



# POORNIMA

## COLLEGE OF ENGINEERING

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### A Report on A Virtual lab on “DSA: Stacks & Linked Lists” using Virtual Lab

#### CONTENTS:

**NAME OF ACTIVITY:** A Virtual lab on “DSA: Stacks & Linked Lists” using Virtual Lab.

**DATE & DURATION:** September 4, 2020 (2 hours)

**TYPE OF ACTIVITY:** Expert Lecture

**ORGANIZER(S):** Department of Information Technology, Poornima College of Engineering, Jaipur.

#### EXPECTED OUTCOMES:

- Student will be able to gain a basic understanding of Stacks & Linked Lists as an abstract data type.
- Student will be understand stack & Linked Lists operations and associated time complexity through interactive animations.
- Student will be understand applications of Stacks & Linked Lists.

#### MAPPINGS WITH PO & PSO: Mapping Levels: 1- Low, 2- Moderate, 3-Strong

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	-	-	-	-	-	-	2	3	2
CO2	-	-	-	-	-	-	-	-	3	-	-	-	2	3	2
CO3	-	-	-	-	-	-	-	-	-	-	-	3	2	3	2

**BRIEF BIODATA OF RESOURCE PERSON:** The resource person of the Expert Lecture session was **Ms. Shazia Haque, Assistant Professor- IT Department, PCE.**

**ABSTRACT OF THE SEMINAR:** The virtual labs are fully interactive simulations in which students perform experiments, collect data, and answer questions to assess their understanding. The

**labs** combine animations, illustrations, and videos to convey key information and engage students in the process of science. 3IT4-21 Data Structures and Algorithms Lab has been conducted with the help of Virtual Labs. The Estimated time of virtual lab is 1 hour.

All students have performed practical as per instruction or procedure provided on line and also shown output of their assigned practical. They also cleared their doubts and provided conclusion by doing trouble shooting.

Stack: In this experiment, you will be learn about:

- Gain a basic understanding of Stacks as an abstract data type
- Understand stack operations and associated time complexity through interactive animations
- Understand applications of Stacks

Linked Lists: In this experiment on Linked Lists, you will learn following topics:

- Introduction
  - What is linked list?
  - How is linked list stored in memory?
- Types of Linked Lists
  - Singly linked List
  - Doubly Linked List
  - Circular Linked List

In this module on Singly Linked Lists, you will learn following topics:

- Insertion introduction on Singly Linked list
- Deletion introduction on Singly Linked list
- Practice module on Singly Linked list
- Exercise module on Singly Linked list

## GLIMPSES:

### Stacks:

The image displays two screenshots of the Virtual Labs website, specifically the 'Stacks Concept' video page. The top screenshot shows the video player with a woman speaking, and the bottom screenshot shows the same page with a diagram illustrating the stack operations.

**Virtual Labs**  
An MoE Govt of India Initiative

HOME PARTNERS CONTACT

Recap : Arrays  
Recap : Linked List  
Pretest  
Stacks  
Aim  
Concept  
Demo  
Arrays Practice  
Time Complexity  
Linked List Practice  
Exercise  
Quiz  
Queues  
Analysis  
Posttest

**Stacks Concept**

2 Stacks

Watch on YouTube

BE A LEADER

Stack diagram showing push and pop operations:

Diagram illustrating the Stack concept. It shows a vertical container labeled 'STACK' with a 'TOP' pointer. To the left, a sequence of numbers (5, 4, 3, 2, 1) is shown being pushed into the stack. To the right, a sequence of numbers (1, 2, 3, 4, 5) is shown being popped from the stack. The word 'Supply' is written below the popped sequence.

MORE VIDEOS

2:06 / 6:08

YouTube

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Virtual Labs

Stacks Concept

Recap : Arrays

Recap : Linked List

Pretest

Stacks

Aim

Concept

Demo

Arrays Practice

Time Complexity

Linked List Practice

Exercise

Quiz

Queues

Analysis

Posttest

Stacks and Queues

Instructions

10	12						
0	1	2	3	4	5	6	7

↑  
Top

Observations

12 is pushed into the stack.  
The index of the top of stack:1

Enter an element

Push

Pop

Clear

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Stacks and Queues

Instructions

Question: A set of elements are given in Stack A. With the help of Stack B, POP the elements in ASCENDING order.

