

Ex/CSE/T/425B/2017 (Old)

BACHELOR OF COMPUTER SCIENCE AND ENGINEERING 4TH YEAR EXAMINATION, 2017
(2ND Semester Old)

PARALLEL AND HIGH PERFORMANCE COMPUTING

Time : Three hours

Full Marks : 100

Answer any *five* questions

1. (a) What is the difference between computer architecture and organization?
(b) What are the different levels of parallelism?
(c) Explain Flynn's classification.
(d) What is the advantage of using CMOS in integrated circuits?
3+4+10+3
2. (a) What are the techniques to improve the energy efficiency of a computer system?
(b) How do you calculate the clock per instruction?
(c) Explain Amdahl's Law.
(d) What are MTTF and MTTR ?
A disk subsystem have the following components
- 10 disks, each rated at 1,000,000-hour MTTF
- 1 ATA controller 500,000-hour MTTF
(AT Attachment: interface standard for connection of storage devices)
- 1 Power supply, 200,000-hour MTTF
- 1 fan, 200,000-hour MTTF
- 1 ATA cable, 1,000,000-hour MTTF
Power supply system was improved by adding one more. What is the performance improvement of the power supply?
What is the reliability improvement of the whole system?
4+2+3+11
3. (a) Explain the functioning of a six transistor SRAM cell.
(b) What are miss and hit in accessing cache?
(c) Explain Fully associative, Set associative and Direct-mapped cache. Explain how miss and hit occur in these cases.
6+2+12
4. (a) How does the performance improve by using two level cache?
(b) Explain interleaved memory. What is its advantage?
(c) Explain Translation-Lookaside Buffer?
(d) Explain three instruction formats for MIPS.
4+5+5+6

5. (a) What is the advantage of pipelining?
(b) What is hazard in pipelining? Explain the different hazards in pipelining. What are the methods to remove them?
(c) Explain Tomasulo's algorithm. 3+10+7
6. (a) Explain name dependencies in a MIPS program.
(b) Compare Superpipeline versus Superscalar computing.
(c) Explain VLIW.
(c) What is the advantage of SIMD over MIMD?
(d) Explain Vector Processing. Why is it needed? 4+5+3+3+5
7. (a) Compare centralized and distributed memory multiprocessor with their pros and cons.
(b) What is Cache Coherence problem? How can that be solved?
(c) What are the different approaches to multithreading within a processor? 8+8+4