

EngrECE 298
System-on-Chip Description and Modeling
Spring 2004

Assignment 5

Posted: June 4, 2004 (week 9)
Due: June 17, 2004 (final week)

Task: Technical Report on SoC Specification and Exploration

Instructions:

The goal of this assignment is to wrap up the contents of this class in a technical report that summarizes the specification and implementation of a System-on-Chip design example. While the report should focus on the description and modeling of the specification model, it should also describe the design flow and exploration steps that have been used to create the implementation model at the cycle-accurate level.

Naturally, the report should describe the steps taken and lessons learned from the design model used in the previous assignments, i.e. the MPEG-Audio Decoder (or, the GSM Vocoder).

Guidelines:

The following skeleton may serve as a starting point to structure the report.

0. Title page
 - Title, authors, date
1. Introduction to SoC Design
 - a. Challenges of SoC Design
 - General SoC issues, problems and goals
 - b. SoC Specification
 - Specification capture and modeling, goals
 - c. SoC Exploration
 - Design flow, stages, exploration cycles
2. Design Example
 - a. Description of the design example
 - Background, area, algorithm, features
 - b. Source
 - Origin, C code, properties
 - c. Design considerations
 - Design constraints, requirements, goals

3. Specification capture
 - a. Testbench
 - Structure, conversion from C code, validation
 - b. Design Under Test
 - Structure, hierarchy, parallelism, communication, properties, ...
4. Design space exploration
 - a. System architecture
 - Number and type of PEs, mapping
 - b. Scheduling
 - Dynamic vs. static scheduling (if applicable)
 - c. Communication architecture
 - Bus allocation, mapping (if applicable)
5. Implementation
 - a. Software implementation
 - Code generation (if applicable)
 - b. Hardware implementation
 - Behavioral and RTL synthesis (if applicable)
 - c. Cycle-accurate model
 - Final model, properties
6. Conclusion
 - Concluding remarks, lessons learned
7. References
 - Applicable literature

Note that the outline above is just a general template. Feel free to adjust it according your taste and needs!

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