	Note: If two or more elements have an equal number of digits, those elements are to be sorted in decreasing order of their value. For example: Input: 23,10,4566,344,123,121 Output: 23,10,344,123,121,4566	
3.	Suppose you have a matrix of positive integers with *m* rows and *n* columns. Design an algorithm that will find all the duplicate elements in the matrix and then sort them(duplicate elements) in increasing order and then convert the sorted set of all these numbers into a single number. For example, suppose you are given a 2 x 5 matrix of positive integers as follows: [1 9 9 2 1 7 2 2 2 5] The duplicate elements are 1, 9, 2. After sorting it will be 1,2,9. Then, convert it into a single number to output 129.	**10**
4.	Write an algorithm to find kth largest element in an array of distinct integers. Elements in the array are not necessarily sorted. For the identified kth largest element, say x, find the sum of the digits of x and cross check if the sum of digits and its corresponding index position in the array are same. If yes then 'x' is a "Magic" number. Output if 'x' is a magic number. Compute the time complexity for your algorithm. Example, if given array is [1, 3, 12, 19, 13, 2, 15] and you are asked for the 3rd largest element i.e., k = 3 then your program should print 13. For 13 find its sum of digits 1+3=4. Since the sum of digit and the index position of 13 are same, 13 is a "Magic" number.	**10**
5.	Given a list of n distinct integers sorted in ascending order, write an algorithm that returns a Fixed Point in the list, if there is any Fixed Point present in array, else returns -1. Fixed Point in a list is an index i such that list[i] is equal to i. Note that integers in a list can be negative. Compute the time complexity for your algorithm.	**10**

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School of Computer Science and Engineering

Fall Weekend Intra Semester 2023-24

Continuous Assessment Test – I

SLOT: X11/X12/X21

Programme Name & Branch : B.Tech – Computer Science and Engineering

Course Name & code: Data Structures and Algorithms & BCSE202L

Class Number (s): VL2023240108166

Faculty Name (s): Dr.P.Iyappan

Exam Duration: 90 Min. Maximum Marks: 50

General instruction(s):

Answer all the Questions

Draw diagrams, Algorithms and graphical representations wherever necessary

Q.No.	Question	Max Marks
1.	a. What do you mean by a good algorithm? (3 Marks) b. Why it is necessary to analyse algorithm rather than the program?(3 Marks) c. Differentiate recursive and non-recursive algorithm with example.(4 Marks)	10
2.	a. Explain various categories of Asymptotic notations and order of growth with example.(5 Marks) b. Find the asymptotic complexity for the function by using Iteration method, where $T(n) = \begin{cases} T(1) & \text{if } n = 1 \\ 7T(\frac{n}{3}) + \theta(n^3) & \text{if } n > 1 \end{cases}$	10
3.	a. Solve the Following recurrence equation $T(n) = 4T(n/2)+n^2 \log n$ using Master Method. (5 Marks) b. Having an array of unsorted elements, define an algorithm to search an element using binary search, and write the best and worst case of time complexity with an example.(5 Marks)	10
4.	Write an algorithm for Selection Sort. Illustrate the operation of selection sort on the array A = {10, 23, 14, 46, 11, 39, 22, 52, 7, 19, 43, 7, 66}. Explain the algorithm neatly step by step. Also give a detailed view of the solution.	10
5.	Sort the following numbers 3,1,4,10,5,9,2,6 using sorting algorithm based on breaking down a list into sub-lists until each sub-list consists of a single element and combine those sub-lists in a manner that results into a sorted list. **And determine the running time of the algorithm for** a. Sorted input b. Reverse-ordered input c. random input	10

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Continuous Assessment Test I – September 2022

Programme	:	B.Tech. CSE	Semester	:	FALL 2022-23
Course	:	Data Structures and Algorithms	Code	:	BCSE202L
			Slot	:	A1
Faculty	:	Dr.S.Brindha, Dr Balaji C, Dr Hasmath Farhana, Dr. J. Uma Maheswari, Dr Sindhia Lingaswamy, B Jayaram, D Mansoor Hussain, S. Kirthica, Dr. L. Mary Shamala, B. Sahaya Beni Prathiba, K.Tamilarasi, Dr.S.Bharathiraja	Class Nbr	:	CH2022231001389 CH2022231001387 CH2022231001414 CH2022231001390 CH2022231001411 CH2022231001392 CH2022231001422 CH2022231001060 CH2022231001383 CH2022231001413 CH2022231001391 CH2022231001395
Time	:	1½ Hours	Max. Marks	:	50

