

(1)

BS(cs), Ali Raza, ID#14989, Sir M. Adil.

Design and Analysis of Algorithms:

Q NO 1:

Answer:

Linked List:-

A linked list is a list whose elements may not occupy continuously memory location and whose elements are connected by means of links between them.

Each element of a linked list is called node. Each node has at least two field/parts:

1:- Info fields-
Info field keeps data

2:- Link field:
Link field keeps

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address of next node.

- Link field of last node kept ϕ .

Q Head:-

A pointer "head" is used to keep the address of 1st node.

Q Types of linked lists-

There are three types

of linked list.

1 :- One way linked list.

2 :- Two way linked list.

3 :- Circular linked list.

Q NO.1:- part(B)

Answer:-

Diagrammatic

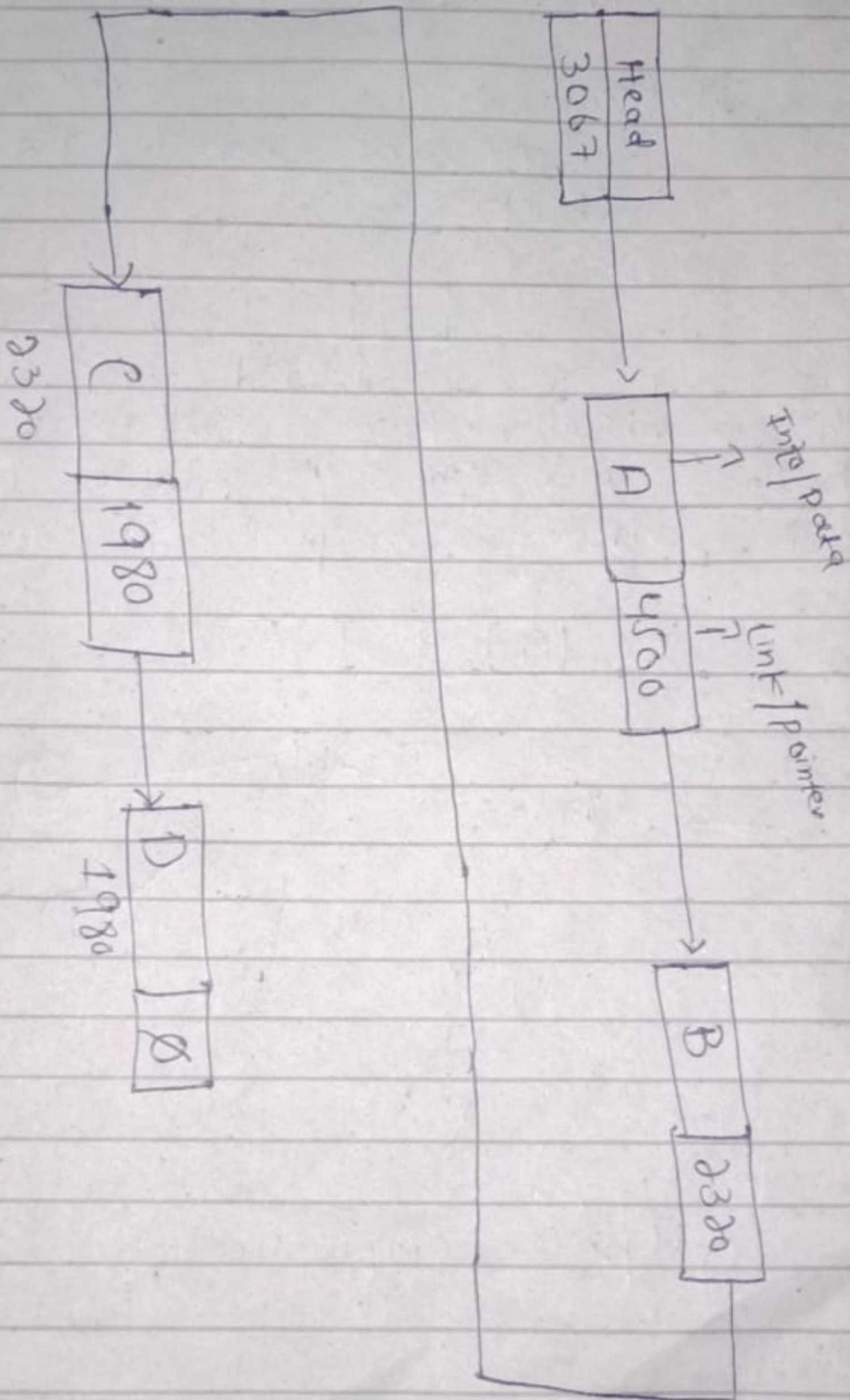
one way

linked lists-

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part (B) Q NO 1.



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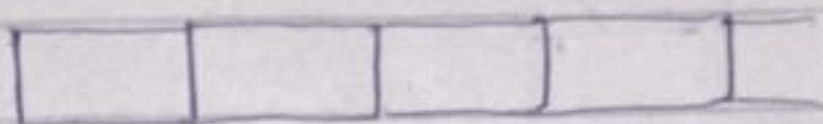
Q No 2:-

Ans:-

Depth-First Technique

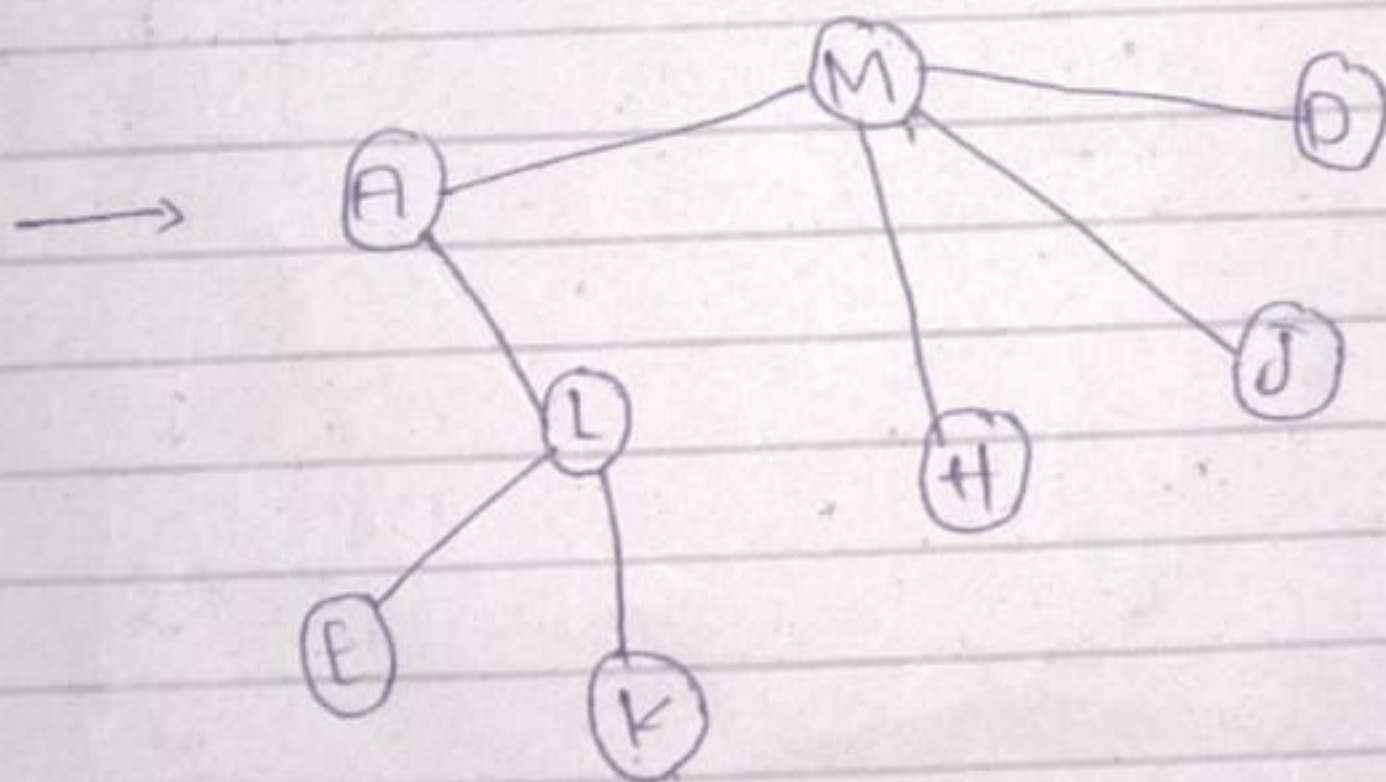
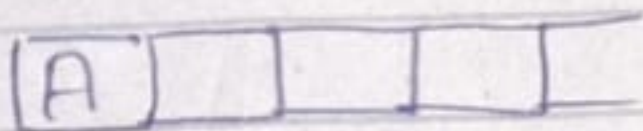
Solution:-

