

Distributed Systems

Exercise Sheet 5, Monday, 11:45

Klingemann, SS 2022

Deadline: 13th June 2022

2nd Assessed Exercise

1. Date-Service using Java RMI

Understand the example code and test the programs. Client and server can run on the same machine. The nameservice has to be started by means of the rmiregistry command.

2. Distributed system for the management of shopping baskets using Java RMI

Extend your simple system for the management of shopping baskets from Sheet 3 to create a client-server-based system using Java RMI. Therefore, you have to transform the objects of the classes shopping basket and shopping item into remote objects. All shopping basket- and shopping item-objects exist only on the server! For each shopping item there exists a separate object. Similar to the description in Sheet 3, we require that each shopping basket has two private attributes: a name and a set of shopping item objects. This set should represent the shopping items that belong to the shopping basket. (Note that it is a set of objects and not just a number!) Each shopping item has three private attributes: a unique name, a price and a quantity.

A shopping basket have methods with the following functionality. All these methods can be invoked from the client.

- Search for a shopping item with a particular name. You can assume that there exists at most one. The method returns a reference to the corresponding shopping item object.
- Add a shopping item to a shopping basket. The method has three parameters: the name of the item, the price and the quantity. A corresponding shopping item object is created and added to the set of items of the shopping basket
- Return the set of all item objects of the shopping basket. (The return value has to be a collection of references to shopping item objects and not just a number!)
- Return the name of the shopping basket.

A shopping item should have methods with the following functionality. All these methods can be invoked from the client.

- Return the name
- Return the price
- Return the quantity
- Change the quantity

Implement a client that is calling all methods of the objects on the server in a sensible manner. In particular, your client should be able to calculate based on the methods above the total value of all shopping items of a shopping basket. Your application should use two shopping basket objects. The nameservice has to be started by means of the rmiregistry command.

Organisational matters

- 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 your 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.