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Semester : 4th

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Paper Subject : Design an Analysis of Algorithms

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Dated : 14th April 2020

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BS(CS) 4th Semester

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Design and Analysis of Algorithms

Q1

Ans:a

Linked List =

A linked list is a whose element may not occupy continous memory location and where element 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 .

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1) Info field ৎ Info field keeps data

2) Link field ৎ Link field keeps address next node.

• Link field of last node is kept ∅.

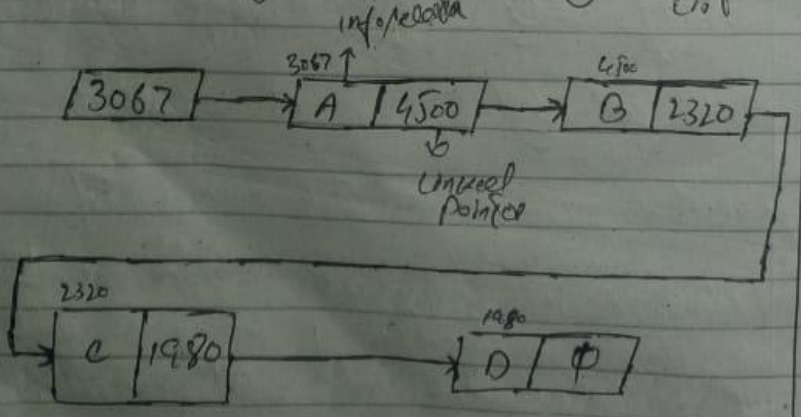
Head ৎ A pointer 'head' is used to keep the address of 1st node.

Type of linked list ৎ There are three type of linked list.

1) One way linked list
2) Two way linked list
3) circular linked list.

Q1 Ans b, 5

Diagreme One way linked list



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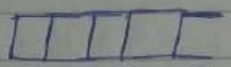
Q2.

Ans 5

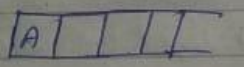
Depth-first Technique ω

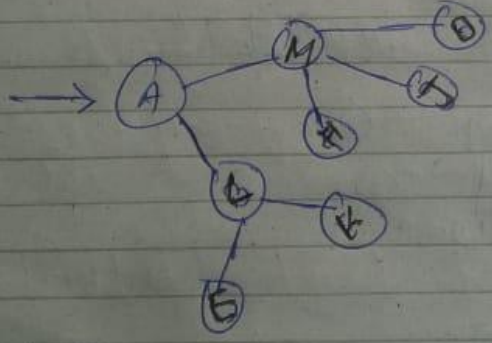
First we take an empty stack.



Empty stack

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





output sequence ω A

2) Now 'A' is adjacent to 'M' and 'L' we follow alphabetically we select 'L'
- Highlight this node 'L'
- Now we push 'L' into the top of stack.

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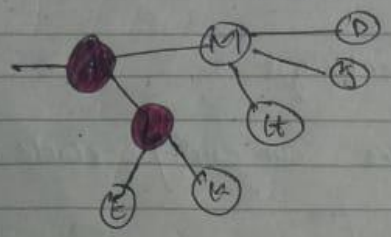
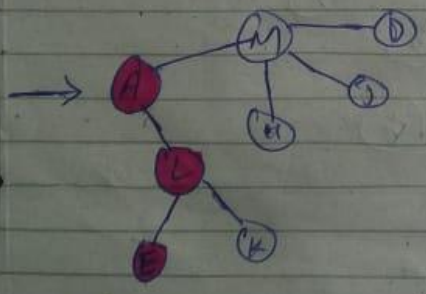
A	L	I		



output sequence of 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 of A.L.E

4) As 'E' is leaf so we pop it from stack.
- we get back to 'L,
- Now we push 'K' on top of stack
- Highlight node K,

A	L	E	K	

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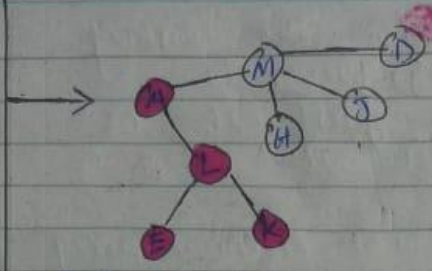
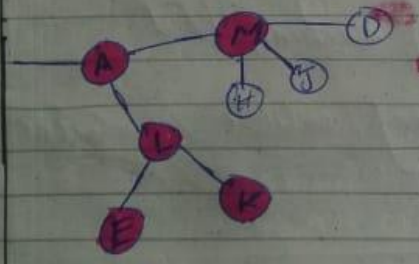


output sequence is A, L, E, K

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.
- Highlight the node 'M'

A	L	K	M	L



output sequence is
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 the node 'D'

A	L	M	D	L

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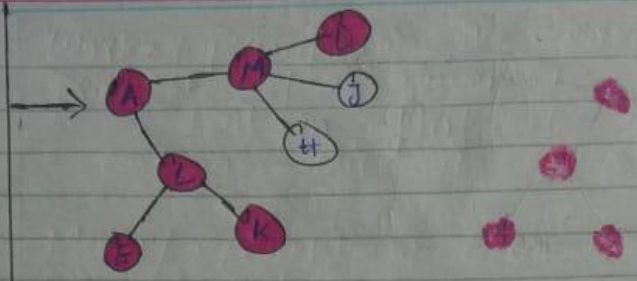
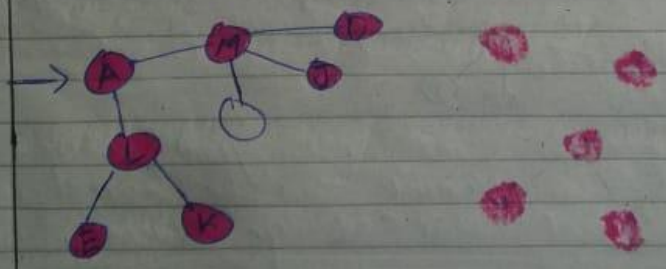


output sequence is
A, L, E, K, M, D,

7) 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'.

A	L	M	D	J



output sequence is
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 'K' on top of the stack
- Highlight this node 'K'

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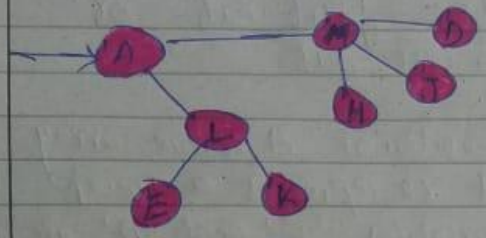
A	L	M	D	J	H	



out opit sequence ur
A, L, E, K, M, D, J, H.

Q3/5

Ans/3

Queue ur A sequential coll in which elements are inserted from ~~one end~~ one end and are deleted / retrieved from other end is called Queue.

Rear ur The end from where an element can be inserted in called rear of De Queue.

Front ur The end from where an element can be deleted / retrieved in called front of Queue.

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Working Principle: The working principle of a queue is
First in - first out 'or'
Last in — last out

Memory representation: A linear array Q[] is used to represent a queue.
* Two variables 'F' and 'R' are used to denote Front and Rear of Q[].

Examples: * Automobile waiting to pass through a signal make up a queue.

* People waiting to submit bills at a bank's window

* Luggage checks by luggage checking machine

* patients waiting outside the doctor clinic"