First we can take an empty stack.



Empty stack

- (1) Start from root node "A"
- Highlight this node "A"
- Now we push "A" into stack.



Output Sequences:-

A,

(2) Now "A" is adjacent to "M"

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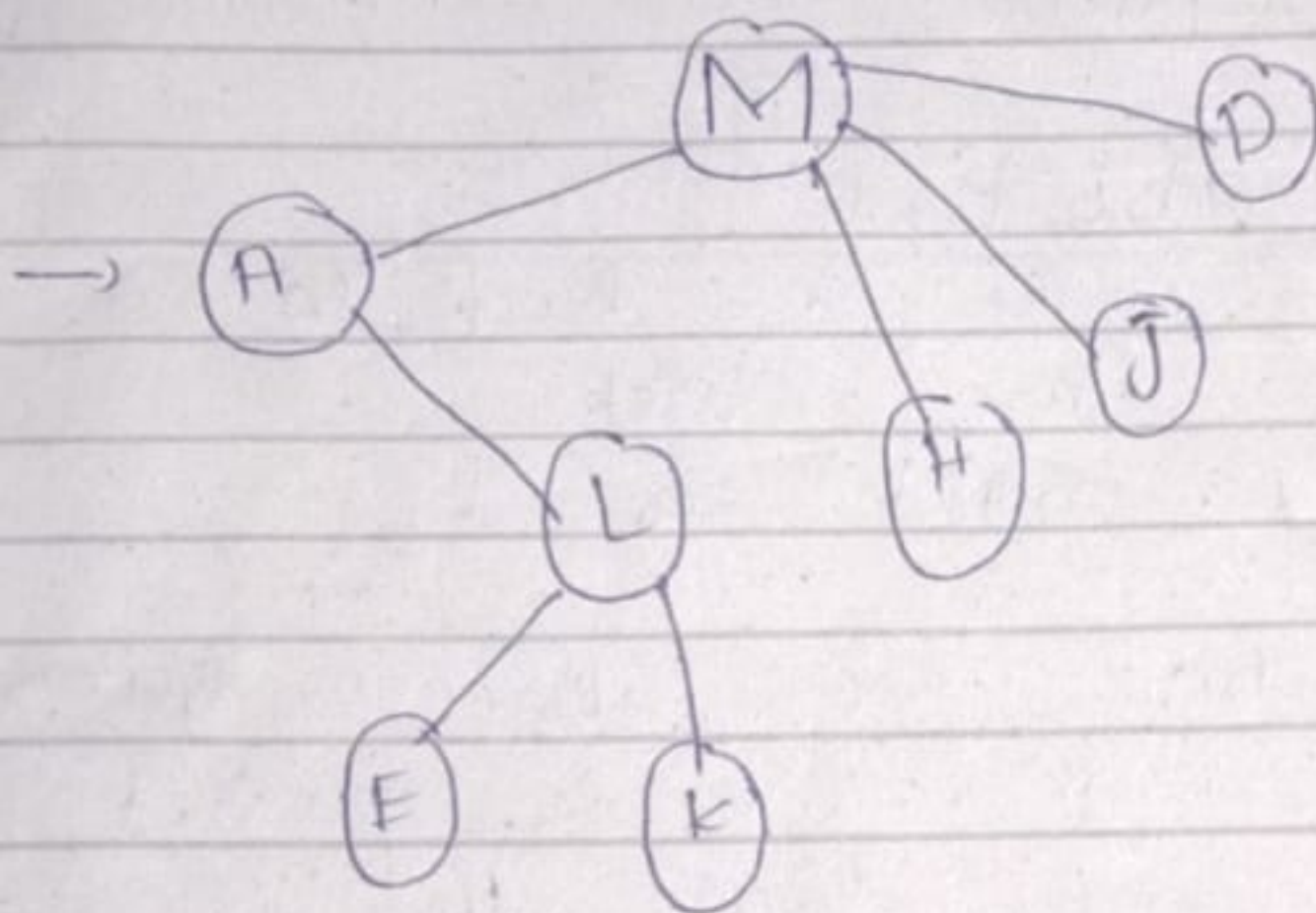
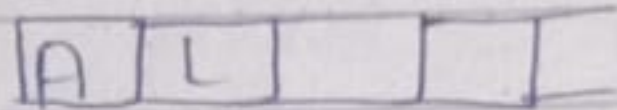
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"L".