Answer ALL the questions

Q.No.	Questions	Marks

1.	a)Consider the following algorithm (5 Marks)
	
	Algorithm Test(int n)
	{
	value=0;
	for i in range(n/2 to n)
	for j in range(2 to n with j=j*2 increment)
	value=value+n/2
	return value
	}
	
	What does the above algorithm return as value for any set of integers given as input? Derive the time complexity of the algorithm.
	b)Consider the following algorithm
	
	Algorithm Test1(int n)
	{
	if(n is in less than or equal to 1)
	return 1
	return 2*Test1(n-1)
	}
	
	Write down the recurrence relation for the above algorithm and solve it. (5 Marks)
		10

2.	Consider an array of n integers, write an algorithm to sort the integers based on the number of digits of all the integers in the array. Compute the time complexity for your algorithm.	10

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Continuous Assessment Test - 1 – September 2023

Programme	:	B. Tech (BRS, BPS, BAI, BCE, CSE)	Semester	:	Fall Semester 2023-24
Course Title	:	Data Structures and Algorithms	Code	:	BCSE202L
			Class Nbr(s)	:	CH2023240101210, CH2023240100642, CH2023240100647, CH2023240100649, CH2023240100651
Faculty (s)	:	Dr. J Uma Maheswari, Dr. Vijayaprabakaran K, Dr. Karthikeyan N, Dr. Sudheer Kumar E, Dr. Avuthu Aninash Reddy	Slot	:	A1+TA1
Time	:	90 minutes	Max. Marks	:	50 marks

Answer all the Questions

1. Find the running time of the given algorithm and also discuss the running time in terms of three bounds (upper bound, lower bound and tight bound). 10

```
FindMaxElement (arr [ ]):
    1. max_element = arr[0]
    2. for i from 1 to n – 1
    3.         if arr[i] > max_element
    4.             max_element = arr[i]
    5. return max_element
```

2. Consider the following statement: 10

"The time complexity of recurrence relation T(n) = 8T(n/2) + O(1) is greater than T(n) = 4T(n/8) + O(1)".

Check whether the statement is true or false and justify your answer.

3. You are given a sorted array of integers and a target value. Your task is to implement a function that finds the first and last occurrence of the target value in the array. Write a function **findFirstLastOccurrence** that takes in an array of integers **nums** and an integer **target**, and returns a pair of indices [first, last] where first is the index of the first occurrence of the target value, and last is the index of the last occurrence of the 10

target value. If the target value is not found in the array, return [-1, -1].

Example:

Input : 1, 2, 2, 2, 3, 4, 4, 4, 5

target = 4

Output:

First Occurrence: 5

Last Occurrence: 7

4. The 'N' integer numbers in the list are not necessarily sorted. Write an algorithm (**findKpostLarg(arr[0,1,...,N-1], K)**) applying all the constraints listed below to find the **K**th largest element: Sort the list by choosing the smallest member from the unsorted position and shifting it to the sorted position. Analyse the (findKpostLarg(arr[0,1,...,N-1], K))'s **worst-case time complexity**. 10

5 Mr Carlo is conducting a game between two players using two stacks namely **stack1** and **stack2**. Initially, both stacks are empty. At the starting of the game Mr Carlo has to load two stacks with n integers each. Assume n is an even number. Mr.X has to play the game using **stack1** and Mr.Y has to play the game using **stack2**. Both players have to play n/2 rounds. In each round two elements are popped (top element and element next to top) and the following conditions have to be checked to provide the score.

If (top element of **stack1**) > (top element of **stack2**) and (next to top element of **stack1**) > (next to top element of **stack2**) then Player1(Mr.X) gets 2 points

If (top element of **stack2**) > (top elemnt of **stack1**) and (next to top element of **stack2**) > (next to top element of **stack1**) then Player2(Mr.Y) gets 2 points 10

In all other conditions, no points will be given for both players. The same procedure is repeated for **n/2 times**. Write an algorithm for this game starting from loading of stack and calculate the cumulative score of Mr.X and Mr.Y after playing **n/2 rounds**. Announce the winner based on the highest score. If two players have got the same score either 0 or some other integer, then announce it as "**Game Draw**". Analyse the time complexity of your algorithm.

