Design & analysis of algorithm

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Q: How would you be defining a linked list ?

Ans: LINKED LIST:

A linked list is a linear data structure where each element is a separate object; a linked list is a list whose element may not occupy continous memory location and whose elements are connected by means of links between them.

Each element of a linked list is called a node.

Each node has at least two fields.

INFO FIELD: info field keeps data.

LINKED FIELD:

Link field keeps the address of the next node.

Link field of the last node is kept.

HEAD:

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

Type of linked list

There are three types of linked list

(1) One way linked list

(2) Two way linked list

(3) circular linked list

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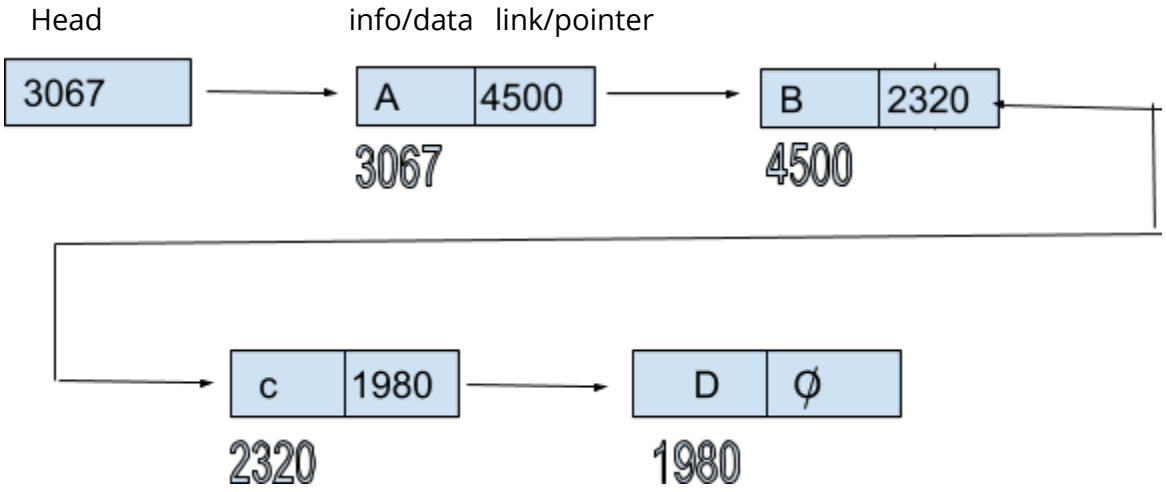
Q1: (B)

Diagramatic one way linked list.



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Q2: Apply depth first technique on the given tree

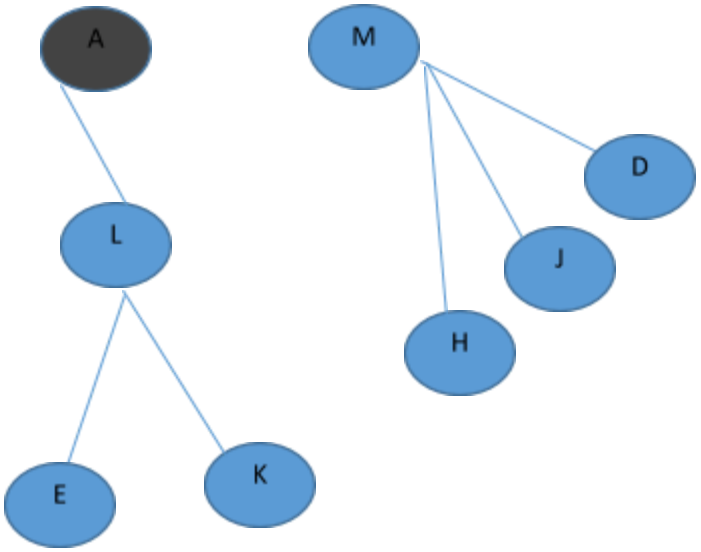
Ans: First we take an empty stack

Empty stack

(1) Start from root node “A”

NOW highlight this node “A” NOW we push A into stack.

A		



OUTPUT SEQUENCE:

A.

