The University of Melbourne

Cloud Computing and Distributed Systems Laboratory
Department of Computing and Information Systems

433-678/COMP90024: Cluster and Grid Computing

Examination – A Sample Question Paper

Semester 1, 200X.

Exam Duration: 2 hours
Reading Time: 15 minutes

This paper has 2 pages, including this cover page.

Authorized Materials:

- There is NO special authorized material for this examination.

Instructions to Invigilators:

- Please provide students with standard script books.
- No calculators allowed.
- **Please collect the exam paper from students once they finished answering.**

Instructions to Students:

- This examination is worth of 50% of your final mark.
- Answer any 5 out of 7 questions. **Please note only first 5 answers will be marked.**
- Each question carries 10 marks.
- The numbers in square bracket after each sub-question represents marks allocated to it.
- Start you answer to each question on a new page.
- Make sure your answers are readable. Any unreadable parts will be deemed incorrect.

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Question 1:

A) Discuss the major trends in computing that have led to the emergence of Cluster computing. [5]
B) Describe the design issues and the architecture of Cluster computing systems. [5]

Question 2:

A) What is a Single System Image (SSI) ? Describe different SSI services that cluster middleware need to support. [5]
B) Discuss SSI architecture of implementing at Operation System and Tool levels with a suitable example. [5]

Question 3:

A) What are the key distinctions between Cluster and Grid computing? [5]
B) Discuss two commercial applications of Clusters and Grids. [5]

Question 4:

A) Discuss in detail the architecture of Grid Computing systems. [5]
B) Discuss the design issues of Grid Resource management systems. [5]

Question 5:

A) Discuss the architecture of a Grid Resource Broker with a suitable example. [5]
B) Discuss Deadline-and-Budget Constrained Time and Cost optimization scheduling algorithms for Grid Computing. [5]

Question 6:

A) Discuss different models or strategies for parallelization of applications. [5]
B) Discuss the design of a parallel algorithm for matrix multiplication? Discuss its implementation using the standard MPI (message passing interface). [5]

Question 7:

A) Write a multithread program for file copy operation. [5]
B) Discuss parametric processing programming model and its applications in Grid computing. [5]

NOTE: one of the above questions may be changed to multiple choices.