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Continuous Assessment Test I - September 2022

Programme	:	B.Tech. CSE	Semester	:	Fall 2022-2023
Course	:	Data Structures and Algorithms	Code	:	BCSE202L
Faculty	:	Bhuvaneswari, Richa, Joshan, Tamilarasi, Hasmath Farhana, Kirthica, Mansoor Husain D, Valarmathi, Rajakumar, Sindhia Lingaswamy, Sahaya Beni Prathiba, Vinothini A, Balaji, Saleena	Class No.	:	CH2022231001424, 1459, 1453, 1471, 1447, 1445, 1457, 1425, 1423, 1450, 1427, 1426, 1454, 1472
			Slot	:	A2+TA2
Time	:	90 minutes	Max.Marks	:	50

- Anwer ALL Questions.
- Answer the Questions with your Intelligence Only.
- If some information is required for answering any question, assume the same.

Q.No	sub Q.No	Question Description	Marks
1		Give asymptotic upper and lower bounds for $T(n)$ in each of the following recurrences. Assume that $T(n)$ is constant for $n \leq 2$. Make your bounds as tight as possible, and justify your answers. (a). $T(n) = 3T(n/2) + n^2$ (5 marks) (b). $T(n) = 16T(n/4) + n$ (5 marks)	10
2		Given two arrays A and B of positive integers, write an algorithm to list out all pairs (x, y) such that $x^y > y^x$, where x is an element from A and y is an element from B. Compute the running time of your algorithm.	10

3		An equation is said to be line in two variables if it is written in the form of $L(x, y) = ax + by + c = 0$, where a, b & c are real numbers and the coefficients of x and y are $a(\neq 0)$ and $b(\neq 0)$ respectively. A point $P = (x_1, y_1)$ is on the line equation if $ax_1 + by_1 + c = 0$. For example, $10x - 2y + 4 = 0$ is a line equation and $P(x = 1, y = 7)$ is a point on the line equation. **Farthest pair problem:** Given a line $L(x, y)$ and let $P_0 = (x_0, y_0)$ be a point on the line. Assume $P_1 = (x_1, y_1), P_2 = (x_2, y_2), ..., P_n = (x_n, y_n)$ are n points on the line L. Find the farthest (in the sense of Euclidean distance) point among n points from the point P_0. Write a recursive algoritthm to solve the Farthest pair problem (as defined above). Illustrate your algorithm for any sample input. [**Hint**: The Euclidean distance of P_1 and P_2 is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$]	10
4		Let $L = \{a_i\}, 1 \leq i \leq n$ and let k be a positive integer. Write an algorithm to arrange elements of L in increasing order where the index of elements in L are divisible by k and other elements need not be sorted. Illustrate your algorithm for any sample input. For example, If $L = \{1, 9, 4, 6, 3, 5, 8\}$ and $k = 2$ then result is $L = \{1, 9, 3, 6, 4, 5, 8\}$	10
5		Assume you are given a number X and two sorted lists A and B of n numbers such as $A = \{a_1 \leq a_2 ... \leq a_i \leq ... \leq a_n\}$ and $B = \{b_1 \leq b_2 ... \leq b_i \leq ... \leq b_n\}$. Write an algorithm to determine the total number of pairs (i, j) such that $a_i + b_j \leq X$. Illustrate your algorithm for any sample input.	10

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Continuous Assessment Test 1 – September 2023

Programme	:	B. Tech (CSE)	Semester	:	FALL 2023-24
Course	:	Data Structures and Algorithms	Code	:	BCSE202L
			Slot		A2 + TA2
Faculty	:	Dominic Savio M Vijayaprabakaran K Vatchala S Sudheer Kumar E Avuthu Aninash Reddy Karthikeyan N Valarmathi K	Class Number	:	CH2023240100659 CH2023240100653 CH2023240101211 CH2023240100657 CH2023240100661 CH2023240100660 CH2023240100655
Time	:	90 Minutes	Max. Marks	:	50

Answer all the Questions

1. Consider a m x n matrix of real numbers with the elements arranged in column-wise sorted order. Write an algorithm to search a target (search element) from the given matrix such that your algorithm takes a worst-case running time of less than O (m * n). Consider a sample matrix of size 5 X 4 which is arranged in column-wise sorted order. If a target 179 is searched, your algorithm should return 'true'. If a target 37 is searched your algorithm should return 'false'. Compute the running time of your algorithm. **10**

$$\begin{pmatrix} 10 & 26 & 55 & 90 \\ 12 & 34 & 63 & 110 \\ 17 & 39 & 78 & 154 \\ 19 & 47 & 81 & 179 \\ 22 & 49 & 88 & 199 \end{pmatrix}$$

2. Forward-Reverse-Fifty-Fifty Sorting: Consider an array A of n integer elements. When the sorting process comes to an end, half of the array elements are arranged in ascending order and the remaining half is arranged in descending order. **10**

For example, for an array A=[15, 2, 9, 17, 24, 1, 18, 11, 3] with size n = 9 elements, sorting algorithm outputs as : A=[1, 2, 3, 9, 24, 18, 17, 15, 11].

