

525.712 Advanced Computer Architecture

Charles B. Cameron
Engineering for Professionals
Whiting School of Engineering
Johns Hopkins University

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Date	Lecture Topics
27 January 2010	<ul style="list-style-type: none">• Review of instruction set design, principles of measuring processor performance, instruction-level processing, and pipelined processor design.
3 February 2010	<ul style="list-style-type: none">• Review of hierarchical memory systems, including cache memories, virtual memory, and input/output systems.
10 February 2010	<ul style="list-style-type: none">• Canceled due to inclement weather.
17 February 2010	<ul style="list-style-type: none">• Superscalar processor design, including limits on throughput of scalar pipeline and the organization of superscalar pipelines.• Quiz 1
24 February 2010	<ul style="list-style-type: none">• Branch prediction, register reuse, register renaming, Tomasulo's algorithm, memory data flow techniques.
3 March 2010	<ul style="list-style-type: none">• Case studies: the PowerPC and the Intel P6
10 March 2010	<ul style="list-style-type: none">• Midterm exam

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17 March 2010	<ul style="list-style-type: none"> • Spring break: class held as usual • Static branch prediction techniques: single-direction prediction, backwards taken/forwards not-taken, Ball/Larus heuristics, profiling.
24 March 2010	<ul style="list-style-type: none"> • Dynamic branch prediction techniques: basic algorithms, tournament predictor, static predictor selection, multihybrid predictor.
31 March 2010	<ul style="list-style-type: none"> • Advanced register data flow techniques: value locality, redundant execution, instruction reuse, speculation. • Quiz 2
7 April 2010	<ul style="list-style-type: none"> • Multiprocessor systems: fully shared memory, memory coherence, cache coherence, synchronization of multiple memories.
14 April 2010	<ul style="list-style-type: none"> • Multithreaded processors: fine- and coarse-grained multithreading; resolution of control, register, and memory data dependencies; fault detection; prefetching, branch resolution. • Quiz 3 • Term paper due • Student research presentations (2).
21 April 2010	<ul style="list-style-type: none"> • Student research presentations (7).
28 April 2010	<ul style="list-style-type: none"> • Student research presentations (7).
5 May 2010	<ul style="list-style-type: none"> • Final exam