Introduction

Design and Design Automation in the Undergraduate Curriculum
Education Through Design

✔ Learn by Doing, not by Memorizing

✔ Motivation for Principles Becomes Clear

✔ Reinforce Lecture Material

✔ Integrate Isolated Lecture Topics
Integrating Design

- Simulation is Needed to Reduce the Time Required for Individual Projects
- Some Re-Orientation of Course Material is Required
- Design Automation Software is Required
- Some New Courses Should be Offered
Essential Areas in Hardware

- Logic Design
- Computer Architecture
- Digital System Design
- FPGA Design
- CMOS Design
- PCB Design
- Design Automation
Why Design Automation?
Because ...

- Modern Design is Impossible Without Design Automation
- Design Automation is a Mature Area with Many Well-Defined Principles
- Design Automation is a Fruitful Research Area for Computer Scientists
- Design Automation Positions are in High Demand
Relationships

- DESIGN AUTOMATION
  - Existing Computer Science Courses
  - New Courses
DA ==> Existing Courses

Tool Projects

Logic Design

Computer Architecture

VLSI Design

Logic Synthesis

ROM Tools

Routing Tools
DA ==> New Courses

Tool Projects

Design Automation

FPGA Design

Analyze Tools

Design Mapping
Today and Tomorrow

✔ Today
  - FHDL & Introduction to Design Automation
  - How to put together a DA Course
  - FHDL Practice

✔ Tuesday
  - Logic Design and Computer Architecture
  - Intro to Visual Basic/DLL Programming
  - Visual Basic Practice
  - Laboratory Exercises
The Rest of the Week

✔ Wednesday
  – How to Design an FPGA Course
  – Digital Design Using FPGAs
  – XILINX Tools & Practice I
  – XILINX Tools & Practice II

✔ Thursday
  – XILINX Tools & Practice III
  – How to put together a CMOS VLSI Course
  – Introduction to Design Tools
  – Lab with Tools
Break Time!
Introduction

Design and Design Automation in the Undergraduate Curriculum
Education Through Design

✔ Learn by Doing, not by Memorizing

✔ Motivation for Principles Becomes Clear

✔ Reinforce Lecture Material

✔ Integrate Isolated Lecture Topics
Integrating Design

✔ Simulation is Needed to Reduce the Time Required for Individual Projects
✔ Some Re-Orientation of Course Material is Required
✔ Design Automation Software is Required
✔ Some New Courses Should be Offered
Essential Areas in Hardware

✔ Logic Design
✔ Computer Architecture
✔ Digital System Design
✔ FPGA Design
✔ CMOS Design
✔ PCB Design
✔ Design Automation
Why Design Automation?
Because ...

✔ Modern Design is Impossible Without Design Automation
✔ Design Automation is a Mature Area with Many Well-Defined Principles
✔ Design Automation is a Fruitful Research Area for Computer Scientists
✔ Design Automation Positions are in High Demand
Relationships

DESIGN AUTOMATION

Existing Computer Science Courses

New Courses
DA ==> Existing Courses

Tool Projects

- Logic Design
- Computer Architecture
- VLSI Design

- Logic Synthesis
- ROM Tools
- Routing Tools
DA ==> New Courses

- Tool Projects
  - Analyze Tools
  - Design Mapping
- Design Automation
- FPGA Design
Today and Tomorrow

✔ Today
  – FHDL & Introduction to Design Automation
  – How to put together a DA Course
  – FHDL Practice

✔ Tuesday
  – Logic Design and Computer Architecture
  – Intro to Visual Basic/DLL Programming
  – Visual Basic Practice
  – Laboratory Exercises
The Rest of the Week

✔ Wednesday
  – *How to Design an FPGA Course*
  – *Digital Design Using FPGAs*
  – *XILINX Tools & Practice I*
  – *XILINX Tools & Practice II*

✔ Thursday
  – *XILINX Tools & Practice III*
  – *How to put together a CMOS VLSI Course*
  – *Introduction to Design Tools*
  – *Lab with Tools*
Break Time!