

Assignment: 2

1. Find an application of Singleton design pattern in your application and draw its corresponding class diagram and a collaboration diagram and implement it in Java. Explain in a text document why singleton should be applied in the scenario and how it improves your design.

Singleton pattern

The singleton pattern is a software design pattern, which limits the instantiation for any given class to a single instance per JVM which will further be shared within all the classes of a given application. This approach is often used when one object is required to perform actions in the system.

Singleton design pattern scenario:

For our application, a Singleton design pattern is used to authenticate the validity of the manager class, which manages the functionalities of the application. We need only one Manager (only one object of Manager) throughout the entire application.

Why Singleton?

Our application requires an allocation for a single manager. With credentials such as:

managerId: mid@eventshire.com

managerPwd : MEvent@111

can only provide access to authenticated users who control the entire application.

How a Singleton pattern can enhance our application:

In the scenarios of online event management, we have many instances of

- Booking an event
- Organizing an event
- Ticketing

Such activities need to be implemented securely. Whenever a manager gets logged into an application no other managers can possibly enter into the application GUI using the same (managerId, managerPwd) credentials. And so, by using only the manager class using a singleton design pattern can improve the security feature of our online event management application.

Implementation:

The object for the Manager class is created by keeping the singleton design pattern in mind. The class has a private constructor so any new instances cannot be created. We used getManager() which helps to return a reference to the instance of the manager class. We

created two static attributes `managerId`, `managerPwd` to authenticate the validity of the manager.

Steps to run the code:

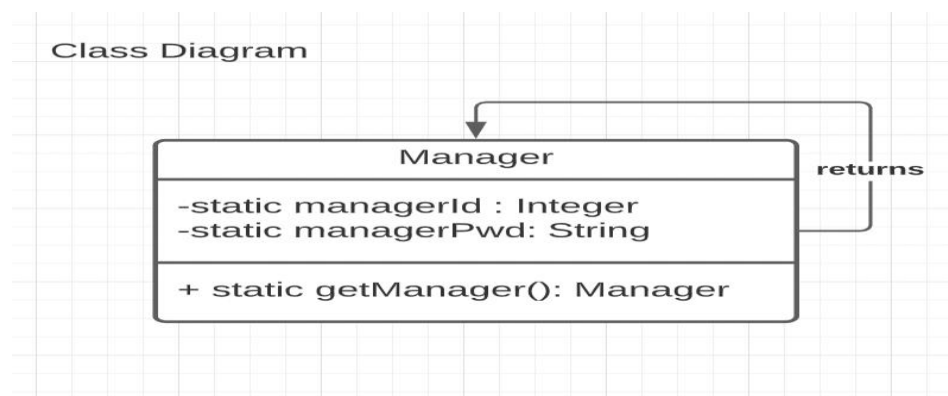
- We are using `Manager.java` file in the `src` folder
- Enter the following commands to run and compile the program code:

```
Javac Manager.java
```

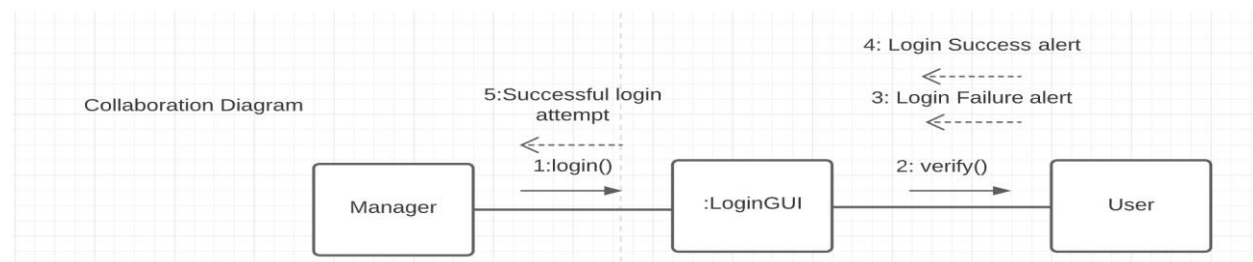
```
Java Manager
```

- `managerId` = mid@eventshire.com and `managerPwd`= MEvent@111 are the inputs to be taken

Class diagram- Singleton Design Pattern



Collaboration diagram- Singleton Design Pattern



Output of the code:

```
Manager.java X
1 package Assign;
2 import java.util.Scanner;
3
4 public class Manager {
5     private static Manager manager = null;
6     private static String mgrId = "mid@eventshire.com";
7     private static String pw = "MEvent@111";
8     private static Scanner scanner;
9
10    private Manager(String logId, String pwd) {
11        if((logId.equals(mgrId)) && (pwd.equals(pw))) {
12            System.out.println("Successfully logged in.");
13        }
14        else{
15            System.out.println("Incorrect Username/Password. Please try again.");
16            main(null);
17        }
18    }
19    public static synchronized Manager getInstance (String logId, String pwd) {
20        if(manager == null)
21            manager = new Manager(logId, pwd);
22        return manager;
23    }
24    public static void main (String[] args) {
25        scanner = new Scanner(System.in);
26        do{
27            System.out.print("Enter Username :");
28            String managerId = scanner.nextLine();
29            System.out.print("Enter Password :");
30            String managerpwd = scanner.nextLine(); ..
31    }
32    }
```

Problems Javadoc Declaration Console Coverage

<terminated> Manager [Java Application] /Library/Java/JavaVirtualMachines/jdk-9.0.4.jdk/Contents/Home/bin/java (21-Mar-2022, 11:45:59 pm - 11:47:00 pm)

Enter Username :mid@events.com
Enter Password :MEvent@111
Incorrect Username/Password. Please try again.
Enter Username :mid@eventshire.com
Enter Password :mevent@9999
Incorrect Username/Password. Please try again.
Enter Username :mid@eventshire.com
Enter Password :MEvent@111
Successfully logged in.

Problems Javadoc Declaration Console Coverage

<terminated> Manager [Java Application] /Library/Java/JavaVirtualMachines/jdk-9.0.4.jdk/Contents/Home/bin/java (21-Mar-2022, 11:45:59 pm - 11:47:00 pm)

Enter Username :mid@events.com
Enter Password :MEvent@111
Incorrect Username/Password. Please try again.
Enter Username :mid@eventshire.com
Enter Password :mevent@9999
Incorrect Username/Password. Please try again.
Enter Username :mid@eventshire.com
Enter Password :MEvent@111
Successfully logged in.