Vivekanand Education Society's
Institute of Technology
Approved by AICTE & Affiliated to University of Mumbai

Department of Artificial Intelligence and Data Science

Data Structures Lab Journal

Student Name: **Roll No:**

Class: **D6AD-B** **Academic Year: 2024-25**

Lab Objectives:

	Description
1	To implement basic data structures such as arrays, linked lists, stacks and queues
2	Solve problem involving different types of trees
3	To develop applications using different data structures and algorithms.

Lab Outcome (LOs):

LO	Description
LO 1	Students will be able to implement linear data structures & be able to handle operations like insertion, deletion, searching and traversing on them.
LO 2	Students will be able to implement nonlinear data structures & be able to handle operations like insertion, deletion, searching and traversing on them.
LO 3	Students will be able to choose appropriate data structure and apply it in various problems.
LO 4	Students will be able to select appropriate searching and sorting techniques for given problems.

Program Outcomes (PO):

PO1) Engineering knowledge: Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2) Problem Analysis: identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3) Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate

consideration for public health and safety, and the cultural, societal, and environmental considerations.

PO4) Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5) Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6) The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7) Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8) Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9) Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10) Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11) Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12) Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)

PSO1) Professional Skills: Understand, analyze and develop essential proficiency in the areas related to artificial intelligence and data science like mathematics, computational methods and statistics.

PSO2) Successful Career: Ability to design and implement novel solutions using state of the art Artificial Intelligence and Data Science techniques such as Machine Learning, Reinforcement and Deep Learning, Natural Language Processing leading to successful careers.

Programme Educational Objectives (PEOs)

PEO1: To inculcate the fundamentals of science and engineering concepts essential for solving real world problems in the field of Artificial Intelligence and Data Science.

PEO2: To empower students with knowledge and expertise to accomplish Socially Innovative Project with ethical practices in the area of Artificial Intelligence and Data Science.

PEO3: To enable graduates to participate in lifelong learning, innovative research and product development in the area of Artificial Intelligence and Data Science

LO-PO-PSO Mapping :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
LO1	3	2	3	2	-	-	-	-	1	1	1	3	2	1
LO2	3	2	3	2	-	-	-	-	1	1	1	3	2	1
LO3	3	3	3	2	-	-	1	-	1	1	1	3	2	1
LO4	3	3	3	2	-	-	1	-	1	1	1	3	2	1

Mark Distribution for Journal & Mini Project

Journal Parameter	Marks	Mini-Project Parameter	Marks
Program Execution	3 Marks	Mini project Execution	3 Marks
Documentation	3 Marks	Documentation	3 Marks
Timely Checked	2 Marks	Timely Checked	2 Marks
Viva	2 Marks	Viva	2 Marks
Total	**10 Marks**	**Total**	**10 Marks**

Evaluation:

- Experiments are evaluated based on mock viva taken on experiments.
- Journals are evaluated based on soft skills and presentations.
- Evaluation is based on the following table:

Range	Grade
80 and above	Outstanding (O)
75.00 – 79.99	Excellent (A)
70.00 – 74.99	Very Good (B)
60.00 – 69.99	Good (C)
50.00 – 59.99	Fair (D)
45.00 – 49.99	Average (E)
40.00 – 44.99	Pass (P)
Less than 40.00	Fail (F)

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List of Experiments:

No	List of Experiments	LO's	BL's	Marks
1	Stack using arrays.	LO1, LO3	1,2	/ **10**
2.	Applications of Stack: a. Parenthesis Matching b. Conversion of Infix Expression to Postfix Expression c. Postfix Expression evaluation.	LO1, LO3	3 3,4 3	/ **10**
3	Linear Queue using array	LO1, LO3	1,2	/ **10**
4	Implement ● Circular Queue using array. ● Priority Queue using array.	LO1, LO3	3	/ **10**
5	Implement a Singly Linked List.	LO1, LO3	3	/ **10**
6	Implement Stack and Linear Queue using Linked List.	LO1, LO3	3	/ **10**
7	Implement Circular Linked List.	LO1, LO3	3	/ **10**
8	Implement Binary Search Tree.	LO2, LO3, LO4	3	/ **10**
9	Implement an Expression Tree.	LO2, LO3, LO4	3	/ **10**
10	Searching Techniques : a. Binary Search b. Hashing	LO1, LO4	3 3,4	/ **10**
11	Sorting Techniques : a. Selection Sort b. Insertion Sort c. Merge Sort	LO1, LO4	3	/ **10**
12	Sorting Techniques : a. Quick Sort b. Heap Sort c. Bucket Sort	LO1, LO4	3	/ **10**
13	**Continuous Assessment** 1. MCQ 2. Mini Project Report 3. Programming Test on HackerRank	LO1, LO2, LO3, LO4, LO5, Lo6	1,2,3 4,5,6	/ **30** / **10** / **10**

Name of Lab Teacher: **Mrs. Lifna C S** **Signature** :