

## CS 211 – Fact Sheet/FAQ for Doctoral Prelim Exam

- What topics/materials are covered in the computer architecture core area ?
  - To successfully pass this area exam, a student is expected to know fundamental concepts from computer organization and computer architecture.
  - Topics in Computer Organization include basics of processor design, Boolean arithmetic, design of arithmetic logic units and switching circuits, and basics of memory and I/O.
  - Topics in Computer Architecture include design of advanced processors – principles of pipelined processors, Instruction level parallel (ILP) processors and high performance processors (superscalar and EPIC/VLIW); design of memory hierarchy including cache systems; instruction set architectures (ISA) of high performance processors, limiting factors in ILP processors and solutions; software support and solutions for ILP processors including compiler support; multiprocessor systems and issues related to multiprocessing; networked computers and parallel processing principles.
- How should I prepare for this area and what books should I read ?
  - Preparing for the computer architecture area implies reviewing your undergraduate material in computer organization as well as material from graduate courses in computer architecture.
  - Since the exam may cover a number of topics, it is essential that you cover all the fundamental concepts in this area.
  - There are a large number of books that cover the topics mentioned above. As a starting point (i.e., the minimum reading requirement) you may reference the material from the two books by Hennessy and Patterson.
    - Computer Architecture: A Quantitative Approach, 3<sup>rd</sup> Edition, John Hennessy and David Patterson, Morgan Kaufman Publishers.
    - Computer Organization and Design: Hardware/Software Interface, 2<sup>nd</sup> or 3<sup>rd</sup> edition, David Patterson and John Hennessy, Morgan Kaufman Publishers.
- What format and time will the problems be ?
  - A problem in the architecture area will be expected to take one hour to solve in the average case.
  - A problem typically (but not always) consists of multiple parts, with each part addressing one (or more) specific topic(s). Thus, each problem is expected to cover a number of topics in the area.
  - The questions may require both quantitative and qualitative answers.

- Usually you are not expected to memorize all the details of any specific architecture. Specific details, if needed in order to answer the question, will be provided in the question.