

CONCORDIA UNIVERSITY

DEPARTMENT OF  
COMPUTER SCIENCE AND SOFTWARE ENGINEERING

COMP 6231, Winter 2023

Instructor: R. Jayakumar

ASSIGNMENT 2

Issued: Feb. 6, 2023

Due: Feb. 20, 2023

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

**Distributed Movie Ticket Booking System (DMTBS) using Java IDL (CORBA)**

In this assignment, you are going to implement the Distributed Movie Ticket Booking System (DMTBS) from Assignment 1 in CORBA using Java IDL. In addition to the 3 customer operations (namely, *bookMovieTickets*, *getBookingSchedule*, and *cancelMovieTickets*) introduced in Assignment 1, the following operation needs to be implemented.

- *exchangeTickets* (*customerID*, *movieID*, *new\_movieID*, *new\_movieName*, *numberOfTickets*)  
A customer might want to exchange *numberOfTickets* of his/her already booked tickets with *movieID* for another movie with *new\_movieID* and *new\_movieName*. In this case, the server (which receives the request from the customer) first checks whether the customer has already booked for *movieID*, then checks with the new area server (on which the new booking has to be made) whether there is available capacity for the new booking *new\_movieName* and *new\_movieID*, and if both checks are successful then atomically books the customer for the new reservation *new\_movieID* and cancels the old booking for *movieID*. That is, the booking and cancel operations should both be successful or none of them should be done. Note that all these checks, booking 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 application in CORBA using Java IDL. Specifically, do the following:

- Write the Java IDL interface definition for the modified DMTBS with all the specified operations.
- Implement the modified DMTBS. 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 *exchangeTickets* 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*: You have to register for a 5–10 minutes demo. Please 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 any aspect of this assignment, feel free to contact your teaching assistants (Lab FI: Anurag Shekhar [anurag.shekhar@mail.concordia.ca](mailto:anurag.shekhar@mail.concordia.ca), Lab FJ: Kiana Nezami [nezami.kiana@gmail.com](mailto:nezami.kiana@gmail.com), Lab FK: Yash Patel [ycpatel1999@gmail.com](mailto:ycpatel1999@gmail.com)). It is strongly recommended that you attend the lab sessions, as various aspects of the assignment will be covered there.