EEL 5764 Computer Architecture

Sandip Ray
Department of Electrical and Computer Engineering
University of Florida

Lecture 13: Projects

Project and Term Paper

- **You can do an implementation project or a survey**
  - →Implementation involves closer look at one of the topics discussed in class
  - →Survey involves studying and learning a topic not covered in class
  - →**Surveys will be graded stricter than implementations**
- **In any case you must turn in:**
  - →A proposal, explaining what you want to do and why
  - →A presentation
  - →A final report
- **Look at Canvas announcement for more details**

Logistics and Grade Division

- Proposal: 10%
- 10-minute Presentation (with Demo): 60%
- Final Report: 30%

Dates:

- Proposal: 09/26/2018 4am through Canvas
- Presentation: Nov 18-22
- Final Report: Dec 6 (4am)

Deadlines will be strictly enforced.

Suggested Topics -- Implementation

- Implementation and comparison of two cache prefetching schemes
- Implementation of two-level on-chip caching and study of the effect of various parameters (e.g., associativity, cache size, block size, etc.)
- Implementation of TLB and evaluation of its effect on cache performance
- Implementation and comparison of different branch prediction schemes
- Implementation and study of the effect of history length on prediction results
- Implementation and comparison of two static code scheduling schemes to exploit ILP
- Implementation and comparison of victim cache and skewed associative cache
- Implementation and comparison of in-order vs. out-of-order instruction execution
- Implementation and study of speculative execution
- Implementation and comparison of page replacement policies
- Implementation and comparison of two cache write policies

Suggested Topics -- Survey

- Survey of energy efficient processor design
- Survey of different nonvolatile memory technologies
- Survey of architecture features for microarchitecture validation
- Survey of microarchitecture correctness statements and verification techniques
- Survey of architectures for deep learning
- Survey of automotive system architectures
- Survey of network on chip architectures
- Survey of quantum computer architectures
- Survey of high-performance computers

Suggested Topics – Advanced Hacking

- An implementation study of register renaming logic
- An implementation study of phase prediction
- An implementation study of efficient ISA encoding
- An implementation study of virtual cache

Project Notes

- **You can do implementation project on top of SimpleScalar architectural simulator**
  - →We will post some basic resources on SimpleScalar
  - →But you can choose your own platform too
- **Your proposal should include proposed experimental platform**
- **Think carefully about what you propose**
  - →It should be doable within a month's effort
  - →It should require a month's effort
- **At any point in the project if you need help, come to us**