Write an algorithm to perform Forward-Reverse-Fifty-Fifty Sorting and compute the time complexity.

3. Compute and analyze the time complexity of the following recursive functions. 10

a. $T(n) = T(n/3) + C$, $T(1) = 1$ and C is a constant.
b. $T(n) = 64\,T(n/8) + n^2 \log n$

4. Assume that you are given an array of real numbers with an initial array index that starts from 1. Your task is to sort the Fibonacci series indexed numbers in the array. Apply the divide and conquer approach to write your sorting algorithm and compute the running time of your algorithm. Consider a set of elements of an array as follows: 10

87, 23, 56, 91, 42, 18, 70, 65, 33, 79

Elements of Fibonacci series 1, 1, 2, 3, . . . indices only need to be sorted and the sorted output is as follows:

23, 42, 56, 91, 65, 18, 70, 87, 33, 79

5. Assume that B is an array of non-negative integer elements.

```
FIXIT1(B)
1. n = length(B)
2. l = n % 2
2. for k = 1 to n
3.      f = FIXIT2(B[i])
4.      if (f % 2 != 0)
5.              l = l + f
6.      else
7.              l = l - f
8. print l
```

10

```
FIXIT2(p)
1. h = 0
2. while(p != 0)
3.      p = p / 2
4.      q = p % 10
5.      h = h + q
6. return h
```

i. Trace the algorithm for a given array B = [1029, 1567, 33789, 44444]. [4]
ii. What is the functionality of FIXIT1? [3]
iii. Compute the running time of the algorithm FIXIT1. [3]

□□□

4. Alice is developing a queue-based system for managing customer requests at a busy helpdesk. Initially, Alice decided to implement the helpdesk's queue using a fixed-size array with a capacity of 100 slots. However, Alice soon encounters various limitations associated with this approach. Once such limitation is when a customer gets serviced, all other customers need to move one step ahead. Suggest Alice how the existing approach can be improved to reduce customer movement and write down pseudocode to add and remove customers in the queue with the illustration.

5. Suppose you have a pointer to the head of singly linked list having n nodes. Assume n is positive even number. Write an algorithm to split the given list into two equal halves, list1 with first n/2 nodes and list2 with last n/2 nodes and analyse the time complexity.
Also, write an algorithm to create a new list list3 with even nodes from list2 followed by odd nodes from list1 and analyse the complexity.

List: Head->1->2->3->4->5->6->7->8->9->10>NULL
List1:Head->1->2->3->4->5->NULL
List2:Head->6->7->8->9->10->NULL
List3:Head->7->9->1->3->5->NULL

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Continuous Assessment Test I – September 2023

Programme	:	B.Tech (ECM)	Semester	:	FALL 2023-24
Course	:	Data Structures and Algorithms	Code	:	BCSE202L
			Class Nbr	:	CH2023240101289
Faculty	:	Prof Karthika V	Slot	:	C2+TC2
Time	:	90 Minutes	Max. Marks	:	50

Answer ALL the questions

Q.No.	Questions	Marks
1	You are a dedicated meteorologist working in a cutting-edge weather forecasting office. Your role is to design and implement algorithms to improve the accuracy and reliability of weather predictions. Consider two algorithms, Algorithm X and Algorithm Y are designed to predict the weather. The input size for both algorithms is n. The running time of algorithms are given as follows: Algorithm X: $T_X(n) = 2n^3 + 4n^2 + 6n + 8$ Algorithm Y: $T_Y(n) = 2^n + 100n$ a) Determine the upper bound time complexity for each algorithm. Compare the growth rates of Algorithm X and Algorithm Y as 'n' approaches to infinity. Which algorithm has a higher growth rate?	6
	b) Consider a scenario where the input size 'n' is doubled. How does the runtime of each algorithm change? Explain the impact of doubling the input size on the runtime of both algorithms.	4
2.	Can the master method be applied to the given recurrence relation? Justify your answer. $T(n) = 16T\left(\frac{n}{4}\right) + \frac{n^2}{\log n}$ Find the time complexity for the given recurrence relation.	10
3.	You are given a stack of random integers, and your task is to sort the integers in ascending order using stack data structure. You can use stack operations and an additional stack for temporary storage. Write an algorithm to sort the integers in ascending order using two stacks (input stack and temporary stack). For example, Consider a stack with the following integers: [5, 2, 9, 1] and the top is pointing to 1. Final Sorted Stack: [1,2,5,9], top is pointing to 9. Describe each step and the state of both stacks after each operation until the final sorted stack is achieved.	10

