

CS-1181 Lab Problem 1: Are We Secure?

PURPOSE: To review and practice object oriented programming and inheritance in Java.

DIRECTIONS: For this lab you will need to download the associated .zip file from Pilot. The `User` class contains two fields: a username and a password. It also has two methods: `isValidPassword` and `authenticate`. A password is considered valid if it is at least eight characters long and it does not contain the username as part of the password. The `authenticate` method takes a string as an argument and returns `true` if that string matches the user's password; otherwise it returns `false`. The file `Main.java` contains code that thoroughly tests the `User` class.

Your task for this lab is to write and test a subclass of `User` called `SecureUser`. This subclass should override the `authenticate` method to meet more stringent requirements. In particular, a `SecureUser` class should "lock" a user out after three consecutive failed authentications. In other words, the `authenticate` method should return `true` only if the string passed into the method matches the password AND there have not been three consecutive failed authentications. If the user has two failed authentications and then a successful authentication, you should reset the number of consecutive failed authentications to zero. You should also add code to `Main.java` so that it thoroughly tests the `SecureUser` class. It is up to you how many tests you want to create, but keep in mind that you will not receive credit for this lab if your code to produce an incorrect response in any of our tests.

You should not make any changes to `User.java`, and you should only add to `Main.java`. Do not change any code that is already present.

Hint: You will probably find it useful to add a new field to the `SecureUser` class to keep track of the number of consecutive failed authentications.

EXAMPLE: The `SecureUser` `su` has username `Michelle` and the password is `"hello123"`.

```
su.isValidPassword(); // return true
su.authenticate("hello"); // return false
su.authenticate("hello12"); // return false
su.authenticate("hEllo123"); // return false (case is important)
su.authenticate("hello123"); // return false (3 consecutive failed authentications)
```

RUBRIC:

- [1pt] Documentation (comments)
- [1pt] User is successfully locked out after 3 failed attempts
- [1pt] Successful authentication resets the failed attempts count