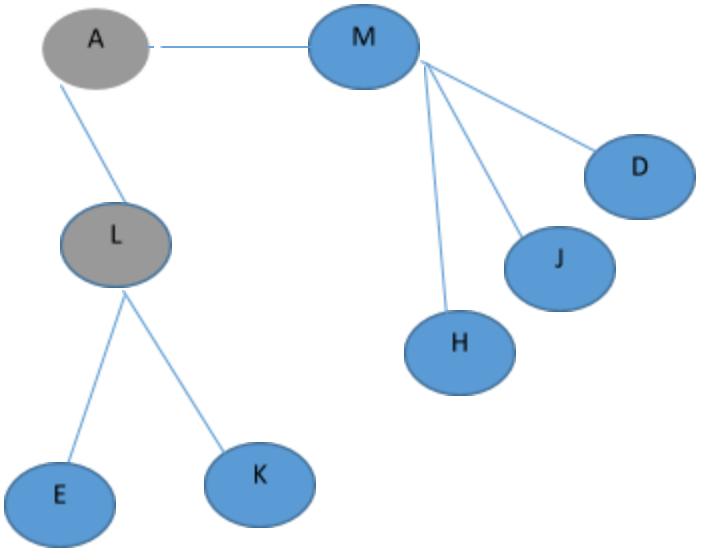
(2) Now “A” is adjacent to ”M” and “L”

We follow alphabetically . we select “L” highlight this node “L”

Now we push “L” onto the top of the stack

.

A	L		



OUTPUT SEQUENCE:

A,L

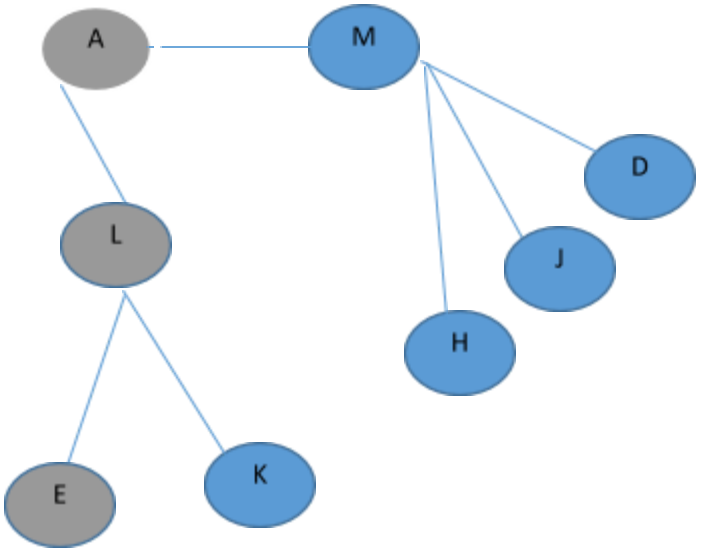
(3) Now “L” is adjacent to “E” and “K”

We follow alphabetically. We select “E”

Highlight this node “E”.

Now we push “E ” on the top of the stack.

A	L	E	



OUTPUT SEQUENCE:

A,L,E

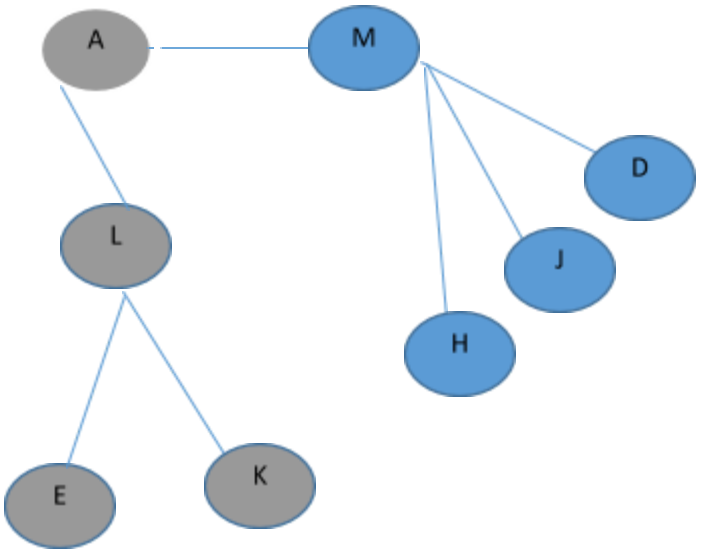
(4) As “E” is a leaf so we pop it from the stack

We get back to “L”

Now we push “K” on the top of the stack

Highlight node “K”

A	L	E	K	



OUTPUT SEQUENCE:

A,L,E,K.

