

The architecture of this project centers around utilizing CORBA to facilitate a distributed order management system. The server and client interact remotely via IDL-defined interfaces, providing clear separation and abstraction of services. The IDL file defines a single module, `OrderManagement`, which exposes procedures necessary to manage orders and enforce user roles, namely `Customers` and `Managers`. The IDL definitions include `placeOrder`, `checkOrderStatus`, and an `Order` struct to standardize order details along with a couple additional procedures I added later: `managerLogin`, and `managerDisconnect`.

The server implementation extends the generated `OrderServicePOA` class and manages the logic to store, retrieve, and update order information. I implemented this using a `Hashtable` to store `Order` objects keyed by usernames. As stated, this program, for simplicity, assumes that each username can only have one username associated with it. This is why, I decided that if a username already in the system is provided again, it will overwrite the existing order information. This functionally allows users to modify their orders.

The restriction to a single manager at any given time, is addressed by employing a boolean flag indicating the active status of the manager. Manager clients authenticate through the `managerLogin` method, which checks and toggles this flag accordingly. I added this after compiling the initial IDL file and it was one of the last features I implemented. As such, I ran into some issues with re-compilation and making sure all the class files were up-to-date – briefly getting a `BAD_OPERATION` error that took me a while to debug.

Both user types are implemented in a single client file, and are differentiated based on user role selection for simplicity. This uses the generated stub classes to communicate with the remote server via the ORB, providing role-specific interactions without maintaining multiple codebases. To ensure robustness, I implemented some basic exception handling for invalid inputs and prompting users for retry.

Throughout development, notable challenges included ensuring synchronized access to shared resources like the `Hashtable` for orders and managing the state of the manager session. Additionally, I had some difficulties arise from managing CORBA-related runtime exceptions, particularly concerning client-server communication stability. These issues were managed through connection logic and some exception management within both client and server applications.

Overall, the project's design successfully demonstrates a robust implementation of a distributed system leveraging CORBA technology to effectively manage stateful interactions and enforce role-based restrictions, maintaining data consistency and ensuring reliability across client and server communications. This helped familiarize me with CORBA as a smoother alternative to RPC which I have used in another class before this. I enjoyed working on this project more than the previous one as I was able to easily implement this on my mac rather than rely on a Linux machine with limited resources.