Lecture 4
Simulation

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Scientific Research

- Take hypothesis about environment
- Design experiment
- Run experiment and quantify
- Interpret results
- If necessary, create new hypothesis
Architecture Research

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- Run experiment and quantify – run model or measure hardware
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Architecture Research

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- Design Experiment - pick baseline design and workload
- Run experiment and quantify – run model or measure hardware
- Interpret results
- If necessary, propose new design
Simulator wars

Photos from wikipedia
Simulation Tradeoffs
Modeling Approaches

- Hardware measurement

- Prototyping
  - Hardware

- Simulation
  - Software
  - Hardware

- Emulation
  - Software
  - Hardware

What are the basic strengths and weaknesses of each approach?
Techniques

- Parallelization
- Modularization
- Split functional/timing
  - Timing-directed vs Functional-directed
- Split behavior/timing
- Hardware-only
  - Time-division multiplexing
  - “Transplanting”