THE SINGLETON PATTERN

WHAT IS A SINGLETON?

THERE ARE SITUATIONS WHERE EXACTLY ONE OBJECT OF A PARTICULAR TYPE IS NEEDED -

WHERE IT WOULD BE BAD TO HAVE ANY MORE THAN ONE OBJECT OF A PARTICULAR CLASS

DEVICE DRIVERS, REGISTRY SETTING MANAGERS, OR OTHER SYSTEM-WIDE SHARED OBJECTS ARE THE CLASSIC EXAMPLES

SINGLETON OBJECTS ALSO MAKE SENSE WHERE THE STATE OF AN OBJECT CONSUMES A LOT OF MEMORY, AND JUST ONE VERSION OF THAT STATE IS SUFFICIENT FOR THE ENTIRE APPLICATION

IN SUCH SITUATIONS, A STANDARD AND WIDELY USED WAY OF ACHIEVING THIS IS VIA

THE SINGLETON PATTERN

THE SINGLETON PATTERN

A SINGLETON OBJECT MUST SATISFY TWO ATTRIBUTES -

IT IS SURPRISINGLY DIFFICULT TO GUARANTEE THAT AN OBJECT IS INSTANTIATED EXACTLY ONCE..

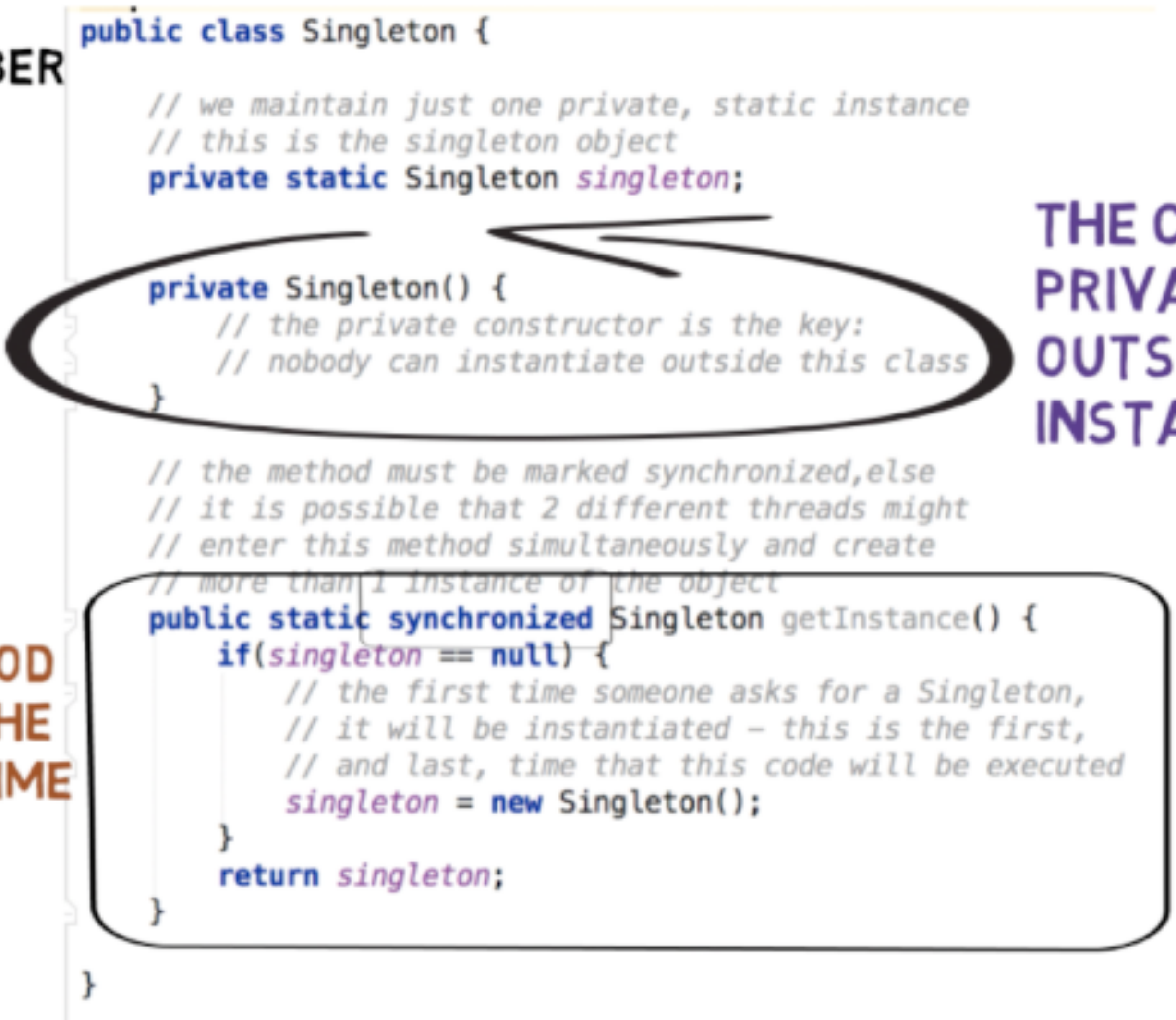
EXACTLY ONE (WELL ACTUALLY, AT MOST ONE) INSTANCE OF THE OBJECT SHOULD EXIST

EVERYONE OUGHT TO BE ABLE TO ACCESS THAT ONE SINGLETON OBJECT

THIS MEANS THAT THE OBJECT NEEDS TO BE GLOBALLY ACCESSIBLE

CREATING A SINGLETON

A STATIC PRIVATE MEMBER VARIABLE TO HOLD THE SINGLETON



```java
public class Singleton {

    // we maintain just one private, static instance
    // this is the singleton object
    private static Singleton singleton;


    private Singleton() {
        // the private constructor is the key:
        // nobody can instantiate outside this class
    }

    // the method must be marked synchronized,else
    // it is possible that 2 different threads might
    // enter this method simultaneously and create
    // more than 1 instance of the object
    public static synchronized Singleton getInstance() {
        if(singleton == null) {
            // the first time someone asks for a Singleton,
            // it will be instantiated - this is the first,
            // and last, time that this code will be executed
            singleton = new Singleton();
        }
        return singleton;
    }

}
```

THE CONSTRUCTOR MUST BE PRIVATE - THIS WAY NOBODY OUTSIDE THIS CLASS CAN INSTANTIATE THE SINGLETON

A STATIC GETTER METHOD WHICH INSTANTIATES THE SINGLETON THE FIRST TIME IT IS CALLED

IT IS IMPORTANT THAT THE GETTER BE MARKED 'SYNCHRONIZED', ELSE 2 THREADS MIGHT INTERFERE WITH EACH OTHER AND CREATE 2 INSTANCES OF THE SINGLETON!