• we follow alphabetically. we select "L".

• highlight this node "L".

• Now we push "L" on to the top of stack.



Output sequence x

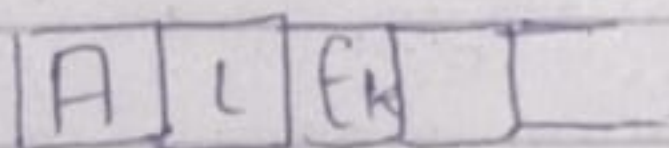
A, L, E

As "E" is leaf, so we pop it from stack.

• we get back to "L".

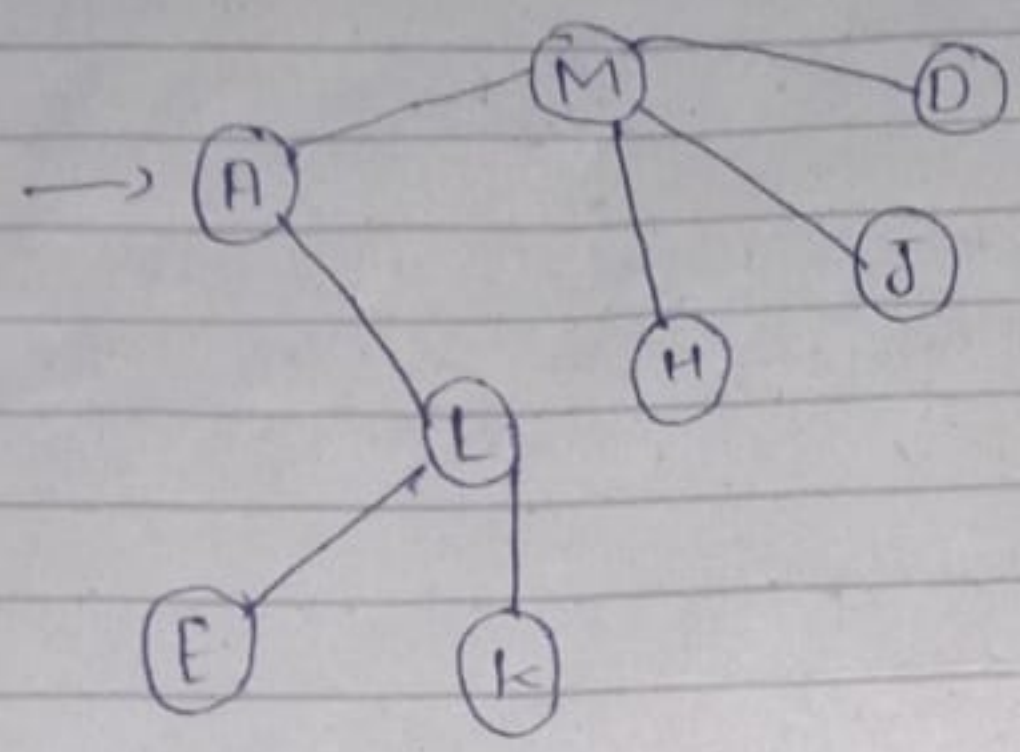
• Now we push "K" on top of the stack.