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Continuous Assessment Test I – September 2023

Programme	: B.Tech (ECM)	Semester	: FALL 2023-24
Course	: Data Structures and Algorithms	Code	: BCSE202L
		Class Nbr	: CH2023240101287
Faculty	: Prof. Karthika V	Slot	: C1+TC1
Time	: 90 Minutes	Max. Marks	: 50

Answer ALL the questions

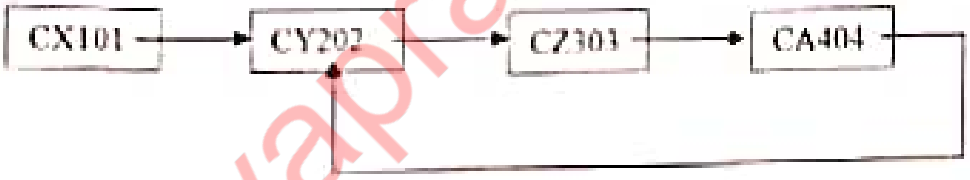
Q. No	Questions	Marks
1.	You are working for a financial firm that handles high-frequency trading. The firm receives a continuous stream of real-time market data, and algorithms are employed to analyse this data and make rapid trading decisions. The efficiency of these algorithms is crucial to capitalize on market opportunities. You have three candidate algorithms for processing real-time market data and the input data size is n, where 'n' is a positive integer. The running time of algorithms are given as Algorithm A: $T_A(n) = 3n^2 + 5n + 2$ Algorithm B: $T_B(n) = 2^n + 4n^3$ Algorithm C: $T_C(n) = 20n + 1000$ i) Calculate the upper bound time complexity for each algorithm. Also, Arrange the three algorithms in increasing order of their upper bound time complexity. Justify your arrangement. ii) In the context of real-time market data analysis, which algorithm would offer the highest level of efficiency? Justify your answer.	7 3
2.	Solve the given recurrence relation by using recursion tree method and find its upper bound time complexity i) $T(n) = 2T\left(\frac{n}{2}\right) + n^2$ ii) $T(n) = 3T\left(\frac{n}{4}\right) + n^2$	5 5
3.	(i) In order to reduce the memory overhead, the infix expression needs to be represented in reverse polish notation. Convert the below infix into reverse polish notation using suitable data structure with the illustration. a^b^a-(c/d)*e+(f+g) (ii) Evaluate the obtained reverse polish notation with the following values and illustrate the same. a=2, b=3, c =15, d = 5, e = 7, f = 6, g = 1	5 5

4. Imagine you are designing a system for processing "food orders" in a restaurant. Customers can place their food orders, and the orders need to be processed in the sequence they are received. You decided to implement the ordering and processing operations using two stacks, "OrderStack" and "ProcessingStack" respectively. 10

Write algorithms for ordering and processing operations in the restaurant and analyse its time complexity

5. Consider a university course registration system that stores the student's course registration information in a singly linked list. Courses are represented by course codes (e.g., Course X with code "CX101," Course Y with code "CY202"). Each student can register for any number of courses in a semester. The university course registration system should prevent the student from registering already registered courses. 10

For example, If a student registers for 4 distinct courses already (CX101-> CY202 -> CZ303 -> CA404), then the student tries to register 5th course as CY202, the course registration system should detect and prevent from doing so.



Write down the pseudocode to implement a cycle detection mechanism in the university course registration system.

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Continuous Assessment Test (CAT-I) – September 2023

Programme	: B.Tech (CSE)	Semester	:	Fall 2023– 2024
		Code	:	BCSE202L
Course Title	: Data structures and Algorithms	Slot	:	D1+TD1
Faculty	: Dr. A. Vijayalakshmi, Dr. Bharathi Raja S, Dr. Raja Sree T, Dr. Sendhil R, Dr. Ilavendhan A, Dr. Elakiya E	Class Nbr	:	CH2023240101102 CH2023240100841 CH2023240100842 CH2023240100843 CH2023240100844 CH2023240100846
Time	: 90 Minutes	Max. Marks	:	50

If any assumptions are required, assume the same and mention those assumptions in the answer script.

