**TK1: Distributed Systems -
Programming & Algorithms**

**4. Programming Assignment
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Prof. Dr. Max Mühlhäuser
Dr. Immanuel Schweizer

Dr. Benedikt Schmidt
Dipl.-Wirtsch.-Inform. Axel Schulz

TELEKOOPERATION
Fachbereich Informatik
Hochschulstr. 10
64289 Darmstadt

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Task 1 Programming Mandelbrot with TSpaces (20P)

Create an application that calculates the Mandelbrot in distributed manner. The system consists of a SWING-based client and an arbitrary number of workers. The client divides the task and provides job objects in the Tuple Space. The workers take these job objects from the Tuple Space, perform the calculation and put the result back in the Tuple Space. Thereafter the SWING-based client takes the results out of the Tuple Space and presents them. The application implements the following features / internal behavior:

- The client implements a listener. This listener responds if a worker puts a result object in the Tuple Space.
- A colored bar on the left side indicates which worker calculates the corresponding line of the image (cf. illustration 1).
- Multiple simultaneously active clients should be possible.
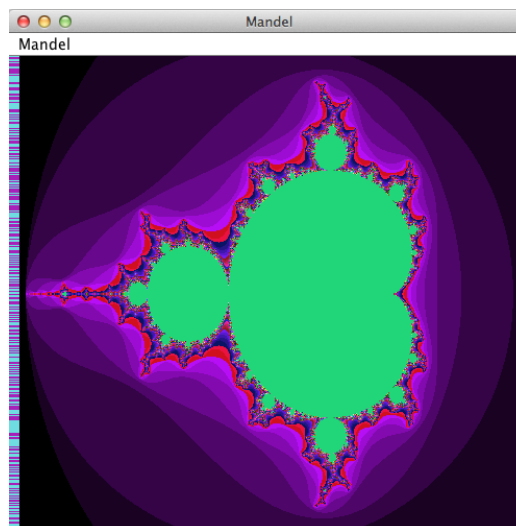- A working Ant script starts the SWING-based client and two workers.

Illustration 1: Example for two workers

Getting Started

Download the TSpaces and Mandelbrot framework from Moodle. To start the TSPaces server, you should unzip tspaces-2.1.2sp3.rar and run "bin\tspaces.bat" or "sh bin/tspaces.sh" (alternatively you can directly start the jar file in the lib directory). If the bat

file runs with error you need to replace the line "if "%TSPACES%" == "" set TSPACES=." With "if "%TSPACES%" == "" set TSPACES=.." in the bat file.
You should also use the Mandelbrot framework.

Grading:

- Basic Requirements: Working ANT Script, starting a client and two workers
- Workers with all capabilities (10 points)
- Client with all features (10 points)