• Highlight node "K".



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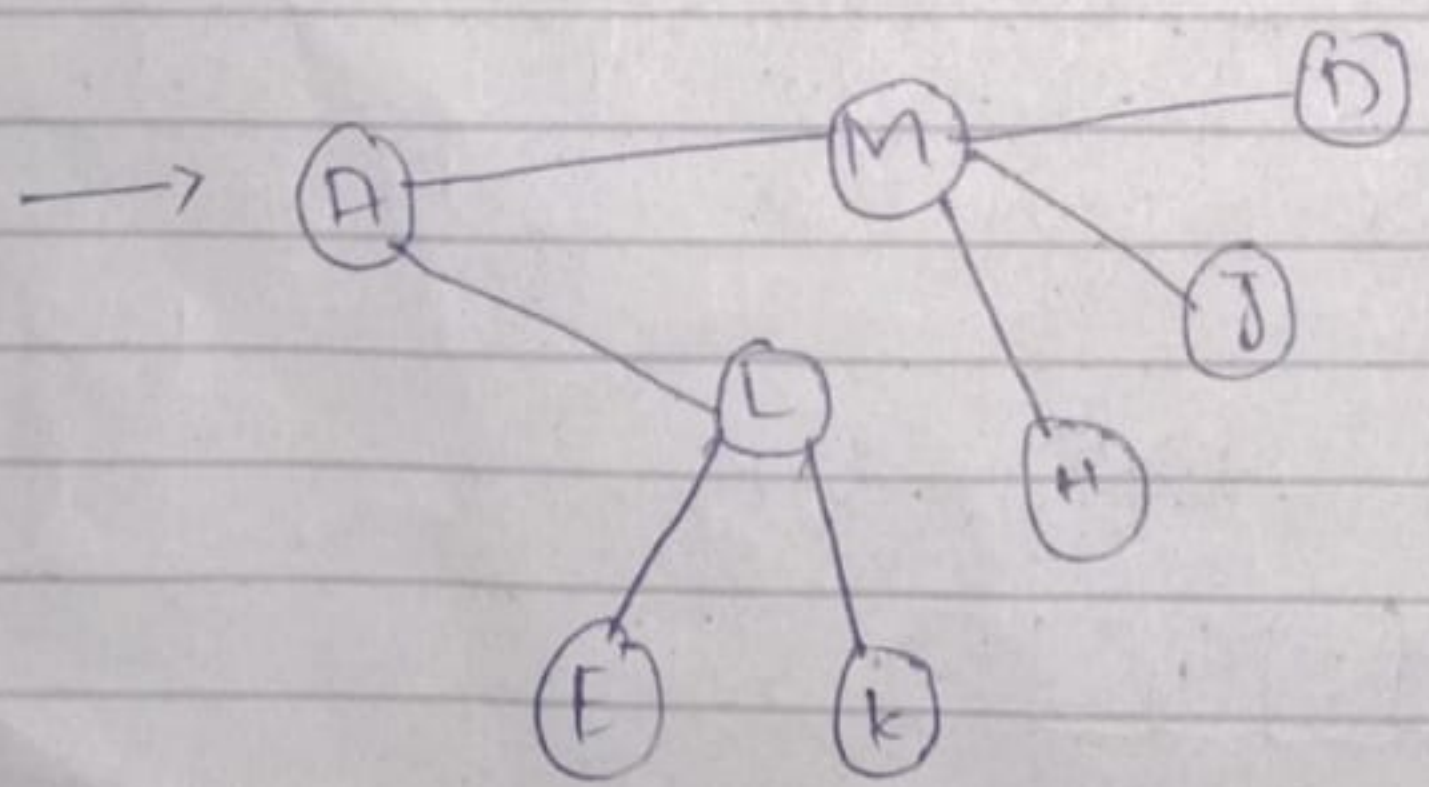
Output Sequence:

A, L, E, K.

