$\mathbf{R07}$ 

## IV B.Tech I Semester Examinations, May 2011 ADVANCED COMPUTER ARCHITECTURE **Computer Science And Engineering**

Time: 3 hours

Code No: 07A70504

Max Marks: 80

#### Answer any FIVE Questions All Questions carry equal marks \*\*\*\*

- 1. (a) What do you mean by the "hot swapping"?
  - (b) Explain "mirroring".
  - (c) Explain the block interleaved parity and distributed block interleaved parity. [6+5+5]
- 2. What is a cluster? Explain about the designing of a cluster with an example. [16]
- 3. What are the decisions and transformations that we had to make to obtain final unrolled code? Discuss. [16]
- 4. (a) How are conflict misses reduced? (b) What is Write back and write through cache? [8+8]
- 5. What are the disadvantages of statically scheduled pipelining? Suggest a techinque which over comes these disadvantages. 16
- 6. Discuss in detail conditional branch operations? Give examples for each? [16]
- 7. Explain measuring and Reporting performance in computer design. [16]
- 8. (a) Explain how to convert thread level parallelism into instruction level parallelism.
  - (b) List the disadvantages of coherence implemented in software. [8+8]

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- Distinguish between parallelism and pipelining. [16]
  (a) Write about block replacement strategies. (b) Explain how write policies distinguish cache designs. [9+7]
   (a) Discuss about working set effect. (b) Discuss write invalidation protocol with an example. [8+8]
   (a) Write a detailed notes on register-register architecture. (b) Give a note on little endian format. [12+4]
- 5. (a) Explain briefly about interconnection media.
  - (b) Suppose you have 25 magnetic tapes each containing 40GB assume that you have enough tape readers to keep in a network busy. How long will it take to transmit the data over a distance of 1km? Assume the choice or category 5 twisted pair wires at 100M bits/sec, multi mode fibre at 1000M bits/sec and single mode fibre at 2500M bits/sec. How do they compare to deliver the tapes by a car? [8+8]
- 6. (a) Give the relation between the throughput and response time.
  - (b) Derive the Little's law for calculating the mean number of tasks. [8+8]
- Show how the loop would look on MIPS, both scheduled and unscheduled, including any stalls or idle clock cycles, schedule for delays both for floating point operations.
   [16]
- 8. What is parallelism? Discuss the need for parallelism? What are the advantages of parallelism. Explain with examples. [16]

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[8+8]

[8+8]

[16]

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- 1. (a) Draw the diagram of a bus read transaction. Explain the actions.
  - (b) What do you mean by direct memory access? Explain how it works. [8+8]
- 2. Write short notes on:
  - (a) SPEC.
  - (b) Learning curve.
- 3. (a) Mention the two groups of MIMD computers and explain.
  - (b) Give the advantages of shared memory organization.
- 4. Give the reasons for emergence of general purpose resisters? What are the advantages and disadvantages of general purpose register computers [16]
- 5. (a) What are the limitations of window size?
  - (b) Give a note on register renaming. [8+8]
- 6. (a) Define the performance parameters of the interconnection networks.
  - (b) Assume a network with a bandwidth of 1000M bits/sec has a sending overhead of 80microsec and receiving overhead of 100microsec. Assume two machines one wants to send a 10,000byte message to the other [including header] and a message format allows 10,000bytes in a single message. calculate the total latency to send a message from one machine to another in a SAN. Assuming they are 10m apart. [8+8]
- 7. (a) Compare the three methods of reducing cache miss penalty/miss rate via parallelism.
  - (b) Define
    - i. Virtual Cache
    - ii. Process Identifier Tag
    - iii. Antialiasing
    - iv. Page Colouring. [8+8]
- 8. Explain VLIW approach.

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[16]

[6+6+4]

[6+6+4]

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- 1. Write notes on out-of-order execution.
- 2. Write about
  - (a) Memory mapped I/O
  - (b) Interrupt driven I/O
  - (c) Polling.

3. What are the different basic variations in instruction encoding? Explain. [16]

- 4. (a) Give the types of "Conflict misses"
  - (b) Which principle of locality does the first miss rate reduction technique address? Explain why? [8+8]
- 5. Clearly bring out the difference between hardware and software speculation mechanism. [16]
- 6. (a) What is the difficulty of spin lock implementation? How can it be eliminated?
  - (b) Explain how to reduce the contention is barrier implementation.
  - (c) What is meant by queuing lock?
- 7. (a) Define transport latency. Express total latency algebraically.
  - (b) Assume a network with a bandwidth of 1000M bits/sec has a sending overhead of  $80\mu$ s and receiving overhead of  $100\mu$ s. Assume 2 machines one wants to send a 10,000byte message to the other [including header] and a message format allows 10,000bytes in a single message. Compare SAN, LAN and WAN by changing the distance between the machines. Calculate the total latency to send a message from one machine to another in a SAN. Assuming they are 10m apart. Next, perform the same calculation but assume the machines are now 500m apart, as in a LAN. Finally assume they are 1000km apart as in a WAN. [6+10]
- (a) Find the die yield for dies that are 1cm on a side and 0.7 on a side assuming a defect density of 0.6 per cm<sup>2</sup>.
  - (b) Give a brief note on significance of parallelism. [8+8]

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