Pop from A and Push to B

Pop from B and Push to A

Pop from Stack A

Pop from Stack B

6139

8814

7591

8606

9464

7936

2304

8588

Observations

## Linked List:

Insertion of a node:

Linked List

Instructions

Head

48

12

56

Null

Observations

Next of new node is pointed to the head node. Head pointer is now pointed to the new node.

at head

Insert At Head

at tail

Insert At Tail

search

Search

Index

at node

Insert At Node

remove

Remove

Deletion of a node:

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Virtual Labs

### Linked List

Instructions

```
graph LR; Head --> Node1[65]; Node1 --> Node2[45]; Node2 --> Node3[69]; Node3 --> Null[Null];
```

Observations

Value found!

at head  at tail  search

index  remove

### Practice Exercise:

Virtual Labs

### Linked List

Instructions

Question: Convert to 31, 29, 2, 67, 2

```
graph LR; Head --> Node1[31]; Node1 --> Node2[29]; Node2 --> Node3[67]; Node3 --> Node4[2]; Node4 --> Null[Null];
```

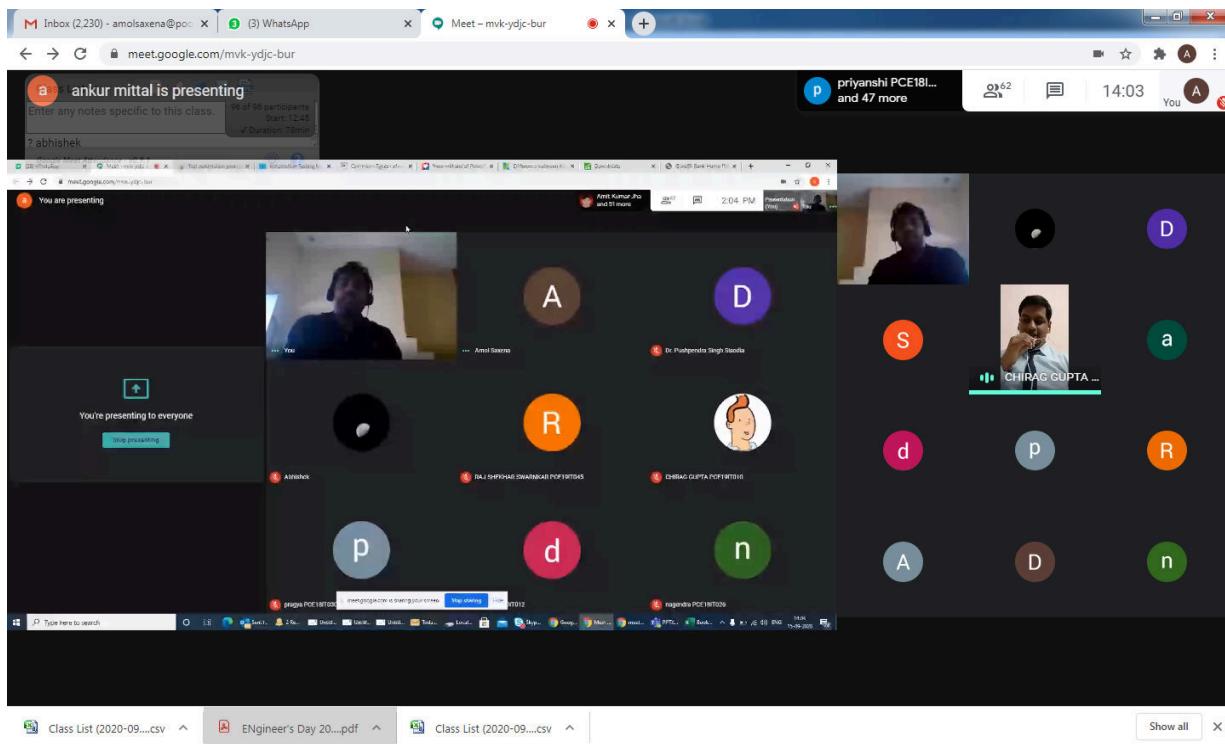
Observations

at head  at tail

index  Submit




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### LIST OF PARTICIPANTS:


