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The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical and Computer Engineering

Study Programme	: Bachelor of Technology Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	**: EEX6236 – Advanced Computer Architecture**
Academic Year	: 2020/21
Date	: 18th February 2022
Time	: 1400-1700hrs
Duration	: **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper contains four (4) questions on two (2) pages.
3. Answer ALL questions.
4. The answer to each question should commence from a new page.
5. This is a Closed Book Test (CBT).
6. Answers should be in clear handwriting.
7. Do not use Red colour pen, and clearly state your assumptions, if any

Answer ALL questions.

1)

a) Briefly describe different techniques used for parallel processing. Using an example, show how you convert a sequential process to a parallel process.

b) You have to write a program to find the number of occurrences of each vowel ***a, e, i, o, u*** (both lower case and upper case) in a text. Assume there are four Processing Elements (PE) in the computer system, and they can be organized to any architecture according to Flynn's classification.

(i) Design two different methods of doing this problem in parallel for MIMD and SIMD architectures.

(ii) Estimate the execution time in a number of steps for each method given in (i) and compare both methods you designed.

(40 marks)

2)

a) Briefly describe Flynn's taxonomy of computer systems and Johnson's taxonomy of MIMD parallel architectures. What are the main factors used for these two classifications?

b) Name two applications that use SIMD architectures. Briefly explain the advantages they gained using SIMD.

c) What are the disadvantages when using SIMD architectures?

(20 marks)

3)

a) Briefly describe how concurrent data structures improve the performance of a program. Give an example where you can use concurrent data structures.

b) Depict how computer memory is organized in parallel computers.

c) Discuss implications of computer memory organization for parallel programming.

d) Briefly describe the Redundant Array of Independent Disks (RAID), and show how it can tolerate multiple faults.

(20 marks)

4) A student commented, "An Instruction Set designed for a specific application domain gives better performance than a standard ISA."

a) Giving two examples, explain what Application Specific ISA is.

b) Do you agree with the given statement? Justify your answer with suitable examples.

c) Compare Application Specific ISA with standard ISA showing similarities in them.

(20 marks)