(5)” K” is also a leaf so we pop it from stack

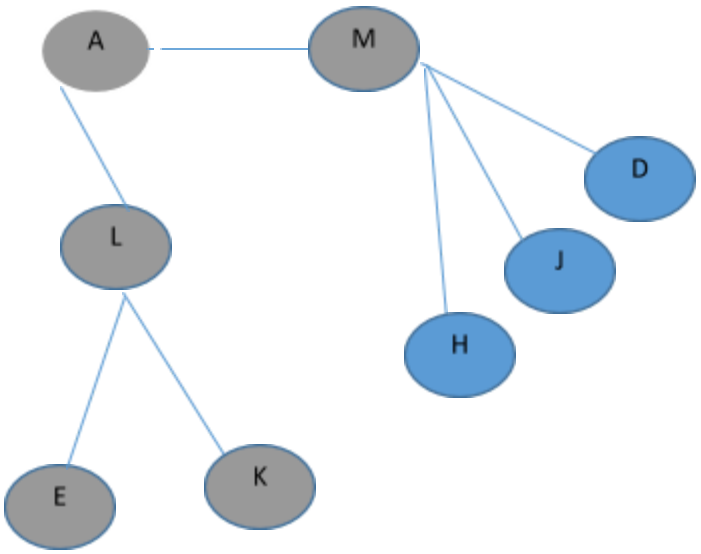
We get back to “L”

As “L” is no other adjacent element which we are push so we get back to “A”

We push “M” on the top of the stack.

Highlight this node”M”

A	L	K M	



OUTPUT SEQUENCE:

A,L,E,K,M

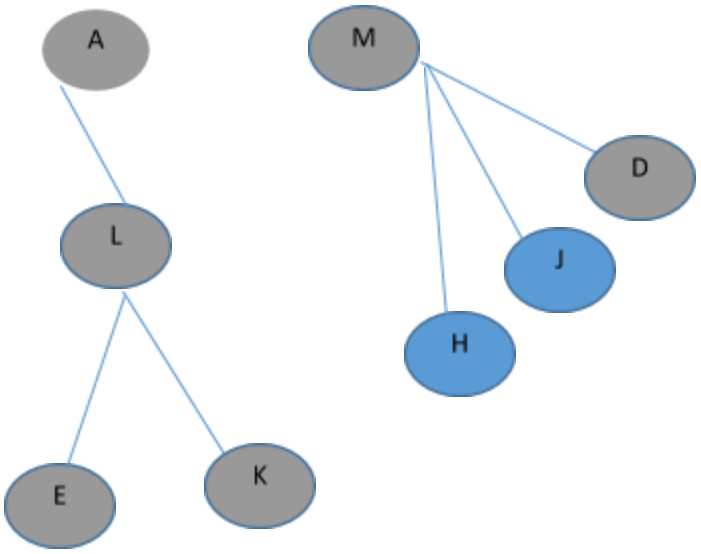
(6)"M" is adjacent to "D"."J" and "H"

We follow alphabetically we select "D"

We push "D" on the top of the stack

Highlight this node "D"

A	L	M	D	



OUTPUT SEQUENCE:

A,L,E,K,M,D

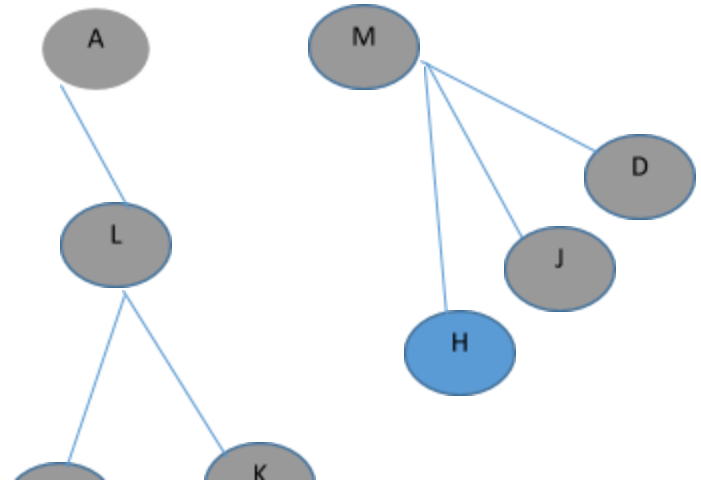
(7) As “D” is a leaf so we pop it from the stack.