(5) "K" is also a leaf, so we pop it from stack.
 we get back to "L".

As "L" has no other adjacent elements, which we are pushed, so we get back to "A".
 we push "M", on top of the stack.

Highlights this node "M".



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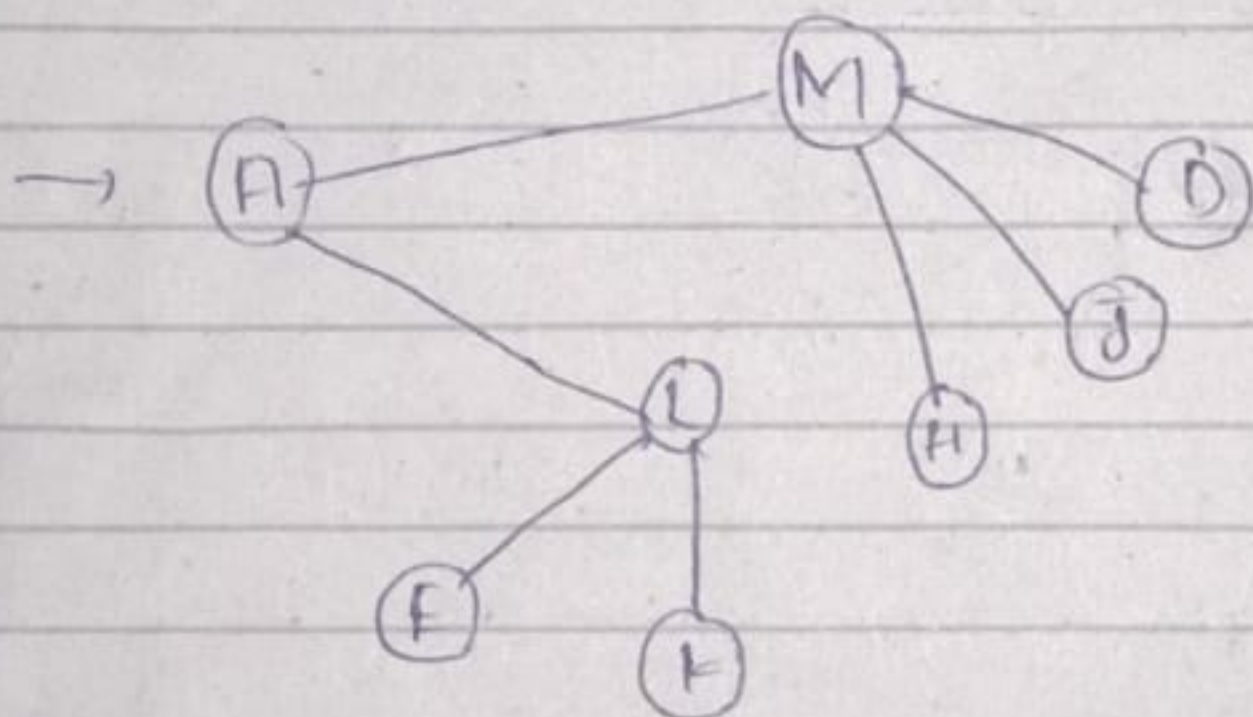
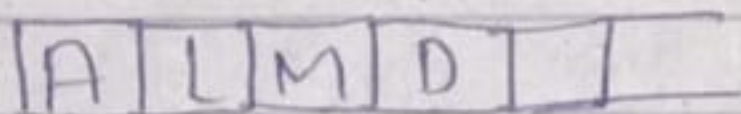
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Output sequence:

A, L, E, K, M

(6) "M" is adjacent to "D", "J" and "H".

- We follow alphabetically, we select "D".
- We push "D" on the top of the stack.
- Highlight this node "D".



Output sequence

A, L, E, K, M, D, J.

(8) "J" is also leaf, so we pop it from stack.

