Izmir University of Economics
Faculty of Engineering

SE 311 - Software Architecture
2020 Spring
Term Project

Project Topic:

Pluggable Authentication Mechanism

Authors:

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In this project, five design patterns are used.

1) Singleton

This pattern is used, because requirements of the project says that there should be only one module for each authentication mechanism. So 'Local', 'LDAP', 'KERBEROS' classes implemented this pattern. 'OperatingSystem' class also implemented this pattern. In total there are 4 classes which implements Singleton.

2) Template Method

Template method is used because there is a skeleton but subclasses should implement some steps in their own way. There is a parent class called 'AuthenticationMechanism' and it has three subclasses. They implement some similar methods so we used inheritance and declared them in parent class then override in subclasses.

Participants - class mapping:

Abstract Class -> AuthenticationMechanism

Concrete Classes -> Local, LDAP, KERBEROS

3) Observer

Observer is used to create notification when user authenticates.

Participants - class mapping:

Subject Class -> AuthenticationMechanism

Observer Class -> Observer (interface)

ConcreteSubject Class -> Local, LDAP, KERBEROS

ConcreteObserver Class -> User

4) Command

Command pattern is used because we wanted to send request to find user and encapsulated it as an object.

Participants - class mapping:

Interface Command -> Command

ConcreteCommand -> AuthenticationMechanism

Client -> PluggableAuthenticationMechanism

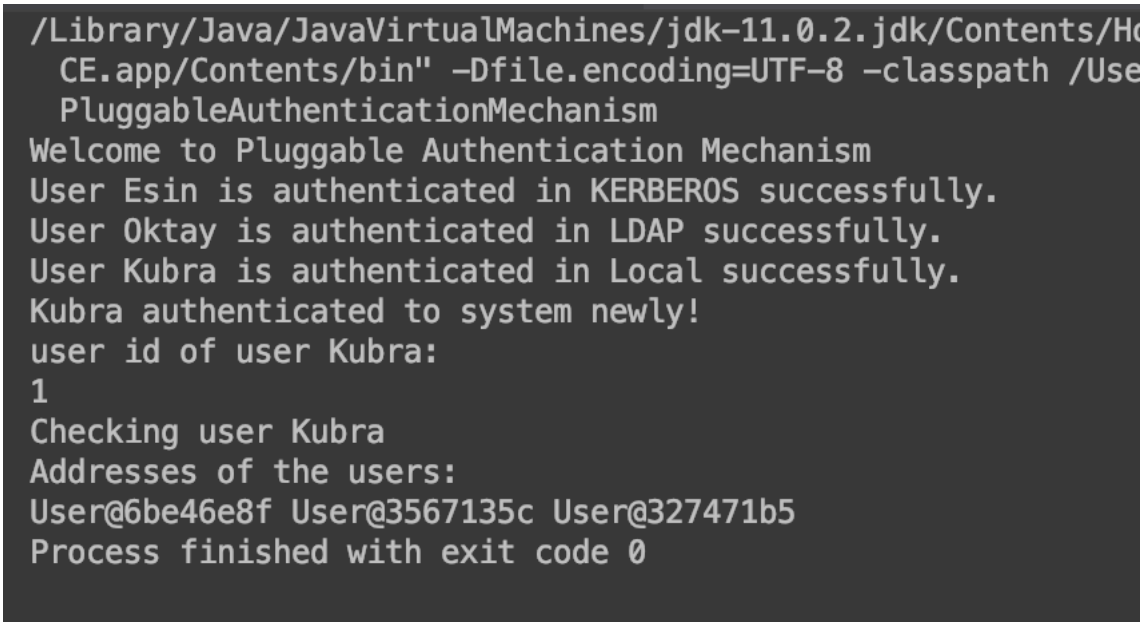
Invoker -> Invoker

Receiver -> User

5) Iterator

Java Iterator is used to iterate users in the list. (Iterator pattern design was a little complicated.)

Screen dump of the project:



Class Informations

There are 10 classes in this project.

1) OperatingSystem:

Since the system will have only one operating system to perform, this class is added to implements Singleton design pattern.

2) Command:

It is an interface. It has execute() method in it. It is ‘Command’ class of Command pattern.

3) Invoker:

This class takes command list and calls execute method for each command.

4) Observer:

It is an interface, it has a userAuthenticated() method which will be called inside Notify().

5) User:

This class has user attributes, implements Observer(Concrete Class of Observer pattern). Also has a function called check(), which will be used for command pattern.

6) AuthenticationMechanism:

This is the 'abstract' class of Template Method. Also ‘Subject’ class of Observer pattern. It has attach, detach and notify methods for observer; execute method for Command.

7) Local, LDAP and KERBEROS:

They are subclasses for Template. Since there will be only one module for each of these authentication mechanisms, Singleton pattern is also used. They have execute method for Command.

8) PluggableAuthenticationMechanism:

Main body is in this class. To make design simple we implemented Java Iterator here and tested other patterns.

UML Class Diagram