Distributed Systems
Exercise Sheet 6, Monday, 11:45
Klingemann, SS 2022

Deadline: 27th June 2022

3rd Assessed Exercise

1. ActiveMQ

1. Download the file for a binary installation of ActiveMQ (classic) for your operating system. Extract the file.
2. Start ActiveMQ. To do so, you can start a command prompt and switch to the subdirectory `bin` of your installation of ActiveMQ. In this directory you can call `activemq start`.

2. CLASSPATH

The ActiveMQ-library activemq-all-x.x.x.jar (the x describe the version number) has to be contained in the environment variable `CLASSPATH`. If you compile and execute your programs from a command prompt, you can achieve this by executing `cpa.bat` (You have to adjust the path-information so that it fits to your computer.) or you can set this variable in the Windows control panel. If you are using an IDE like Eclipse you have to configure it appropriately.

3. Example programs

Understand the example code and test the programs.

4. Realize a remote method invocation by using JMS

In this task like in Exercise Sheet 4 we want to extend the client and server so that the client can invoke methods on the server and a corresponding return value is delivered to the client. However, in contrast to Exercise Sheet 4, this time the data has to be transported using JMS. Use Point-to-Point for this task.

You have to extend your system for the management of shopping baskets from Sheet 3. Use exactly two shopping basket-objects on the server. The methods offered by the server operate on these objects. Objects of the classes shopping basket and shopping item must only exist on the server and not on the client. The client should be able to invoke three different methods on the shopping basket-objects. The first method is the adding of a new shopping item-object. The client provides the server with the values of the three attributes and gets an acknowledgement as a reply. The second method is the query for the names of all shopping item-objects of the shopping basket (an additional method of the class shopping basket). The third method is the search for an item with a particular name. The client provides the name of the item and gets the price of the item as a reply. The client has to offer the possibility to choose the shopping basket and call one of the three methods. Solve this task by encoding all the different pieces of information that are necessary for the method invocation within a single string. Transport this string by means of a JMS-message. Similarly, you have to transport the return-value.

5. Non-blocking Receiver

Extend your server, so that it is able to receive messages without blocking. For this purpose you should use a `MessageListener`. The server should be able to receive messages until it gets some input from the keyboard.

Organizational issues

- You have to solve the exercise completely on your own! (No working in groups!)
- It is necessary but not sufficient to present a working program. Moreover, you have to be able to explain all parts of your program, be able to answer questions with respect to your program and make small extensions of you program.
- Your program has to be created completely within the exercise slot.
- If you violate one of the rules above, this implies that you definitely fail in this exercise.
- You can only present solutions that correspond to the exercise slot you are assigned to.
- It is in your responsibility to present your solution in time before the deadline. The assessment of your solution can only be guaranteed if you finish your program 60 minutes before the end of the exercises.
- To take part in the exam it is required to solve at least three of five assessed exercise sheets.