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14ELD41

Fourth Semester M.Tech. Degree Examination, June/July 2018

Advanced Computer Architecture

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. List the classes of computers. Explain the seven dimensions of ISA. (10 Marks)
b. Explain the four important technologies which have led to the improvements in computer system. (10 Marks)
- 2 a. Assume a disk subsystem with the following components and MTTF.
i) 10 disks, each rated at 1,000,000 hour MTTF
ii) 1 SCSI controller 500,000 hour MTTF
iii) 1 power supply 200,000 hour MTTF
iv) 1 Fan 200,000 hour MTTF
v) 1 SCSI cable 1,000,000 hour MTTF.
Using the simplifying assumptions that the life times are exponentially distributed and that failures are independent, compute the MTTF of the system as a whole. (05 Marks)
b. Find the number of dies per 200 cm wafer of a circular shape that is used to cut dies that are 1.5 cm side. Compare the number of dies produced on the same wafer if dies size is 1.25 cm side. (05 Marks)
c. Explain how the pipeline is implemented in MIPS. (10 Marks)
- 3 a. Define ILP and CPI for a pipeline processor. List the techniques and what component of overall CPI, a reduces? (10 Marks)
b. Explain the 3 possible data hazards. (06 Marks)
c. Discuss on the 4 recent multiple issue processors. (04 Marks)
- 4 a. With a neat diagram explain the levels in a typical memory hierarchy in embedded, desktop and server computers. (05 Marks)
b. Explain the six basic cache optimization techniques. (10 Marks)
c. List the three steps to improve the performance of virtual machines. (05 Marks)
- 5 a. Discuss the relation between faults, errors and failures. (10 Marks)
b. Explain importance of a little queuing theory and derive Little's law. (10 Marks)
- 6 a. What are the dependences between S1 and S2 in the given loop? Is the loop parallel? If not show how to make it parallel.
for (i = 1; i <= 100; i = i + 1)
{ A[i] = A[i] + B[i]; /*S1*/
B[i] = C[i] + D[i];} /*S2*/ (10 Marks)
b. Explain the architecture of Itanium 2 processor. (10 Marks)
- 7 a. Explain the performance metrics in hardware communication mechanism. (10 Marks)
b. Discuss the advantages of message passing communication. (10 Marks)
- 8 a. List the system issues relative to integer arithmetic and explain the floating point addition. (10 Marks)
b. Use the floating point addition algorithm to compute $(-1.001_2 \times 2^{-2}) + (-1.111_2 \times 2^0)$. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.