CONCORDIA UNIVERSITY

DEPARTMENT OF
COMPUTER SCIENCE AND SOFTWARE ENGINEERING

SOEN 423, Fall 2019 Instructor: R. Jayakumar

ASSIGNMENT 2

Issued: Oct. 3, 2019 Due: Oct. 24, 2019

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

Distributed Health Care Management System (DHMS) using Java IDL (CORBA)

In this assignment, you are going to implement a distributed health care management system (DHMS) from Assignment 1 in CORBA using Java IDL. In addition to 3 patient operations introduced in Assignment 1, the following operation needs to be implemented:

- *swapAppointment* (*patientID, oldAppointmentID, oldAppointmentType, newAppointmentID, newAppointmentType*):

  When a patient invokes this operation to change an appointment (belonging to an appointment type) he/she has already booked. In this case, the current city branch server (which receives the request from the patient) first checks whether the patient has booked the old appointment, then checks with the new city branch server (on which the new appointment has to be booked) whether there is available capacity for the new appointment, and if both checks are successful then atomically book the patient for the new appointment and cancel the old appointment for the patient. That is, book and cancel operations should both be successful or none of them should be done. Note that all these checks, book and cancel operations should be done using UDP/ IP messages as they are server-to-server communications.

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

- Write the Java IDL interface definition for the modified DHMS with all the 7 specified operations.
- Implement the modified DHMS. You should design a server that maximizes concurrency. In other words, use proper synchronization that allows multiple users to correctly perform operations on the same or different records at the same time.
- Test your application by running multiple clients with the 3 servers. Your test cases should check correct concurrent access of shared data, and the atomicity of swapAppointment operation.

Your submission will be graded for correct and efficient implementation of all the 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 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. The 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 any aspect of this assignment, feel free to contact your teaching assistants (Ms. Harsh Deep Kour at harsh.comp6231@gmail.com or Mr. Kishan Bhimani at kishanbhimani9111@gmail.com. It is strongly recommended that you attend the tutorial sessions, as various aspects of the assignment will be covered there.

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.