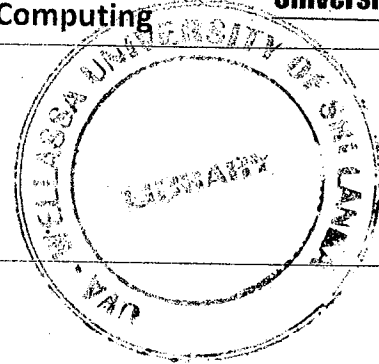
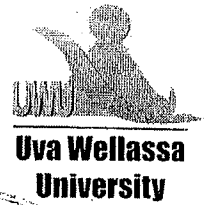


Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
300 level 2nd Semester Examination – Dec. / Jan. 2017
CST326-2 Distributed and Parallel Computing



Instructions to candidates

Duration: Two (02) hours

Number of questions: Five (05)

Mark allocation: 100

Answer four (04) questions only.

1.
 - a. Explain how parallel computing works using an example. (5 mark)
 - b. Briefly describe the need of parallel computing in current context. (4 mark)
 - c. Give three (03) areas of Science and Engineering that uses parallel computing to model a difficult problem. (3 mark)
 - d. Compare and contrast Distributed and Shared Memory. (5 mark)
 - e. Analyze the pros and cons of serial computing. (5 mark)
 - f. Briefly describe Multiple Instruction Multiple Data (MIMD) architecture with the aid of an example. (3 mark)

2.
 - a. Briefly describe the major constraints need to be analyzed before decomposing any problem. (4 mark)
 - b. Briefly describe any two (02) communication techniques of Parallel Algorithm. (6 mark)
 - c. Briefly, explain how a task can be shared among processes using MPI-CH mechanism. (7 mark)
 - d. State the use of scattering in MPI-CH decomposition mechanism. (3 mark)
 - e. Explain the matrix-matrix multiplication using parallel algorithms by clearly showing all the steps. (5 mark)

3.
 - a. Distinguish between Blocking and Non-Blocking interconnection network topology. (4mark)
 - b. Explain why a single crossbar switch is too expensive for building a multiprocessor network. (3 mark)
 - c. What are the advantages and disadvantages of a multistage interconnection network compared to a mesh interconnection network? (5 mark)
 - d. Prove that the average distance between any two(02) processors on a hypercube is $d/2$ where d is the dimension. (5 mark)
 - e. Explain the 'all to all communication' mechanism in a 3D Hypercube by drawing the 3D Hypercube. (3 mark)
 - f. Evaluate the Linear array, Star, Hypercube Network using Bisection Width, Cost, and Diameter. (5 mark)

- 4.
- a. Define the term 'Distributed System'. (4 mark)
 - b. Give any two (02) examples for Network Operating System. (2 mark)
 - c. Compare and contrast Parallel and Distributed System. (5 mark)
 - d. Describe Automatic Teller Machine System in Distributed System context. (4 mark)
 - e. Illustrate the architecture of the Distributed Operating Systems using a diagram. (5 mark)
 - f. Explain the role of middleware in Distributed System. (5 mark)

- 5.
- a. Briefly, explain the Amadhal's Law. (5 mark)
 - b. Describe how to find the total communication cost for a message of size 'm' words to traverse 'P' communication links using store and forward method. (5 mark)
 - c. Assume 90% of a program can be executed in parallel.
 - i. Suppose there are 20 parallel units. What is the speedup? (5 mark)
 - ii. Suppose there are 100 parallel executions. What is the speedup? (6 mark)
 - iii. Compare the parallel efficiency for c(i) and c(ii). (4 mark)