ECE 298: System-on-Chip Description and Modeling Lecture 8

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Lecture 8: Overview

- Homework Assignment 4
  - Tasks, Discussion
- Modeling with SystemC SLDL
  - SystemC Overview
  - Introduction to SystemC
    - Presentation by Stuart Swan, Cadence
  - SystemC 2.0 Tutorial
    - Presentation by Thorsten Groetker, Synopsys

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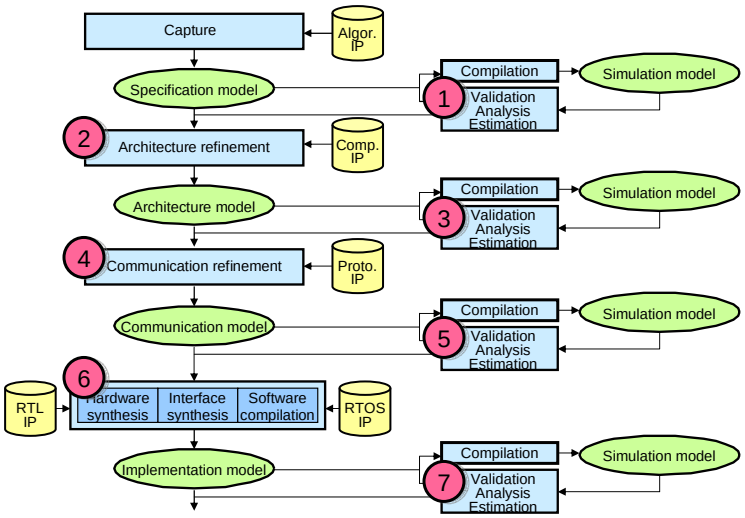
Homework Assignment 4

- Tasks
  - Task 1: Choose design example:
    - Option 1: MPEG-Audio Decoder (from previous homework)
    - Option 2: GSM Vocoder (from SCE tutorial)
  - Task 2: Design Space Exploration with SCE
    - Use different number and type of PEs
      - SW: Motorola DSP56600, Motorola Coldfire, Toshiba TX49
      - HW: Standard custom HW block
      - Memories: Motorola Coldfire Memory, Samsung KM684002
    - Use different clock frequencies (power savings!)
    - Use different mappings (behaviors to PEs, variables to memories)
    - Use different scheduling schemes (dynamic vs. static)
    - Estimate the performance and cost for each option
  - Task 3: Design Refinement with SCE
    - Generate the “best” system architecture for the design
    - Use straightforward communication, HW, SW design
  - *Note/store all results for the final report!*

Homework Assignment 4



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SystemC Overview

- Goals
  - Common C++ Modeling Platform
    - System Level Design
    - HW/SW Codesign
    - RTL
  - Seamless Co-Simulation of HW and SW
  - IP Reuse
  - Free licensing, Open Source
  - De-facto Standard
- Open SystemC Initiative (OSCI)
  - Consortium of many EDA companies
    - Synopsys, Cadence, CoWare, Frontier, ...
  - Open Community (very large!)

SystemC Overview

- Language
  - C++ class library (layered SW architecture)
  - Hierarchy of Modules connected by Ports
  - Communication via Interfaces and Channels
  - Discrete-Event Simulation
- Methodology
  - Untimed Model
  - Transaction-level Model
  - Bus-functional Model
  - Cycle-accurate Model

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Introduction to SystemC

- Presentation by Stuart Swan, Cadence, 2002
  - Goals and Requirements
  - History and Organization
  - Versions, Contents, Coverage
  - Language Architecture
  - Modeling, Models of Computation, Examples
  - Communication Refinement
  - Outlook

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SystemC 2.0 Tutorial

- Presentation by Thorsten Groetker, Synopsys, 2001
  - Motivation
  - Models of Computation
  - Model of Time
  - Communication, Interfaces and Channels
  - Platform Modeling
  - Transaction-level Model, Examples
  - Benefits
  - Summary