

Lab	Type	Practical
Unit:	I – Intro	oduction
1	A	Write a program to calculate area of a Circle.
	A	2. Write a program to find whether a number is odd or even
	A	3. Write a program to determine whether the entered character is vowel or not.
	A	4. Write a program to find factorial of a number. (Using Loop)
	A	5. Write a program to find factorial of a number. (Using Recursion)
	B	6. Write a program to find power of a number using loop.
	B	7. Write a program to find factors of a given number.
	B	8. Write a program to check whether a number is prime or not.
Unit:	II – Line	ear Data Structures: Array, Stack, Queue and Linked List
2	A	9. Write a program to read and display n numbers using an array.
	A	10. Write a program to calculate sum of numbers from m to n.
	A	11. Write a program to calculate average of first n numbers.
	A	12. Write a program to find position of the smallest number from given n numbers.
	B	13. Write a program to find whether the array contains a duplicate number or not.
	В	14. Read n numbers in an array then read two different numbers, replace 1 <sup>st</sup> number with 2 <sup>nd</sup> number in an array and print its index and final array.
3	A	15. Write a program to insert a number at a given location in an array.
	A	16. Write a program to delete a number from a given location in an array.
	В	17. Write a program to insert a number in an array that is already sorted in an ascending order.



	В	18. Write a program to delete a number from an array that is already sorted in an ascending order.
	B	19. Write a program to merge two unsorted arrays.
	A	20. Read two 2x2 matrices and perform addition of matrices into third matrix and print it
	B	21. Read two matrices, first 3x2 and second 2x3, perform multiplication operation and store result in third matrix and print it.
4	A	22. Write a program to swap two numbers using user-defines method.
	A	23. Create class Employee_Detail with attributes Employee_ID, Name, Designation, and Salary. Write a program to read the detail from user and print it.
	В	24. Create array of object of class Student_Detail with attributes Enrollment_No, Name, Semester, CPI for 5 students, scan their information and print it.
4	A	<ul> <li>25. Write algorithms to perform following operations on a stack:</li> <li>Push</li> <li>Pop</li> <li>Peep</li> <li>Change</li> </ul>
		<ul> <li>26. Take a stack of size 3 and performing following operations. Show the position of stack at each step:</li> <li>Push 1, Push 2, Push 3, Push 4</li> <li>Pop, Pop</li> <li>Push 5</li> <li>Change 3rd element to 8</li> <li>Push 6 &amp; 7</li> <li>Traverse the stack</li> </ul>
	В	<ul> <li>27. Write a menu driven program to implement following operations on the Stack created using an Array</li> <li>PUSH</li> <li>POP</li> <li>DISPLAY</li> <li>PEEP</li> <li>CHANGE</li> </ul>
5	A	28. How stack can be used to recognize strings aca, bcb, abcba, abbcbba?
	В	29. Implement a program described in 5(A)



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#### B. Tech. Semester – III | Academic Year 2023-24

	В	30. Write a program to determine if an input character string is of the form a <sup>i</sup> b <sup>i</sup> where i >= 1 i.e., Number of 'a' should be equal to number of 'b'.
6	A	<ul> <li>31. Convert the following infix expressions into postfix expressions:</li> <li>(A + B * C / D - E + F / G / (H + I))</li> <li>(A + B ) * C + D / (B + A * C) + D</li> <li>32. Convert the following infix expressions into prefix expressions:</li> <li>A-B/(C*D^E)</li> <li>(a + b ^ c ^ d) * (e + f / d)</li> </ul>
	В	33. Implement a program to convert in-fix notation to post-fix notation using stack.
7	A	<ul> <li>34. Evaluate the following expressions showing every status of stack in tabular form:</li> <li>5, 4, 6, +, *, 4, 9, 3, /, +, *</li> <li>7, 5, 2, +, *, 4, 1, 1, +, /, -</li> <li>35. Evaluate the following expressions showing every status of stack in tabular form:</li> <li>*, +, 6, 9, -, 3, 1</li> <li>+, -, *, 2, 2, 1, 16, 8, 5</li> </ul>
	В	36. Write a program for evaluation of post-fix Expression using Stack.
	В	37. Write a program for evaluation of pre-fix Expression using Stack.
8	A	<ul> <li>38. Write algorithms to perform following operations on a simple queue:</li> <li>Insert</li> <li>Delete</li> </ul>
		<ul> <li>39. Perform following operations on queue with size 4 &amp; draw queue after each operation:</li> <li>Insert 'A', Insert 'B', Insert 'C'</li> <li>Delete, Delete</li> <li>Insert 'D', Insert 'E'</li> </ul>
	A	<ul> <li>40. Write algorithms to perform following operations on a circular queue:</li> <li>Insert</li> <li>Delete</li> </ul>



	В	<ul> <li>41. Consider the following circular queue having 6 memory cells. Front=2, Rear=4 Queue: _, A, C, D, _, Describe queue as following operation take place:</li> <li>F is added to the queue</li> <li>Two letters are deleted</li> <li>R is added to the queue</li> <li>S is added to the queue</li> <li>One letter is deleted</li> <li>42. Write a menu driven program to implement following operations on the Queue created using an Array</li> <li>ENQUEUE</li> <li>DEQUEUE</li> </ul>
	В	<ul> <li>DISPLAY</li> <li>43. Write a menu driven program to implement following operations on the Queue created using an Array</li> <li>ENQUEUE</li> <li>DEQUEUE</li> <li>DISPLAY</li> </ul>
9	A	<ul> <li>44. Draw a Node Structure of Single linked list for following example (include insertion and deletion)</li> <li>Insert 10</li> <li>Insert 20 at the end of the list</li> <li>Insert 5 at the beginning of the list</li> <li>Delete the last node</li> <li>Delete the first node</li> </ul>
	A	45. Write a sample java code to implement a node structure
	A	46. Implement a program to create a node for singly linked list. Read the data in a node, print the node.
	В	<ul> <li>47. Write a menu driven program to implement following operations on the singly linked list.</li> <li>Insert a node at the front of the linked list.</li> <li>Display all nodes.</li> <li>Delete a first node of the linked list.</li> <li>Insert a node at the end of the linked list.</li> <li>Delete a last node of the linked list.</li> <li>Delete a node from specified position.</li> </ul>
10	A	48. Draw a structure of Stack implemented using LinkedList (Example)
	A	49. Draw a structure of Queue implemented using Linked List (Example)



