Lab

Exercise 05 „Platforms for Embedded Systems“ Prof. Cochlovius

- Client-Server Using Sockets -

Goal:
During this exercise you will understand Client-Server programming based on sockets. Also you will be learn about Makefile projects in Eclipse.

Exercise 5.1: Setup of a Makefile Project
Create a new C-project as an empty Makefile project in Eclipse. Inside the project directoy create (exactly) the same directory structure as usual, and import into the SRC directory the files **`lab_cs.h, lab_client.c, lab_server.c`** and **`Makefile`**. Now learn about the relevant Makefile functionalities we need in the project (link: http://www.gnu.org/software/make/manual/make.html contains some basic information). In Eclipse, pls. Define the following Make-targets:

all_host: builds lab_client and lab_server on the host
all_target: builds lab_client and lab_server for the target
clean: deletes all *.o-files in the SRC-Verzeichnis (why is this absolutely necessary?)
distclean_host: deletes the *.o-files and the executables for the host
distclean_target: deletes the *.o-files and the executables for the target
lab_client_host: builds lab_client for the host
lab_client_target: builds lab_client for the target
lab_server_host: builds lab_server for the host
lab_server_target: builds lab_server for the target

Now test the various Make-targets and doublecheck all the make activities in the console of Eclipse.

Exercise 5.2: Manual testing
To isolate and prevent operating mistakes in Eclipse, you first want to execute and test lab_client and lab_server manually without Eclipse. In particular, run:
a) both on the host
b) both on the target
c) on executable on the target and the other on the host
Watch and analyze the specific console output of the client. What are your total round-trip delays? What are your network delays?

Exercise 5.3: Using Eclipse for testing
Now you create **launch configurations** in Eclipse used to start up and/or debug the client and the server inside Eclipse. In particular you create configurations:

a) local on host: lab_client and lab_server both run on the host; no debugging
b) local on target: lab_client and lab_server both run on the target; no debugging
c) local client debug on host: lab_client and lab_server both run on the host; debugging of the client

d) local client debug on target: lab_client and lab_server both run on the target;
debugging of the client
e) local client debug on target with server on host: lab_client runs on the target
incl. remote debugging; server runs on the host

Note 1: A launch configuration is an ordered collection of several run and/or debug configurations. Before composing lauch configurations, you first create and test all the basic run and debug configurations, which you require for your launch configs.

Note 2: Of course you want to start the lab_server first (“**launch**”). Then you wait 1-2 secs to allow the server to get ready **(“post launch action”)** and then you can start the lab_client.

Note 3: Even if you terminate the lab_server in Eclipse (little red box) correctly, the IDE still seems to block the socket or the port, which will cause errors when starting the server again (even outside Eclipse) → pls. exit Eclipse and start again.