Answer all questions

Q.No.	Sub Sec.	Question Description	Marks
1.		Solve the following recurrence relations and give the corresponding asymptotic notation. i. $T(n) = 3T\left(\frac{n}{3}\right) + n^2$ [Assume T(1)=1] (5 marks) ii. $T(n) = 2T(n-1) + 4$ [Assume $T(0) = 1$] (5 marks)	10
2.		Consider an array L contains 'n' positive integers. Sort the array L in increasing order based on the length of the positive numbers, where the length of the number represents a total number of digits of the number. For example, the length of 1231 is 4. While sorting, if more than one number is in same length, those numbers are to be sorted in decreasing order within them. Write a suitable pseudo code for the same and find the time complexity. For example: Input: L = [23,10,4566,344,123,121] Output: L=[23,10,344,123,121,4566]	10
3.		Consider an array A[0,...,n-1] contains 'n' integers. A peak of an array A is defined as A[i-1] < A[i] and A[i] > A[i+1]. i.e A peak A[i] is greater than to its neighbors in an array A. Assume that first and last integers having only one neighbor (A[0] is peak, if A[0]>A[1] and A[n-1] is peak, if A[n-1] >A[n-2]). Write a pseudo code to find and print the peaks and your code should give time complexity as O(log n). Example: A=[10,6,4,3,12,19,18] Output: 10,19	10

4. Consider a stack contains 'n' integers. Write a pseudo code to move all negative integers to the bottom of stack and move all positive integers to the top of stack without changing the order of the elements in the stack. Your pseudo code should use stack data structure only and find it's time complexity. **10**

5. Let Q be a Queue data structure contains 'n' integers. And also consider another integer 'x'. Write a pseudo code using queue data structure (only) to determine whether there exist two elements in Q whose difference is exactly equal to 'x' or not. If yes, then display those numbers, otherwise print 'not found'. **10**

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Continuous Assessment Test (CAT) - I : September 2023

Programme	:	B.Tech (CSE)	Semester	:	Fall 2023-2024
Course	:	Data Structures and Algorithms	Code	:	BCSE202L
Faculty	:	Dr.U Srinivasa Rao, Dr. Ramesh Ragala, Dr. Raja Sree T, Dr. Sendhil R, Dr. Ilavendhan A, Prof. Sabireen H, Dr. Elakiya E	Class No.	:	CH2023240100847, CH2023240101103, CH2023240100849, CH2023240100850, CH2023240100852, CH2023240100854, CH2023240100855
	:		Slot	:	D2 + TD2
Time	:	90 minutes	Max.Marks	:	50

- **Answer ALL Questions.**
- **Answer the Questions with your Intelligence Only.**
- **If any assumptions are required, assume the same and mention those assumptions in the answer script.**
- **Your answer should consist: understanding of the problem(input and output), logic to develop an algorithm, an illustration, the algorithm, and the running time of your algorithm..**

Q.No	sub Q.No	Question Description	Marks
1		Let S be a stack of n integers. Write an algorithm to compute the total number even integers in the given stack. You are supposed to use stack data structure only.	10

2		(i) Is $4n^{1.52} + 100^3 n + 5logn = \mathcal{O}(n^2)$? Justify your answer. (5 marks) (ii) Solve the following recurrence relation (5 marks) $T(n) = 2T(n/3) + n$, for $n > 1$.Here $T(n) = 1$ if n=1 .	10
3		Your are given a list of n-balls. Each ball is colored with one of the colors from the set {Red,White,Blue}. Rearrange these colored balls such that all Red colored balls come first, the White colored balls come next, and the Blue colored balls come last. Your task is to write an algorithm that should have running time in linear and also exhibits an in-place sorting characteristic to solve this task. [Hint: In-place characteristic means extra auxiliary memory is not used for sorting the given list of n balls]	10
4		Write a modified binary search algorithm that splits the list into two sub-lists, where one of which is twice the size of the other sub-list. However the binary search algorithm splits the list into two (almost) equal sized sub-lists. Compare the performance of the binary search algorithm with modified binary search algorithm for given list of n sorted elements.	10

5		The following algorithm computes the sum of the values at some indices of the given array - A.
		
		Algorithm Sum_AI (A,n)
		// Input: A is an array of n elements
		// Output: Return sum
		{
		sum := 0;
		for j := 1 to n do
		{
		i := 1;
		while(i<n) do
		{
		sum := sum + A[i];
		i := i * 3;
		}
		}
		return (sum);
		}
		
		Your task is to compute the running time of the given algorithm.
			10