We get back to "M".

Now we ~~push~~ push "H" on top of the stack.

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Highlight this node "H".

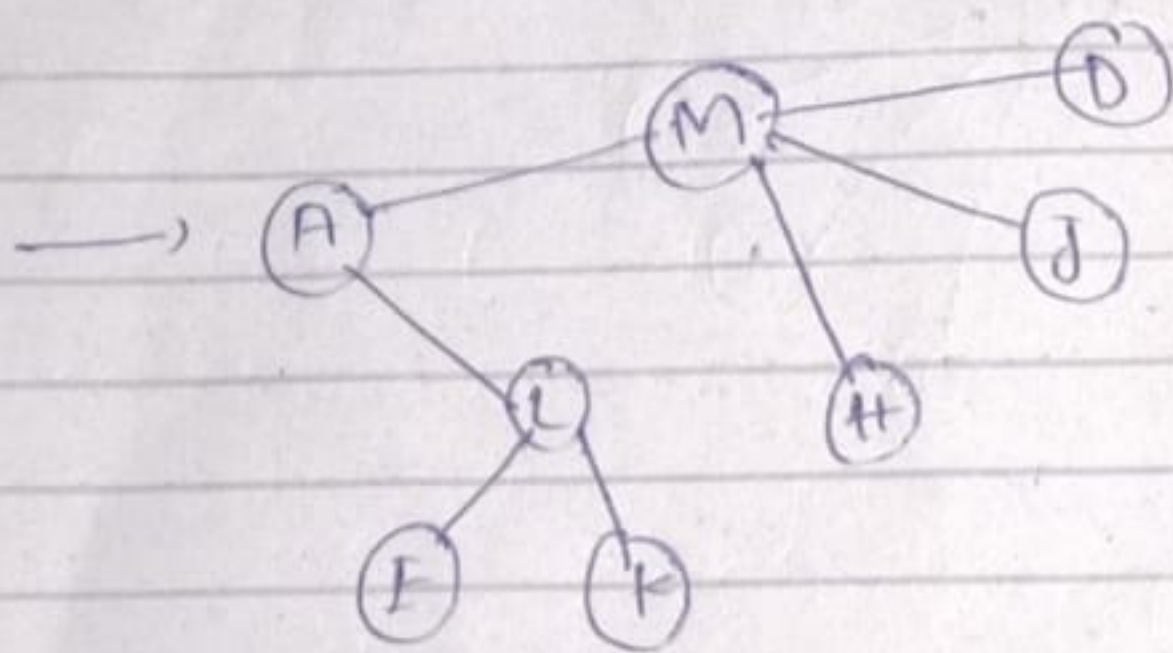
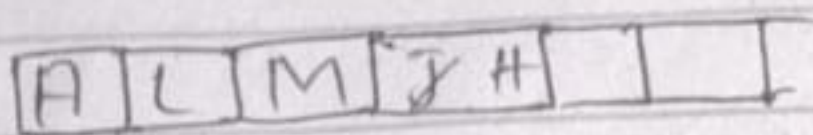
Output sequence:
A, L, E, K, M, D.

As D is leaf, so we pop it from stack.

We get back to "M".

Now we push "J" on top of the stack.

Highlight this node J.



Output sequence:

A, L, E, K, M, D, J, H.

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Q No 3:-

Answers: Queue

A sequential list in which elements are inserted from one end and are deleted/retrieved from other end is called queue.

Rear:-

The end from where an element can be inserted is called rear of the queue.

Front:-

The end from where an element can be deleted/retrieved is called front of the queue.

Working principle :-

The working principle of a queue is; "First In - first out" or "Last In Last out".

Memory Representations

(a) A Linear array $q[]$ is used to represent a queue.

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Two variables "F" and "R" are used to denote Front and rear of Q[].

Examples:-

- 1) Automobiles waiting to pass through a signal make up a queue.
- 2) people waiting to submit bills at a bank's window.
- 3) patients waiting outside the doctor's clinic.
- 4) Luggage checks by luggage checking machine.