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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science and Engineering

Mid Semester Examination, Spring-2024

Course Code: CSE335/CSE411 Course Title: Computer Architecture and Organization

Level & Term: L3-T1, L4-T1, L4-T2

Exam Duration: 1.5 Hours **Marks: 25**

Answer ALL Questions

[The figures in the right margin Indicate the full marks and corresponding course outromes. All portions of each question must be answered sequentially.]

1.		You are aware of the distinction between two fundamental aspects of computer systems, often combined but with distinct roles in computer design and implementation. If so, could you clarify the difference between "Computer Architecture" and "Computer Organization" by highlighting their respective roles in the realm of computing with support of the relevant diagram and examples?	[3]	CO1
	b)	A level of the design processes communicates by word-oriented buses which may be controlled by a subsystem called an interconnection network. Show the connection network in a visual manner.	[2]	
2.		Suppose, you are a computer architecture instructor preparing a lesson on instruction formats and program execution for your students. The lesson covers topics such as fixed versus variable-length instruction formats, addressing modes, speedup techniques, and instruction pipelining.		CO3
	a)	Apply the 1-operand and 3-operand instruction operation technique in the computer architectures for the following instruction: $w \leftarrow q + g * h$ Assume that all data are in registers.	[4]	
	b)	Illustrate the concept of instruction pipelining and its role in improving CPU performance by providing a diagram of instruction processing in a two-stage instruction pipeline.	[4]	
	c)	Apply the addressing techniques if you want to store a hexadecimal number "67839534" into "A1EFCE" address in a computer memory.	[4]	
3.	*a)*	Computer's data representation is mainly connected with number system. A list of different types of numbers are given below: (i) -159 (ii) 2AE78 (iii) 777 (iv) 1111010110010001 Convert number (ii) in binary and subtract it from number (iv). Represent the number (i) in binary.	[5]	CO2
	b)	Assume, you are designing a digital circuit for a control unit in a microprocessor. The control unit requires several logic gates to implement its functionality with limited space and power constraints. How would you optimize the design of a full adder to minimize the number of gates while maintaining the required functionality?	[3]	