

Distributed Systems

Exercise Sheet 5, Wednesday, 11:45

Klingemann, SS 2022

Deadline: 8th 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 equity funds and their stocks using Java RMI

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

An equity fund should have methods with the following functionality. All these methods can be invoked from the client.

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

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

- Return the name
- Return the dividend
- 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 quantity of all stocks with a dividend larger than 5. Your application should use two equity fund objects. The nameservice has to be started by means of the rmiregistry command.

Organisatorical 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.