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**University Examinations 2014/2015**

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

**CCS 3480: PARALLEL SYSTEMS**

**DATE: APRIL 2015 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. Describe what is meant by a parallel computer system (5 Marks)
2. What are the advantages and disadvantages of parallel systems compared with non-parallel systems (8 Marks)
3. Clearly explain the meaning of the four acronyms SISD, SIMD, MISD and MIMD and give examples of computer architectures that are classified by them, respectively (10 Marks)
4. Describe what is meant by a distributed computer system (7 Marks)

**QUESTION TWO (20 MARKS)**

Assume that you are about to implement a web-server application. The server should accept request for files from other computers on the network where it is situated. The server should respond to each request by sending the requested file back to the requesting computer

1. Describe the opportunities for parallelism given in this problem (5 Marks)
2. Does the problem offer opportunities for task or data parallelism (5 Marks)
3. What programming model would you use to implement your server application (5 Marks)
4. Discuss the way a pipelined computer architecture obtains parallel operations (5 Marks)

**QUESTION THREE (20 MARKS)**

1. Describe the Shared Memory programming paradigm. What kinds of computer systems suit it? (5 Marks)
2. What are the advantages and disadvantages of distributed systems compared with centralized systems (5 Marks)
3. Discuss synchronization mechanisms that can be used in shared memory parallel programs and synchronization mechanisms that are suitable for message passing parallel programs

(5 Marks)

1. Nowadays, server class machine tend to use SMP architectures (Symmetric Multi-processor) Explain how SMP works (5 Marks)

**QUESTION FOUR (20 MARKS)**

1. Consider that in a business meeting you recommend using a parallel language to implement a parallel computing solution, and that automatic parallelization might be worth considering. But a colleague responds: “Now days! There aren’t parallel computing languages and automatic parallelization is useless. Present an argument to stand by your statement and illustrate examples confirming that parallel languages do indeed exist-also clarify the current situation of automatic parallelization technique (8 Marks)
2. Describe various styles of massively parallel computer systems. Look at the topology of the system, the kinds of processors and the memory organization (8 Marks)
3. Name two applications that commonly run on large scale parallel computing systems

(4 Marks) **QUESTION FIVE (20 MARKS)**

1. What are the factors that have led to the growth of Parallel Systems (5 Marks)
2. Discuss the features that will enable PARAS systems to function effectively (5 Marks)
3. Explain the challenges that are likely to affect the performance of PARAM (5 Marks)
4. Describe how the types of parallelism that can be found in SIMD and MIMD architectures differ (5 Marks)