Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
300 Level 2nd Semester Examination – Jan. / Feb. 2016
CST 326-2 Distributed and Parallel Computing

Uva Wellassa University

Instructions to candidates
Duration: Two (02) hours
Number of questions: Five (05) essay questions
Answers **four(04)** questions only
Mark allocation: 100 (All questions carry equal mark)

1.

a. Describe Parallel Computing using a real world example.
(4 mark)

b. Describe any two (02) limitations of **serial computing** .
(5 mark)

c. Give three (03) areas of Science and Engineering that uses parallel computing to model the difficult problem.
(3 mark)

d. Compare and contrast two (02) type of Shared Memory.
(5 mark)

e. Describe the pros and cons of **Distributed Memory.**
(5 mark)

f. Briefly describe **SIMD (S**ingle **I**nstruction **M**ultiple **D**ata**)** architecture with the aid of an example.
(3 mark)

2.

a. Describe the steps of **Parallel Algorithm** designing.
(5 mark)

b. What is meant by **Agglomeration** in Foster methodology.
(4 mark)

c. Briefly describe any two (02) decomposition techniques of **Parallel Algorithm**.
(6 mark)

d. List any three (03) parallel programming model.
(3 mark)

e. Consider a task of finding the **summation** of given set of elements.
   i. Write a sequential algorithm to find the global sum.
   ii. Write a parallel algorithm to find the global sum.
   iii. Compare the complexity and performance of sequential and parallel algorithm written for above questions (**i** and **ii**).
(7 mark)

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3.

a. Analyze the importance of an interconnection network.

(3 mark)

b. Distinguish **Blocking** and **Non-Blocking** interconnection network topologies.

(3mark)

c. Draw any three (03) Completely Connected Network (CCN) topologies.

(3 mark)

d. Draw A complete **Omega** Network connecting eight (08) inputs and eight (08) outputs using three (03) bits.

(5 mark)

e. Describes the properties of **Hypercube** Network topology.

(3 mark)

f. Construct a four (04) Dimentional (4D) hypercube interconnection network.

(3 mark)

g. Evaluate **Crossbar** ,**Omega** and **Tree** Network using **Bisection width, Cost** and **Diameter**

(5 mark)

4.

a. Explain how a **Distributed System** differs from a **Centralized System**.

(5 mark)

b. Give four (04) examples for **Distributed System.**

(4 mark)

c. Describe pros and cons of a **Time Sharing System**?

(3 mark)

d. Describe about a Home Automation System in Distributed System context.

(4 mark)

e. Describe the **Workstation-Server Model** in a Distributed System.

(4 mark)

f. Give **four (04)** different types of **transparency** and describe **two (02)** of them.

(5 mark)

5.

a. What is meant by **Startup time (t_s)** in communication cost?.

(3 mark)

b. Describe how to find the total communication cost for a message of size **m** words to traverse **l** communication links using the **store and forward** method .

(5 mark)

c. List any three (03) types of Communication mechanism in Message Passing Interface **(MPI)** .

(5 mark)

g. Explain the **One-to-all** broadcast on an **eight-node (0 to 7)** ring topology (assume Node 0 as source).

(6 mark)

d. Explain **All-to-all** broadcast on a **Hypercube** with the aid of diagrams.

(6 mark)