The Singleton Pattern

Updated: 10/22/2013

Based on Head-First Design Patterns,
Chapter 5
One of a Kind

• Only one instance of an object

• Examples
  – thread pool
  – cache
  – dialog box
  – object that handles registry settings
  – event logger
  – device driver
Definition

• The Singleton Pattern ensures a class has only one instance, and provides a global point of access to it.
Alternative

• Global variable
  – but every part of the program could access and modify it!

• Static member of a class
  – class is still globally visible
class Singleton {
    private static Singleton uniqueInstance;
    private Singleton() { }
    public static Singleton getInstance() {
        if (uniqueInstance == null) {
            uniqueInstance = new Singleton();
        }
        return uniqueInstance;
    }
}
Chocolate Boiler Example

- Only one actual boiler exists
- Only one instance of the controller software can exist
  - why?
Boiler Requirements

- To fill the boiler, it must be empty, and once it's full, we set the empty and boiled flags.
- To drain the boiler, it must be full and also boiled must equal True.
- To boil the mixture, the boiler must be full and not already boiled.
Multithreading Considerations

- The ChocolateBoiler singleton works just fine, except when multiple threads are running!
- How to prevent two threads from calling getInstance simultaneously?
  - synchronized keyword