TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATIONS FOR DEGREE IN:
BACHELOR OF TECHNOLOGY IN INFORMATION COMMUNICAITON TECHNOLOGY (BTIT 12J & 13S)

EIT 4410: PARALLEL COMPUTING

END OF SEMESTER EXAMINATION
SERIES: APRIL 2015
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consists of **FIVE** questions.
Attempt question **ONE (Compulsory)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **TWO** printed pages

Question One (Compulsory)

a) Define the following terms: **(4 marks)**
- **(i)** Parallel over head
- **(ii)** Scalability
- **(iii)** Granubility
- **(iv)** Parallel computing

b) Outline TWO crucial application of Grid computing **(4 marks)**

c) Distinguish between High Performance Computing and computing **(4 marks)**

d) Describe the following data parallel model implementation:
- **(i)** High performance FORTRAN (HPF) **(2 marks)**
- **(ii)** Computer Directives **(2 marks)**

e) Explain the following parallel programming models:
- **(i)** Single program multiple data **(3 marks)**
- **(ii)** Multiple program multiple data **(3 marks)**

f) Outline THREE characteristics of a grid **(3 marks)**

g) Write the acronyms "COBRA" in full and state at least TWO CORBA services **(3 marks)**

h) Explain the Flynn's method of classifying parallel computers **(2 marks)**

Question Two

a) Define the term 'grid computing', specifying the benefits and criteria for a grid **(8 marks)**

b) Some of the important factors that are necessary when designing parallel programs include:
(i) Data dependence
(ii) Load balancing **(4 marks)**

c) Explain the characteristics and implementation of message passing model **(6 marks)**

d) Explain the characteristics of data processing model in parallel computing **(2 marks)**

Question Three

a) Distinguish between the following by outlining THREE characteristics of each computer as stated in Flynn's taxonomy.
(i) SISD and SIMD
(ii) MISD and MIMD **(8 marks)**

b) Differentiate between NUMA and UMA **(4 marks)**

c) Outline the various levels of parallel computing **(4 marks)**

d) Describe the following thread model implementation:
(i) POSIX threads **(2 marks)**
(ii) Open MP **(2 marks)**

Question Four

a) Explain the following methods of grid computing:
(i) High-throughput computing **(2 marks)**
(ii) Collaborative computing **(2 marks)**
(iii) On-demand computing **(2 marks)**
(iv) Data-intensive computing **(2 marks)**

b) With the aid of a diagram, discuss each of the following types of memory in parallel computing, giving TWO advantages and disadvantages of eac

(i) Shared memory
(ii) Distributed memory **(12 marks)**

Question Five

a) Briefly describe TWO basic ways of partitioning computational work among parallel tasks. **(4 marks)**

b) Explain the importance of middleware, listing TWO examples of middleware program **(6 marks)**

c) List TWO "Grand challenge problems' that parallel computing is aiming to solve **(2 marks)**

d) State FOUR reasons for adopting parallel computing **(4 marks)**

e) State FOUR limitations of serial computing **(4 marks)**