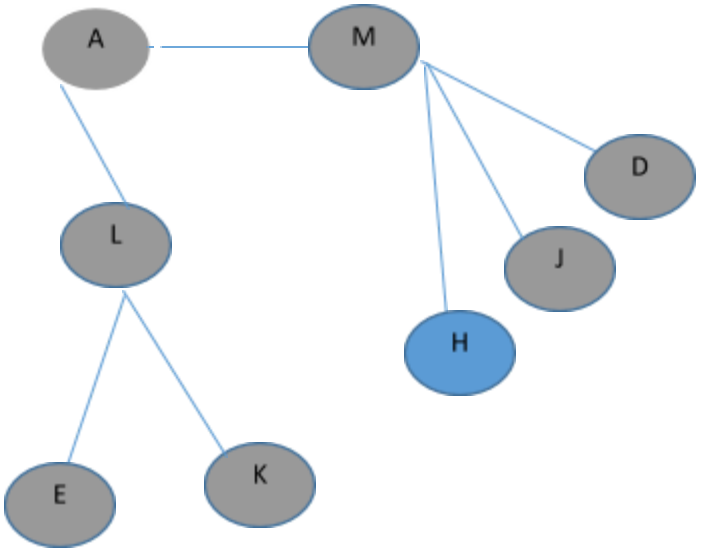
We get back to “M”

Now we push “J” on the top of the stack

Highlight this node “J”

A	L	M	D J	





OUTPUT SEQUENCE:

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

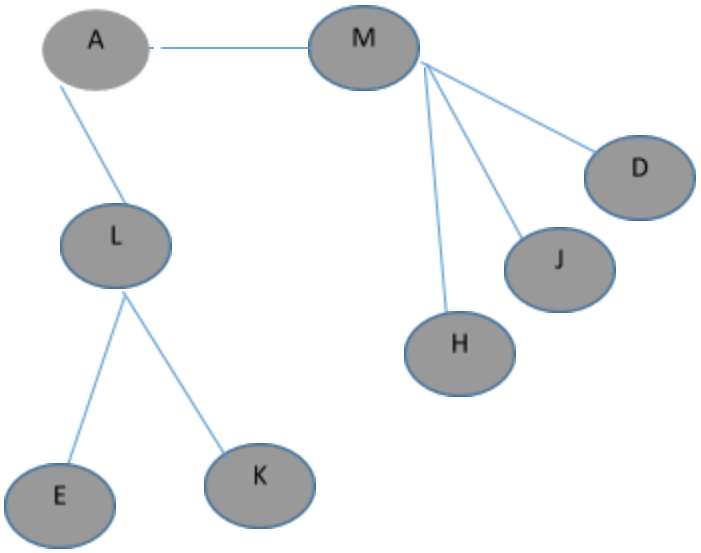
(8) J is also a leaf so we pop it from stack.

We get back to “M”

Now we push “H” on the top of the stack.

Highlight this node “H”.

A	L	M	J H		



THE END OF 2ND QUESTION.

Q:3 How would you be defining a Queue? Give some real life examples of Queues.

Ans: QUEUE:

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

REAR:

The end from which an element can be inserted is called the rear of the Queue.

FRONT:

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

WORKING PRINCIPLE:

The working principle of the Queue is

First in first out

Last in last out

MEMORY REPRESENTATION:

A linear array q [ ] is used to represent a Queue

Two variables “F” and “R” used to be denoted front in rear of Q [ ].

Eg. automobiles waiting to pass through a signal make up a queue.

People waiting to submit bills at a bank window.

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Patient waiting outside the doctors clinic.

Luggage checks by the luggage checking machine.

THE END