UNIVERSITY OF GHANA

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B.A/BSc SECOND SEMESTER UNIVERSITY EXAMINATIONS: 2013/2014

DEPARTMENT OF COMPUTER SCIENCE

CSCD318: INTRODUCTORY TO PARALLEL COMPUTING

EXAMINER: MR B.S-K. WIREDU

TIME ALLOWED: $2^{1/2}$ HOURS

INSTRUCTIONS

Answer Question one in Section A plus ANY TWO Questions from Section B.

SECTION A: (COMPULSORY- 40MARKS)

Q1(40marks)

(a) Explain the terms 'Parallelism' and show THREE approaches to achieving parallelism in computer systems. (20marks)

(b). Explain **THREE** key motivations for migrating from sequential processing to parallel processing and give **ONE** commercially available example of each motivation. (20 marks)

SECTION B (Answer any TWO QUESTIONS-60MARKS)

Q2 (30marks)

(a). With the aid of simple diagrams where possible, explain **THREE** of the following computer models giving a real world application example of each. (10 marks each)

i. Single Instruction stream over a Single Data stream
ii. Single Instruction stream over Multiple Data streams
iii. Multiple Instruction streams over a Single Data stream
iv. Multiple Instruction streams over Multiple Data streams

Q3.(30marks)

(a) The "Input/Output Problem' in sequential computing presents a more difficult challenge in parallel computing environment. Discuss! (10 marks)

(b). Describe TWO factors that influence the choice of interconnection scheme in a parallel computer system. (10 marks)

(c). Compare and contrast system software requirements for sequential, uni-processor system and parallel multiprocessor system (10marks)

Q4(30 marks)

.(a) Explain in detail how the following problems are resolved in parallel computing.

(6 marks each)

i. Synchronization
ii. Scalability
iii. Cache coherence
iv. Process migration
v. Memory consistency

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Q5.(30marks)

(a) Explain the need for employing a four-level memory hierarchy in a multiprocessor system

(15 marks)

(b) With reference to multiprocessor systems, discuss the advantages and disadvantages in using:

i. Shared/Global memory (5marks)

ii. Distributed memory (5marks)

iii. Distributed-shared memory (5 marks)

Examiner:BSK Wiredu

Good Luck