Automatic Placement and Routing using Synopsys IC Compiler

CS250 Tutorial 6 (Version 100609a) October 6, 2009 Yunsup Lee

This is an early version of tutorial 6 which is not done yet. In this tutorial you will gain experience using Synopsys IC Compiler to probe your design.

The following documentation is located in the course locker (~cs250/docs/manuals) and provides additional information about Design Compiler, Design Vision, the Design Ware libraries, and the Synopsys 90nm Standard Cell Library.

- icc-user-guide.pdf IC Compiler Implementation User Guide
- icc-quick-reference.pdf IC Compiler Quick Reference
- icc_dp-user-guide.pdf IC Compiler Design Planning User Guide
- synopsys-90nm-databook-stdcells.pdf Digital Standard Cell Library Databook
- synopsys-90nm-databook-memories.pdf Memory Databook
- synopsys-90nm-databook-opensparc.pdf OpenSparc Megacell Databook

Getting started

Before using the CS250 toolflow you must run the course setup script with the following command.

% source ~cs250/tools/cs250.bashrc

Reporting the Total Area

Run IC Compiler using the following commands. If you have already place and routed your design, you can skip the **make** command.

```
% cd $TUT6_ROOT/build/icc-par/current-icc
% make
% icc_shell
icc_shell> source icc_setup.tcl
icc_shell> open_mw_lib $MW_DESIGN_LIBRARY
icc_shell> open_mw_cel $ICC_CHIP_FINISH_CEL
icc_shell> report_area -hierarchy
```

Highlighting the Hierarchy

Run IC Compiler using the following commands.

% cd \$TUT6_ROOT/build/icc-par/current-icc % icc_shell icc_shell> source icc_setup.tcl icc_shell> gui_start

Then open your chip_finish_icc cell by following the steps. First, start with File > Open Design.

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Select chip_finish_icc.

Choose Placement > Color by Hierarchy. Then hit Reload. Pick Color Specific hierarchical cells. Then select the button on the most right which is for Browse for cells. Pick your register file and ALU from the list.

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Now you will get highlighted cells from your design.

Acknowledgements

Many people have contributed to versions of this tutorial over the years. The tutorial was originally developed for 6.375 Complex Digital Systems course at Massachusetts Institute of Technology by Christopher Batten. Contributors include: Krste Asanović, John Lazzaro, Yunsup Lee, and John Wawrzynek. Versions of this tutorial have been used in the following courses:

- 6.375 Complex Digital Systems (2005-2009) Massachusetts Institute of Technology
- CS250 VLSI Systems Design (2009) University of California at Berkeley