it can not be instantiated in any other way.

2 Pattern use in Solitaire

The primary use of a singleton in Solitaire that comes to mind is with the *GameStateController*, acting controller in a *Model-View-Controller* design. As the *gameStateController* is responsible for creating the Model, View and Undo/Redo module, only one *gameStateController* is desired. The single instance of the *gameStateController* class also needs to be accessed by most classes in the View. Currently, each constructor contains a reference to the *gameStateController*. Instead, the singleton pattern could be used to ensure that only one *gameStateController* exists, and that all classes can access it through its global point of access. This would reduce the complexity of our code and with that increase the readability of the code.

However, with the use of the singleton pattern one may have to deal with concurrency issues. [2] While not a part of our implementation so far, using a singleton controller with several threads moving cards between stacks at the same time would require concurrency control in the Undo/Redo module, as each card move consists of two parts (`oldStack->tempStack` and `tempStack->newStack`).

References

- [1] OODesign. Singleton Pattern. Accessed: 2014-05-09. [Online]. Available: <http://www.oodesign.com/singleton-pattern.html>

- [2] Wikipedia. (2014) Singleton Pattern. Accessed: 2014-04-16. [Online].
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