TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

UNIVERSITY EXAMINATION FOR:
BACHELOR OF TECHNOLOGY IN INFORMATION TECHNOLOGY
(BTIT 11M, Y4 SI)

EIT 4410: PARALLEL COMPUTING

END OF SEMESTER EXAMINATION
SERIES: APRIL 2014
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) In parallel computing, what are shared memory-multiprocessors and distributed memory multicomputers? **(4 marks)**

b) Mention an approach to solve the mismatch problem between software parallelism and hardware parallelism. **(4 marks)**

c) Distinguish between asynchronous and synchronous pipeline models **(4 marks)**

d) Explain the following terms in respect to parallel and high performance computing:
(i) Message passing interface (MPI) **(2 marks)**

(ii) Active messages in **(2 marks)**
(iii) Bulk asynchronous parallelism **(2 marks)**
(iv) Symmetric multi-processors **(2 marks)**

Question Two

We characterize parallel machines by the approach they take to the problem of reconciling multiple accesses, by multiple processes to a joint pool of data. Describe the several types of memory accesses so far available. **(20 marks)**

Question Three

a) Discuss Flynn's classification of computer organization **(10 marks)**

b) Explain relevance of parallel processing for high speed computing **(10 marks)**

Question Four

Discuss the following programming strategies for high performance computing: **(20 marks)**

a) Cache size
b) Cache lines
c) Loop Tilling
d) Cache associativity
e) Translation look-aside buffer (TLB)

Question Five

a) Discuss the following paradigms in relation to granularity of parallelism.
(i) Data parallelism **(3 marks)**
(ii) Instruction level parallelism **(3 marks)**
(iii) Task-level parallelism **(3 marks)**
(iv) Medium grain data parallelism **(3 marks)**

b) With appropriate diagrams where possible, discuss the two communication models for multiprocessors. **(8 marks)**