TECHNISCHE UNIVERSITÄT DARMSTADT

TK1: Distributed Systems - Programming & Algorithms

6. Programming Assignment
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Prof. Dr. Max Mühlhäuser
Dr. Immanuel Schweizer

Jens Heuschkel, MSc.
Michael Stein, MSc.

TELEKOOPERATION
Fachbereich Informatik
Hochschulstr. 10
64289 Darmstadt

Task 1 'Snapshot'-Algorithm by Chandy and Lamport (20P)

Implement a distributed account system with three different accounts. The system shall allow for determining its global state by utilizing the 'Snapshot'-algorithm by Chandy and Lamport. The overall system is initialized with a random amount of money and with three accounts. The accounts are to be implemented as separate processes. Furthermore, they randomly send messages to each other: each message contains a random amount of money but must not lead to a negative account balance.

Implement a specific FIFO queue for each communication channel to simulate the communication delays. The queue thus delays the message delivery. For this purpose, you will need a specific thread, which sends the first element of the queue after having slept for a random amount of time. The communication shall be carried out through UDP sockets.

The money transactions shall be visualized in a GUI in a separate process. The GUI shall also allow starting the simulation. The GUI needs to implement three buttons (cf. Figure 1), enabling the sending of a marker message to one of the three processes manually. Sending the message then starts the 'Snapshot'-algorithm. The result of the algorithm shall then be output in an info panel.

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Summary:

- Account system with three processes
- Random account movement without negative account balance
- GUI with info panel (text area) and three buttons.
- Clicking on each button starts the ‘Snapshot’-Algorithm
- The result is shown in the info panel
- Every account movement is shown in the info window

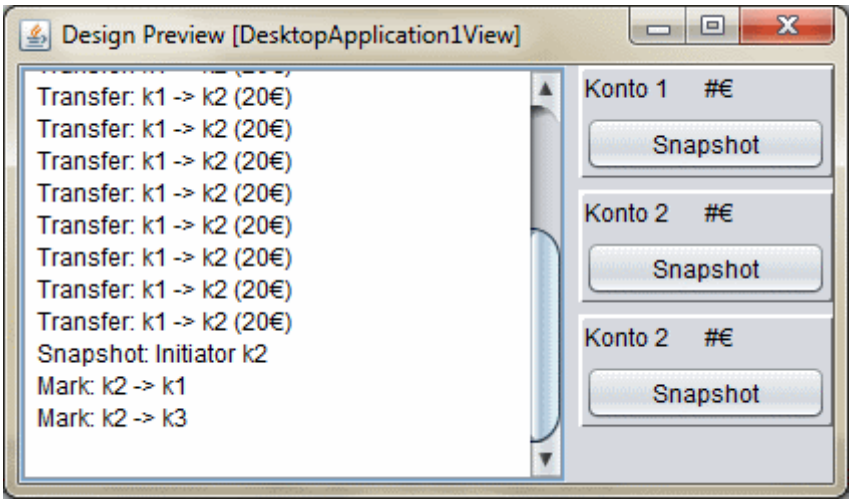

Figure 1: Screenshot of the GUI, which is to be implemented