**Department of Computer Science and Software Engineering**

COMP 6231 - SUMMER 2016

**DISTRIBUTED SYSTEM DESIGN**

**ASSIGNMENT 2**

Issued: 31st May 2016 Due Date: 5th July 2016

***Note:*** *The assignments must be done individually or in a group of 2 (max) and submitted electronically.*

## Distributed Staff Management System (DSMS) using Java IDL

In this assignment, you are going to implement the distributed staff management system (DSMS) from Assignment 1 in CORBA using Java IDL. In addition to the 4 operations introduced in Assignment 1, the following operation needs to be implemented.

- *transferRecord* (*managerID*, *recordID*, *remoteClinicServerName*)

  When a clinic manager invokes this method from his/her clinic, the server associated with this manager (determined by the *managerID* prefix), searches its hash map to find if the record with *recordID* exists. If it exists, the entire record is transferred to the *remoteClinicServer*. Note that the record should be removed from the hash map of the initial server and should be added to the hash map of the *remoteClinicServer* atomically. The server informs the manager whether the operation was successful or not and both the server and the manager store this information in their logs.

In addition to this operation, the previous operations (*createDRecord*, *createNRecord*, *getRecordCounts*, and *editRecord*) shall now have one additional parameter: *managerID*. This is used by the *ClinicServers* to identify which manager conducted an invocation.

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

- Write the Java IDL interface definition for the modified DSMS with all the 5 specified operations.
- Implement the modified DSMS. You should design a server that maximizes concurrency. In other words, use proper synchronization that allows multiple managers to correctly perform operations on the same or different records at the same time.
- Test your application by running multiple managers with the 3 servers. Your test cases should check correct concurrent access of shared data, and the atomicity of *transferRecord* operation (e.g. what if a record being edited 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 *transferRecord* operation 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 electronically by the due date; print the documentation and bring it to your DEMO.

[70%] *DEMO in the Lab*: You have to register for a 5-10 minutes 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%] *The 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 will lose part of marks up to 40%.
- [20%] *Questions:* You need to answer some simple questions (like what we have 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 your Teaching Assistant. It is strongly recommended that you attend the tutorial sessions, as various aspects of the assignment will be covered.

**Note:**

CORBA is an old plugin and cannot be installed in new versions of Eclipse. The latest version in which the CORBA plugin can be installed is Eclipse Ganymede (3.4.2) that was released in 2009.