

CONCORDIA UNIVERSITY

DEPARTMENT OF
COMPUTER SCIENCE AND SOFTWARE ENGINEERING

COMP 6231, Winter 2014

Instructor: R. Jayakumar

ASSIGNMENT 2

Issued: Feb. 4, 2014

Due: Mar. 4, 2014

Note: *The assignments must be done individually and submitted electronically.*

Distributed Player Status System (DPSS) using Java IDL

In this assignment, you are going to implement the distributed player status system (DPSS) from Assignment 1 in CORBA using Java IDL. In addition to the 4 operations introduced in Assignment 1 (namely, *createPlayerAccount*, *playerSignIn*, *playerSignOut*, and *getPlayerStatus*) the following operations also need to be implemented.

Additional Operation for Player

- *transferAccount (Username, Password, OldIPAddress, NewIPAddress)*

When a player invokes this method from his/her geolocation, the server associated with this player (determined by the *OldIPAddress*) searches its hash table to check if the account with this *Username* exists. If it exists, the entire account is transferred to the geolocation server associated with the *NewIPAddress*. Note that the account should be removed from the hash table of the current server and should be added to the hash table of the remote server atomically (that is, both operations should succeed or none should succeed). The server informs the player whether the operation was successful or not and both the server and the player store this information in their logs.

Additional Operation for Administrator

- *suspendAccount (AdminUsername, AdminPassword, AdminIP, UsernameToSuspend)*

When an admin invokes this method from his/her geolocation, the server associated with this admin (determined by the *AdminIP*), if the credentials are accepted, searches its hash table to check if the account with this *UsernameToSuspend* exists. If it exists, the entire account is removed from the hash table of this geolocation server. The server informs the admin whether the operation was successful or not and both the server and the admin store this information in their logs.

In this assignment you are going to develop this modified DPSS application in CORBA using Java IDL. Specifically, do the following:

- Write the Java IDL interface definition for the modified DPSS with all the 6 specified operations.
- Implement the modified DPSS. You should design a server that maximizes concurrency. In other words, use proper synchronization that allows multiple officers to perform operations for the same or different records at the same time.

- Test your application by running multiple players with the 3 servers. Your test cases should check correct concurrent access of shared data, and the atomicity of *transferAccount* operations (e.g. what if an account being suspended needs to be transferred and both operations were initiated at the same time?).

Your submission will be graded for correct and efficient implementation of the *transferAccount* and *suspendAccount* operations in addition to correct use and implementation of mutual exclusion in accessing shared data and proper exploitation of concurrency to achieve high performance.

Marking Scheme

- [30%] *Design Documentation*: Describe the techniques you use and your architecture, including the data structures. Design proper and sufficient test scenarios and explain what you want to test. Describe the most important/difficult part in this assignment. You can use UML and text description, but limit the document to 10 pages. Submit the documentation and code by the due date; print the documentation and bring it to your demo.
- [70%] *Demo in the Lab*: You have to register for a 5-minute demo. Please come to the lab session and choose your preferred demo time in advance. You cannot demo without registering, so if you did not register before the demo week, you will lose 40% of the marks. Your demo should focus on the following.
 - [50%] *Correctness of code*: Demo your designed test scenarios to illustrate the correctness of your design. If your test scenarios do not cover all possible issues, you'll lose part of mark up to 40%. You will also be evaluated on the implementation of your design.
 - [20%] *Questions*: You need to answer some simple questions (like what we've discussed during lab tutorials) during the demo. They can be theoretical related directly to your implementation of the assignment.

Questions

If you are having difficulties understanding sections of this assignment, feel free to email the Teaching Assistant at alexandre.hudon@sympatico.ca. It is strongly recommended that you attend the tutorial sessions which will cover various aspects of the assignment.