S. No.	Registration No.	Year	Name
1	PCE19IT007	II Year	Ashutosh Singh
2	PCE19IT010	II Year	Chirag Gupta
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4	PCE19IT018	II Year	Isha Jain
5	PCE19IT015	II Year	Eshna .Jain
6	PCE19IT006	II Year	Ashutosh Kumar .
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8	PCE19IT002	II Year	Aditi Yashwant Sharma
9	PCE19IT064	II Year	Vatsal Agarwal .
10	PCE19IT063	II Year	Vartika Jain .
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14	PCE19IT016	II Year	Gopal Sharma .
15	PCE19IT022	II Year	Ketan Gupta
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18	PCE19IT034	II Year	Naman Khamesra .
19	PCE19IT008	II Year	Ayushi Khandal
20	PCE19IT057	II Year	Shubhankar Kaviya .
21	PCE19IT019	II Year	Kajal Lal Chandani
22	PCE19IT039	II Year	Prakhar Mathur
23	PCE19IT003	II Year	Ajay Yadav .
24	PCE19IT005	II Year	Anirudh Surya .
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29	PCE19IT036	II Year	Deepak Kumar Manjhi
30	PCE19IT020	II Year	Nisha .
31	PCE19IT048	II Year	Kanika .Agarwal
32	PCE19IT032	II Year	Rishabh Agarwal .
33	PCE19IT050	II Year	Mansi Jain .
34	PCE19IT041	II Year	Sakshi Agarwal
35	PCE19IT025	II Year	Prateek Kachhawaha
36	PCE19IT037	II Year	Khushi Sharma .
37	PCE19IT004	II Year	Palak Gupta
38	PCE19IT051	II Year	Aman Sharma
39	PCE19IT040	II Year	Sanyam Modi
40	PCE19IT047	II Year	Prakhar Mishra
31	PCE19IT042	II Year	Ramanshu Bansal .
32	PCE19IT017	II Year	Prateek Srivastava
33	PCE19IT053	II Year	Harpreet Singh .
34	PCE19IT052	II Year	Shaswat Pandey
41	PCE19IT056	II Year	Satpreet Singh Khera .
42	PCE19IT068	II Year	Shubham .
43	PCE19IT054	II Year	Yatin Agarwal
44	PCE19IT049	II Year	Shivam Jangid
45	PCE19IT026	II Year	Rudresh Sharma
46	PCE19IT029	II Year	Lalit Kumar Dhanjani
47	PCE19IT054	II Year	Yatin Agarwal
48	PCE19IT049	II Year	Shivam Jangid
49	PCE19IT026	II Year	Rudresh Sharma
50	PCE19IT029	II Year	Lalit Kumar Dhanjani

**FEEDBACK ANALYSIS:**

SESSION FEEDBACK ANALYSIS								
Sr.no.	Attributes	Total Feed Back	Total Feed Back- 40					
			>80% Objective Achieved, 60 to 79 %- Satisfactory, Below 60%, Need improvement					
1	Do you think session was useful for you?	40	Yes	No	Partial	---	---	Remark
			35	0	5	0	0	Objective Achieved (90.00%)
			90.00	0.00	10.00	0.00	0.00	
2	Did you receive all the	40	Yes	No	Partial	---	---	



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	information you expected by the session?		37	0	3	0	0	Objective Achieved (93.33%)
			93.33	0.00	6.67	0.00	0.00	
3	Opinion on Rating the speaker for the session	40	Outstanding	Excellent	Good	Average	Satisfactory	Remark
			40	0	0	0	0	Objective Achieved - Outstanding & Excellent (100%)
			100	0	0	0.00	0	
4	Audience Query Response by the Speaker	40	Outstanding	Excellent	Good	Average	Satisfactory	Remark
			40	0	0	0	0	Objective Not Achieved (100%)
			100	0	0	0	0	
5	Overall experience about the Session	40	Outstanding	Excellent	Good	Average	Satisfactory	Remark
			32	4	4	0	0	Objective Achieved - Outstanding & Excellent (83.99%)
			83.99	7.34	7.34	0	0	
6	Would you like to attend future Alumni Session conducted by the department?	40	Yes	No	---	---	---	Remark