Final Paper Survey Report

Final Paper Survey Report

- Now, it is your turn to contribute!
- Make a report of survey and present to all the classmates
- 2—3 people/group (the same as project group)
- Read documents/papers about **ESL and SoC Design**
- (Bonus) verification with ESL tools you have learned or other tools
- (Bonus) design some labs for future students

Recommended Topics

- UML for ESL
- Optimal design of bus matrix
- System-level power estimation and low power design
- Introduction to embedded OS
- Hardware/software co-design
- High-level synthesis
- OCP-IP and OVP
- System emulation and verification
- GreenSoCs project
- Deep survey about TLM 2.0
- New EDA tools for ESL
- New ARM SoC architecture
- Survey on emerging memory systems
- System-in-packaging, advanced packaging technology
- Other related topics

Possible References

- **UML for ESL**
  - There is a book, UML-SystemC晶片設計實務 written by邱郁惠
  - Mueller et al., "UML for ESL design: basic principles, tools, and applications," *Proceedings of the 2006 IEEE/ACM international conference on Computer-aided design*, pp. 73-80, 2006.
- **Optimal design of bus matrix (especially with AXI or advanced AMBA)**
  - S. Pasricha, Y.-H. Park, F. J. Kurdahi, N. Dutt, "System-Level Power-Performance Trade-Offs in Bus Matrix Communication Architecture Synthesis," *Proc. CODES+ISSS'06*, 2006.
  - S. Pasricha, N. D. Dutt, and M. Ben-Romdhane, "BMSYN: Bus Matrix Communication Architecture Synthesis for MPSoC," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 26, no. 8, Aug. 2007.
- **Introduction to embedded OS (not recommended)**
  - eCos, Linux, uC/OS-II, RT-Linux, MeeGo, iOS, **Android**

Possible References

- **System-level power estimation and low power design**
  - E. Macii, M. Pedram, and F. Somenzi, "High-level power modeling, estimation, and optimization," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 17, no. 11, pp. 1061 - 1079, 1998.
  - P. Landman, "High-level power estimation," *Proc. International Symposium on Low Power Electronics and Design*, pp. 29-35, 1996.
  - L. Benini and G. de Micheli, "System-level power optimization: techniques and tools," *ACM Transactions on Design Automation of Electronic Systems (TODAES)*, vol. 5, no. 2, pp. 115-192, April 2000.
  - D. Brooks, Vivek Tiwari, and Margaret Martonosi, "Wattch: a framework for architectural-level power analysis and optimizations," *Proceedings of the 27th annual international symposium on Computer architecture (ISCA'00)*, 2000.

Possible References

- **Fast Models (available from CIC)**
- **Hardware/software partition**
  - Read the book, *Reading in Hardware/Software Co-Design*
- **High-level synthesis**
  - Mentor Graphics: Catapult C
  - Synopsys: Synphony C compiler
  - Cadence: Stratus (Available from CIC)
  - R.K. Gupta and G. De Micheli, "Hardware-software cosynthesis for digital systems," *IEEE Design & Test of Computers*, vol. 10, no. 3, pp. 29-41, 1993.
  - R. Ernst, J. Henkel, and T. Benner, "Hardware-software cosynthesis for microcontrollers," *IEEE Design & Test of Computers*, vol. 10, no. 4, pp. 64-75, 1993.
  - R. Ernst, "Codesign of embedded systems: status and trends," *IEEE Design & Test of Computers*, vol. 15, no. 2, pp. 45-54, 1998.

Possible References

- **System emulation with ALDEC HES-DVM**
  - http://www.aldec.com/en/products/emulation/hes-dvm
- **OCP-IP and OVP**
  - http://www.ocpip.org/
  - http://www.ovpworld.org/
- **GreenSoCs project**
  - http://www.greensocs.com/
- **IP-XACT and Kactus2**
- **New EDA tools for ESL**
  - IDE for SystemC
  - OpenTLM
  - Verification tools for SystemC
  - …
- **Deep survey about TLM 2.0**
  - Lab design?

Possible References

- New ARM SoC architecture
  - ARM processor technologies
    - ARM architecture v8
    - …
  - AMBA 4.0/5.0: AXI, ACE
  - ARM's platform for different applications
  - ARM CoreLink CCI-400
  - TrustZone and hardware security
  - …
- New computing platforms for AI
  - Intel Movidious
  - ARM DynamIQ
  - NVIDIA Deep Learning Accelerator
  - CEVA NeuPro
  - TPU
  - …

Action Items

- Proposal (1 A4 page)
  - Due: 5/24
    - To sychien@ntu.edu.tw
    - with subject MSoC final paper survey proposal
  - Topics
  - Descriptions
  - List of reference papers/book
  - List of group members
  - Preferred day and duration for presentation and why
- Oral presentation
  - ~20min/on-request
  - 6/14, 6/21 → Need to change to another day, maybe 6/15
- Deliver the PowerPoint files and related files
  - 6/21
  - To sychien@ntu.edu.tw
  - With Subject: MSoC final paper survey report: group X