**DLX SIMULATOR -TUTORIAL**

1. **Simulating an Assembly file**
2. Login to any ***i80labpcXX.ira.uka.de*** directly or using SSH or using X2Go Client. For example login as ***asip04*** into ***i80labpc02.ira.uka.de***
3. Open shell terminal from the start menu. It should be in your default home directory. Go to the directory “***~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis:$***”
4. Set the proper path and parameters in “env\_settings” like dlxsim path, project path and project name.
5. Go to the directory “***~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis/Applications/Arith:$***” and type “***make clean***” clean this directory it there are previously generated files.

asip04@i80labpc04:~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis/Applications/Arith:$make clean

/bin/rm -rf BUILD\_SIM BUILD\_FPGA

asip04@i80labpc04:~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis/Applications/Arith:$ls

1\_Arith.s Makefile

asip04@i80labpc04:~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis/Applications/Arith:$

1. As this application subdirectory contains .s file, you can directly simulate it using “***make dlxsim***” without compiling it. If this application has .c file, then you have to compile it using “***make sim***”. For example to load “***1\_Arith.s***” and using delay slots of 1, use the following parameters. A directory “***BUILD\_SIM***” is created which contains different temporary files and a .dlxsim file to be simulated in dlxsim (in this case it is “***Arith.dlxsim***”).

asip04@i80labpc04:~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis/Applications/Arith:$make dlxsim DLXSIM\_PARAM="-f1\_Arith.s -da0 -pd1"

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Transforming file "1\_Arith.s" for target SIMULATION.

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Assembling/Linking for target SIMULATION:

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Creating combined files.

STACK\_START: 0xFFFFC

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FINISHED ASSEMBLING/LINKING for target SIMULATION.

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Starting dlxsim:

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/Software/epp/dlxsim\_Laboratory/dlxsim -fBUILD\_SIM/Arith.dlxsim -f1\_Arith.s -da0 -pd1

Biggest used address for Text Section (word aligned): 0x1c

Biggest used address for Data Section (word aligned): 0x0

(dlxsim)

1. Then in dlxsim you can use “go” or “step” command to simulate all instructions or each instruction step by step respectively.

(dlxsim) step

stopped after (single) step, pc = \_main+0x04 (0x0004): addi r2,r0,0x9

(dlxsim) step

stopped after (single) step, pc = \_main+0x08 (0x0008): or r3,r1,r2

(dlxsim) get r2

r2: 0x00000009

(dlxsim) go

TRAP #0 received

Altogether 41,0e0(41) cycles executed.

0 Warnings for unresolved data dependencies printed.

0 Warnings for successive load/store commands printed.

0 Warnings for load/stores in the text section printed.

(dlxsim)

1. You can see different statistics using “***stats***” command.
2. Enter “***quit***” command to exit from dlxsim simulator.
3. **Simulating a C file**
4. If the application consists of C files then you can use “***make sim***”, which will compile your application into assembly file and automatically starts dlxsim. The other steps remain the same. Remember, “***make sim***” only works if you have already created CoSy Compiler using “***makeCoSy***”.

asip04@i80labpc04:~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis/Applications/Arith:$make sim

1. You can have different parameter to “***make sim***” like optimization identifier and number of NOPS added for simulating your application in hardware.

asip04@i80labpc04:~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis/Applications/Arith:$make sim COSY\_PARAM=-O3 NUMBER\_OF\_HW\_NOPS=3

1. You can now start dlxsim simulation using following different commands:

asip04@i80labpc04:~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis/Applications/Arith:$make dlxsim COSY\_PARAM=-O3 NUMBER\_OF\_HW\_NOPS=3

OR

asip04@i80labpc04:~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis/Applications/Arith:$make dlxsim DLXSIM\_PARAM="-fBUILD\_SIM/Arith.dlxsim -da0 –pd4"

1. You can save dlxsim simulation output to different file using “***–lf***”, “***–uf***”, or ***“–af***” for LCD, UART or audio respectively as following:

asip04@i80labpc04:~/ASIP\_SS17/Session1/ASIPMeisterProjects/dlx\_basis/Applications/Arith:$make dlxsim DLXSIM\_PARAM="-fBUILD\_SIM/Arith.dlxsim -da0 –pd4 –lfoutput\_dlxsim.txt"