	В	50. Write a program to implement stack using singly linked list.
	В	51. Write a program to implement queue using singly linked list.
	В	31. Write a program to implement queue using singly linked list.
11	A	<ul> <li>52. Explain the concept of circular linked list with example</li> <li>Insert 10</li> <li>Insert 20 at the end of the list</li> <li>Insert 5 at the beginning of the list</li> <li>Delete the last node</li> <li>Delete the first node</li> </ul>
	В	<ul> <li>53. Write a menu driven program to implement following operations on the circular linked list.</li> <li>Insert a node at the front of the linked list.</li> <li>Delete a node from specified position.</li> <li>Insert a node at the end of the linked list.</li> <li>Display all nodes.</li> </ul>
12	A	<ul> <li>54. Explain the concept of doubly linked list with example</li> <li>Insert 10</li> <li>Insert 20 at the end of the list</li> <li>Insert 5 at the beginning of the list</li> <li>Delete the last node</li> <li>Delete the first node</li> </ul>
	В	<ul> <li>55. Write a menu driven program to implement following operations on the doubly linked list.</li> <li>Insert a node at the front of the linked list.</li> <li>Delete a node from specified position.</li> <li>Insert a node at the end of the linked list. (Home Work)</li> <li>Display all nodes. (Home Work)</li> </ul>
Unit:	III – Nor	nlinear Data Structures: Tree and Graph
13	A	56. Construct a Binary Tree for Following Elements 10 20 30 40 50 45 60 15 70
	A	<ul> <li>57. Provide a Pre-order, Post-order and in-order traversal for following binary search tree.</li> <li>10 15 20 5 4 3 18 19</li> <li>20 30 10 15 40 9 8 7</li> <li>50, 70, 60, 20, 90, 10, 40, 100</li> </ul>



	A	58. Construct a Binary tree from pre-order and post order traversal
		• 1, 2, 4, 8, 9, 5, 3, 6, 7 (Pre)
		• 8, 9, 4, 5, 2, 6, 7, 3, 1 (Post)
	В	59. Implement a menu based Binary search tree for following operation
		Insert a node
		Delete a node
		Preorder Traversal
		Post order Traversal
		In order Traversal
Unit:	IV – Has	shing and File Structures
14	A	60. Implement an AVL tree for following node value.
		13 10 15 12 18 2 1 4
		After that delete a node 15 and redraw a AVL tree
	A	61. Explain BFS and DFS search techniques in Graph
	В	62. Implement a Dictionary (key, value) pair using Hash-table.
Unit:	V – Sort	ing and Searching
15	A	63. Discuss a Hash table advantages and disadvantage.
	A	64. Insert a Following value into Hash table where table size is 10, use a linear probing method
		13 10 15 12 18 2 1 4
	В	65. Implement a Hash table using Array
16	A	66. Implement a linear search algorithm
	A	67. Implement a binary search algorithm
17	A	<ul> <li>68. Implement a given sorting technique for Array A= {10,20,5,8,9,11,30}; sort in ascending order</li> <li>Bubble Sort.</li> <li>Insertion Sort</li> </ul>
	В	<ul> <li>69. Implement a given sorting technique for Array A= {10,20,5,8,9,11,30}; sort in ascending order</li> <li>Bubble Sort.</li> <li>Insertion Sort</li> </ul>



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18	A	<ul> <li>70. Implement a given sorting technique for Array A= {10,20,5,8,9,11,30}; sort in ascending order</li> <li>Selection Sort</li> <li>Bucket Sort</li> </ul>
	В	<ul> <li>71. Implement a given sorting technique for Array A= {10,20,5,8,9,11,30}; sort in ascending order</li> <li>Selection Sort</li> <li>Bucket Sort</li> </ul>
19	A	<ul> <li>72. Implement a given sorting technique for Array A= {10,20,5,8,9,11,30}; sort in ascending order</li> <li>Redix Sort</li> <li>Shell Sort</li> </ul>
	В	<ul> <li>73. Implement a given sorting technique for Array A= {10,20,5,8,9,11,30}; sort in ascending order</li> <li>Redix Sort</li> <li>Shell Sort</li> </ul>
20	A	<ul> <li>74. Implement a given sorting technique for Array A= {10,20,5,8,9,11,30}; sort in ascending order</li> <li>Counting Sort</li> <li>Tree Sort</li> </ul>
	В	<ul> <li>75. Implement a given sorting technique for Array A= {10,20,5,8,9,11,30}; sort in ascending order</li> <li>Counting Sort</li> <li>Tree Sort</li> </ul>
21	A	<ul> <li>76. Implement a given sorting technique for Array A= {10,20,5,8,9,11,30}; sort in ascending order</li> <li>Merge Sort</li> <li>Quick Sort</li> <li>Heap Sort</li> </ul>
	В	<ul> <li>77. Implement a given sorting technique for Array A= {10,20,5,8,9,11,30}; sort in ascending order</li> <li>Merge Sort</li> <li>Quick Sort</li> <li>Heap Sort</li> </ul>