Architecture Comprehensive Exam

The comprehensive exam in Architecture will be drawn from the topic areas in ECS 201A. Below is an expanded list of topic areas that may be included in the exam.

Technology
  The interaction of architecture and technology
  The problem with power
  What about reliability?
  Technology trends, challenges, costs

Performance
  How it is defined, measured, and reported
  Improving performaince

Instruction Sets
  Fundamental Questions:
    What operations should be performed?
    How many operations per instruction should there be?
    Where are the operands?
    How big are the operands, and what do they represent?
    How best should all this be encoded?

  Compilers
    What is goal of compiler?
    What are goals of user?
    How does compiler accomplish goals?

Pipelining
  What it is, why it is interesting
  Challenges to pipelining
    Hazards
    Dealing with Hazards
  Interrupts and pipelining
    Precise
    Imprecise
    What happens when multiple ones happen simultaneously?

Instruction level parallelism (ILP)
  What ILP is, what it attempts to exploit
  Different approaches to ILP
    Superscalar
    VLIW
  Limits to ILP

Data level parallelism
  What it is, different ways to exploit it

Thread level parallelism
  What it is
  Detailed understanding of shared memory processors
    Advantages, disadvantages, etc.
  Detailed understanding of message passing processors
    Advantages, disadvantages, etc.

Warehouse computing
  What it is, why it is interesting

Memory Heirarchy
  What is the point of the memory heirarchy?
  Thorough understanding of caching
    Cache optimizations, why they work
  Virtual Memory (VM)
  Interaction of cache and VM
  Memory technology and optimizations

Exam based on material in textbook:

Hennessy and Patterson, "Computer Architecture: A Quantitative Approach",
Morgan Kaufmann (5th edition)