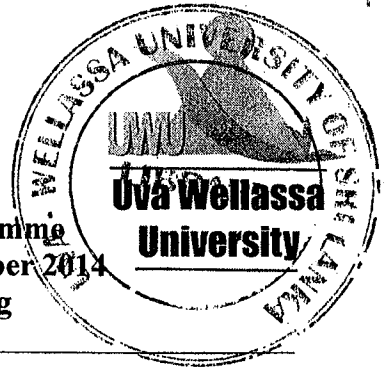


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Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Computer Science and Technology Degree Programme
3rd Year 2nd Semester Examination – August/September 2014
CST 326-2 Distributed and Parallel Computing



Number of questions: Four (04)
Answer all questions.
Time Allocation: Two (02) hours.
Mark Allocation: 100

1. a. Describe the different categories of computer systems and write the suitable categories for parallel systems. (08 mark)
 - b. Give a brief description on the usage of the shared memory and distributed memory for inter-processor communication. (04 mark)
 - c. Define the followings.
 - i) Decomposition
 - ii) Granularity
 - iii) Degree of concurrency
 - iv) Mapping (04 mark)
 - d. Do you think that the same granularity always leads to the same average degree of concurrency? Explain your answer. (02 mark)
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2. a. Describe the matrices which are used to measure the quality of an interconnection network. (08 mark)
 - b. What is a Hypercube network? Explain how you could construct an 8D hypercube. (04 mark)
 - c. What are the differences between synchronous and asynchronous parallel algorithms? (02 mark)
 - d. Consider the formula $f(x + 1) = f(x) + f(x)/f'(x) - f''(x)/f''(x)$. It is required to calculate $f(x + 1)$ iteratively with 4 processors. The processing is started with $x = x_0$. Processor P_1 computes $f(x)$, then processor P_2 computes $f'(x)$ and then processor P_3 computes $f''(x)$. Finally processor P_4 computes $f(x + 1)$ using the above formula. Assume that P_1 , P_2 , P_3 and P_4 take 2, 4, 3 and 1 time units respectively for each computation. Show the necessary computation steps for five iterations. (10 mark)

3. a. Explain how distributed systems differ from centralized systems. In designing a distributed system what kind of issues are necessary to be considered? (08 mark)
- b. Describe the heterogeneous aspects of distributed systems. (04 mark)
- c. What does mean by reliable communication? Describe the following protocols by stating their reliability.
i) Request
ii) Request Reply
iii) Request Reply Acknowledge (12 mark)
- d. "May be", "At-least-once" and "At-most-once" are three Qualities of Services (QoS) for client server communication. State which of the above QoS are suitable for the following applications with a justification.
i) A system that informs about occasional failures.
ii) An automatic cricket score board updating system that uses two methods: update player (player_id, runs) and results (player_id, total) methods.
iii) An online voting system where voters vote by specifying his/her id and candidate name. (06 mark)
4. a. Give a brief description on the Domain Name Service (DNS).
Why do DNS root servers hold entries for two-level names rather than one-level names? (08 mark)
- b. Compare and contrast two navigation mechanisms used for name resolution. Which type of navigation mechanism is used mainly in Network File System (NFS)? Why? (08 mark)
- c. How does the NFS Automounter help to improve the performance and scalability of NFS? (04 mark)
- d. Briefly describe each of the following.
i. Directory services
ii. Discovery services
iii. File group
iv. Name space (08 mark)