Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science and Engineering

Mid Semester Examination, Fall-2024

Course Code: CSE335 Course Title: Computer Architecture and Organization

Level: L3 Term: T1 Batch: 63

Time: 1.5 Hours **Marks: 25**

Answer ALL Questions

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

1.	a)	Throughout history, people have relied on their brains for calculations. In the past, they used simple tools like fingers or pebbles for counting. Explain the main elements of computer in brief with functions.	[2]	CO1
	b)	The development of computers has gone through different generations, each generation marked by significant advancements in terms of technology and architecture. Now, compare the main characteristic features of 1st and 2nd generation electronic computer.	[3]	
2.	a)	Suppose, you are finding the best instruction method to make the processor fast as possible to process. Now, apply the 2-operand and 1-operand instruction operation technique in the computer architectures for the following instruction: $g \leftarrow x + h / c * d$ Assume that all data are in registers.	[4]	CO3
	b)	Illustrate how instruction formatting can be fixed and variable depending on the microprocessor design with diagram and examples for both format.	[4]	
	c)	Apply the addressing techniques if you want to store a data "54D5607" into "ABCDEFH" address in a computer memory.	[4]	
3.	a)	Data representation is the method used to encode information into a format that can be used and understood by computer systems. It involves the conversion of real-world data, such as text, images, sounds, numbers, into forms like binary or hexadecimal which computers can process. Now, convert the binary 10110111 into hexadecimal and then take that number into octal by following proper process.	[4]	CO2
	b)	An iterative design process is a project management and design approach to the development lifecycle that prioritizes flexibility, adaptability, and continuous improvement. Draw the flowchart of an iterative design process. Also give a truth table for XNOR gate for 3 bit input.	[4]	

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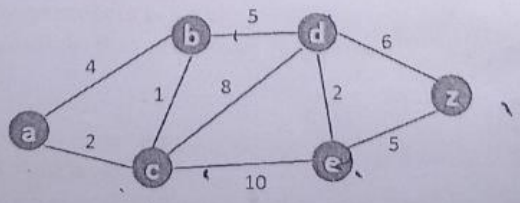
Faculty of Science & Information Technology
Department of Computer Science & Engineering
Midterm Examination, Fall 2024
Course Code: CSE313, Course Title: Computer Networks
Level: 3 Term: 1 Batch: 62, 63

Time: 01:30 Hrs **Marks: 25**

Answer ALL Questions

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

1.	a)	Discuss the relationship between the layers of OSI model and how failure at one layer can affect the functioning of the entire communication process	[5]	CO1
2.		Explain how does DNS resolve the following domain using recursive DNS resolution : www.pickachuedu.edu.uk	[5]	CO2
3.	a)	You are responsible for designing a network for a company that has been allocated the IP address block 172.16.0.0/22. The company has multiple departments that require different sizes of subnets. Your task is to use Variable-Length Subnet Masking (VLSM) to allocate IP addresses efficiently based on the following requirements: MD department requires 120 hosts, Sales department Requires 63 usable host and IT department requires 14 host.	[5]	CO3
		1) Calculate Subnet mask for each department		
		2) Calculate the total number of host and address range for each subnet		
		3) Show how addresses are wasted after assigning in each department.		
4.		Consider the following IP addresses and answer the questions for each IP addresses individually. *(i)* 10.10.0.0/30 *(ii)* 172.16.20.0/26	[5]	CO3
		1) Calculate the Subnet mask and total number of host and total number of subnet for each IP.		
		2) Calculate the address range, first usable last usable address for each IP.		
5.		Apply the Dijkstra algorithm for the following graph and find the shortest distance from **a to z**	[5]	CO3



Daffodil International University

Faculty of Science and Information Technology
Department of Computer Science and Engineering
Mid Term Examination, Semester: Fall 2024
Course Code: CSE221 Course Title: Object Oriented Programming II (OOP II)
Batch: 63 Section: All

Time: 1 Hour 30 Minutes [Answer all the Questions. Obtain marks in the right side] Full marks:25

1.	a.	Explain the concept of dynamic typing in Python. Provide an example to illustrate how Python handles variable types dynamically.	[2]	CO1
	b.	Write a Python function **add_even_numbers(list)** that adds up only the even numbers from a given list.	[3]	
2.	a.	Explain the concept of string slicing in Python. Provide an example demonstrating the use of slicing with both positive and negative indices.	[2]	CO2

	b.	You are tasked with analyzing student data in a class using Python. The data includes students' names, their scores in various subjects, and their favorite subjects. The information is stored in a dictionary where each key is a student's name, and the value is another dictionary containing their scores and favorite subjects.
		students_data = {
		"Alice": {"scores": [85, 86, 78], "favorites": {"Math", "Physics", "Art of living"}},
		"Bob": {"scores": [75, 87, 70], "favorites": {"Math", "English", "OOP"}},
		"Charlie": {"scores": [55, 88, 91], "favorites": {"OOP", "Chemistry", "Math"}},
		"David": {"scores": [78, 42, 85], "favorites": {"Physics", "Chemistry", "Math"}},
		"Eve": {"scores": [90, 45, 87], "favorites": {"Art of living", "Math", "English"}},
		}
		Tasks:
		1. Highest and Lowest Scores:
		Write a function that iterates through all the students' scores and returns the highest and lowest scores in the class.
		2. Average Scores for Each Student:
		Create a function that calculates and returns the average score for each student. Store the results in a new dictionary where the key is the student's name, and the value is their average score.
		3. Unique Favorite Subjects:
		Write a function that returns a set of all unique favorite subjects chosen by any student in the class.
		4. Common Favorite Subjects:
		Write a function that finds and returns the set of subjects that are common favorite subjects among all students.
			[8]	

3	a.	A company is developing an inventory management system to track product stock levels. One requirement is to periodically check the inventory and notify if any product stock falls below a certain limit. To do this, they plan to use a Python function that accepts a list of stock levels and a minimum limit value, and then iterates over the list to identify products that are low in stock. Explain how you would design such a function using a **for** loop.	[3]	CO3

b. [7]

A company offers its employees a yearly bonus based on their performance ratings and years of service. The bonus calculation follows these rules:

- If the employee has worked for the company for less than 5 years, they are eligible for a bonus only if their performance rating is 8 or above:
  - If the rating is 8, they receive a 5% bonus on their salary.
  - If the rating is 9 or 10, they receive a 10% bonus.
- If the employee has worked for 5 years or more, the bonus is calculated as follows:
  - For a performance rating of 7, they receive a 7% bonus.
  - For a performance rating of 8, they receive a 10% bonus.
  - For a performance rating of 9 or 10, they receive a 15% bonus.

Write a Python function **calculate_bonus(years_worked, performance_rating, salary)** that calculates and returns the employee's bonus amount based on the criteria above. If an employee is not eligible for a bonus, the function should return 0.

Hints: For example, for an employee with 6 years of work experience, a performance rating of 9, and a salary of 50,000, the bonus is calculated as 15% of the wage, resulting in 7,500.