

BABU MADHAV INSTITUTE OF INFORMATION TECHNOLOGY, UTU
Integrated M.Sc.(IT) / B.Sc.(IT)

	Practical List: 02
1.	Write a C++ program to display the elements (DBMS, RDBMS, WEB, DATA STRUCTURE, MPI) of array named "Language" using While loop or For loop. [Hint: Take the use of Traversing algorithm]
2.	Write a C++ program to display the elements (97, 55, 68, 71, 80) in ascending order of array named "Percentage". [Hint: Take the use of Sorting algorithm]
3.	Write a C++ program that can take 4 student's enrolment numbers as (101, 103, 105, 109) from the user. Display all the student's enrollment numbers on a screen. Insert enrolment number 107 at the 4th location in an array named NUM. Use appropriate message also like if the array is full, then display "Array is full!" else "Array is still empty!" [Hint: Take the use of Inserting algorithm]
4.	Write a C++ program that can take 5 student's enrolment numbers (as 101, 103, 105, 107, 109) from the user. Display all the student's enrollment numbers on a screen. Remove enrolment number 103 from an array named NUM and again display all the student's enrollment numbers on a screen. Use appropriate message also like if the enrolment is found, then display "Your value is found!" else "Not found!" [Hint: Take the use of Deletion algorithm]
5.	Write a C++ program which can take 10 student's enrolment numbers (as 1011, 1022, 2011, 2022, 3011, 3022, 4011, 4022, 5011, 5022) from user. Display all the student's enrollments on screen. Also search and display the position of 5011 enrolment number. Use appropriate message also like if the value is found, then display "Search is Successful!" else "Search is unsuccessful!" [Hint: Take the use of Searching algorithm]
6.	Write a program to implement stack-using array. Following operation should be performed: A. Insert element (Push) B. Remove element (Pop) C. Display (Note: Program should be menu driven)
7.	Write a program in C++ for the conversion of Infix expression to Postfix expression using a stack.
8.	Write a program in C++ for evaluating the Postfix expression using a stack.
9.	Write a C++ program for Tower of Hanoi.
10.	Write a C++ program to find the factorial of an integer 'n' with a Stack.
11.	Write a menu driven program to implement following functionality with queue using array: A. Insert element (Enqueue) B. Remove element (Dequeue) C. Display the queue

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12.	<p>Write a menu driven program to implement following functionality with Deque using array:</p> <p>A. Insert element at Front B. Insert element at Rear C. Remove element at Front D. Remove element at Rear E. Display the queue</p>
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Objective(s)	To vibrant the concept of Array, Stack and Queue.
Pre-requisites	Basic of Object-Oriented Concepts.
Duration for Completion	10 Hours
PSO(s) to be achieved	PSO3: Student will be able to devise and conduct experiments and provide well informed conclusions using recent tools, technologies and industrial trends.
PO(s) to be achieved	PO2: Problem Analysis and Solution: Identify, Analyse and provide the solution for emerging real-world problems with the help of theoretical and practical understanding of tools and technologies.
CO(s) to be achieved	CO1: Identify essential Data Structures and analyse the complexity of algorithms and identify the optimized algorithm. CO2: Recognize problem properties where arrays, stacks, queues, and deque are appropriate data structures.
Solution must contain	Source Code with comments and Output Screen Shot
Nature of submission	Handwritten on A4 size blank papers
References for solving the problem	Textbook: Classic Data Structures, Debasis Samanta, PHI.
Post Laboratory questions	<p>1. Convert the following Infix expressions into Prefix and Postfix expression:</p> <p>1. $(A + B) * C - D / (E * F)$ 2. $(A + B) / C - (E + F)$ 3. $((A / B) * C) - E$ 4. $(A + B) * (C + D) / (E * F)$ 5. $(A + B - C) * E - F$</p> <p>2. Translate the following Infix expressions into its equivalent Postfixexpression [in a tabular form]:</p> <p>1. $(A + B) * C - D / (E * F)$ 2. $(A + B) / C - (E + F)$ 3. $((A / B) * C) - E$ 4. $(A + B) * (C + D) / (E * F)$ 5. $(A + B - C) * E - F$</p> <p>3. Evaluate the following postfix expression using a stack [in a tabular form]:</p> <p>1) 15, 3, 2, +, /, 7, +, 2, * 2) 10, 3, *, 7, 1, -, *, 23, + 3) 12, 7, 3, -, /, 2, 1, 5, +, *, + 4) 7, 2, -, 1, 14, -, 1, 2, *, +, +</p>

	<p>5) 10, 20, +, 25, 15, -, *, 30, /</p> <p>4. Trace the following code, showing the contents of the 'STACK' after each invocation:</p> <ol style="list-style-type: none"> 1. PUSH(STACK, 1) 2. PUSH(STACK, 2) 3. PUSH(STACK, 3) 4. POP(STACK, ITEM) 5. PEEP(STACK, ITEM) 6. PUSH(STACK, 4) 7. POP(STACK, ITEM) 8. POP(STACK, ITEM) 9. PEEP(STACK, ITEM) 10. PUSH(STACK, 5) <p>5. Trace the following code, showing the contents of the Queue 'q' after each call:</p> <ol style="list-style-type: none"> 1. ENQUEUE(QUEUE, A) 2. ENQUEUE(QUEUE, B) 3. ENQUEUE(QUEUE, C) 4. DEQUEUE(QUEUE, ITEM) 5. DEQUEUE(QUEUE, ITEM) 6. ENQUEUE(QUEUE, D) 7. DEQUEUE(QUEUE, ITEM) 8. DEQUEUE(QUEUE, ITEM) 9. ENQUEUE(QUEUE, E) 10. DEQUEUE(QUEUE, ITEM) <p>6. Consider the following circular queue capable of accommodating a maximum of seven elements:</p> <p style="padding-left: 40px;">Queue is: -, A, B, C, D, -, -, and Front = 2, Rear = 5</p> <p style="padding-left: 40px;">Demonstration of the circular queue as the following operation take place:</p> <ol style="list-style-type: none"> 1. Enqueue "E" 2. Enqueue "F" 3. Dequeue 4. Enqueue "G" 5. Dequeue 6. Enqueue "H"
	<p>7. Suppose a queue is maintained by a circular array QUEUE with N = 12 memory cells. Find the number of elements in QUEUE if...</p> <ol style="list-style-type: none"> a) FRONT = 4 and REAR = 8; b) FRONT = 10 and REAR = 3; and FRONT = 5 and REAR = 6; then two elements are deleted.