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14ELD41

Fourth Semester M.Tech. Degree Examination, Dec.2016/Jan.2017
Advanced Computer Architecture

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1
 - a. Define what is computer architecture. Illustrate the seven dimensions of an Instruction Set Architecture (ISA). (10 Marks)
 - b. Explain the performance equation using CPU time, clock rate, CPU clock cycles for a program and CPI. (10 Marks)
- 2
 - a. Describe the highlights of the Pentium 4 micro architecture and examine its performance for the SPEC CPU benchmarks. (10 Marks)
 - b. Explain Fallacies and pit falls of Instruction level parallelism, its exploitation and limits on ILP. (10 Marks)
- 3
 - a. In the design of memory hierarchies, describe three topics in cross cutting issues. (10 Marks)
 - b. What is Queuing Theory? With reference to queuing theory, explain Little law and equation for Server Utilization. (10 Marks)
- 4
 - a. Discuss detecting and enhancing Loop Level parallelism VLIW. (10 Marks)
 - b. Explain Hardware support for exposing parallelism of predicated instructions. (10 Marks)
- 5
 - a. Explain the intel IA – 64 Architecture and Itanium processor. (10 Marks)
 - b. Explain Hardware support for memory reference speculation. (05 Marks)
 - c. Consider the following code fragment from an if – then – else statement of the form
 if (A = 0) A = B ; else A = A + 4 ;
 where A is at O(R₃) and B is at O(R₂) :
 LD R1, O(R3) ; Load A
 BNEZ R1, L1 ; test A
 LD R1, O(R2) ; then clause
 J L2 ; skip else
 L1 : DADDI R1, R1, # 4 ; else clause
 L2 : SD R1 O(R3) ; store A.
 Assume the then clause is almost always executed. Compile the code using compiler based speculation. Assume R14 is unused and available. (05 Marks)
- 6
 - a. Explain characteristics of scientific applications. (10 Marks)
 - b. Explain Synchronization mechanisms for larger – scale multiprocessors. (10 Marks)
- 7
 - a. Explain the protection of virtual memory and virtual machines. (10 Marks)
 - b. Explain the requirement of a virtual machine monitor. (10 Marks)
- 8
 - a. Explain Carry Skip Adder and Carry Select adder with figure. (10 Marks)
 - b. Draw a neat diagram of an array multiplier and explain a simple array multiplier for multiplying two 5 – bit numbers. Using three CSAs and one propagate adder. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any scribble or modification of paper, candidates and questions, will be equitably reflected in the final marks.