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Subject

Design and analysis of
Algorithms.

Q: NO: 01 PART "A"

Ans:

Definition:

A linked list is a sequence of data structure which are connected by ~~the~~ links.

A linked list is a linear data structure, in which

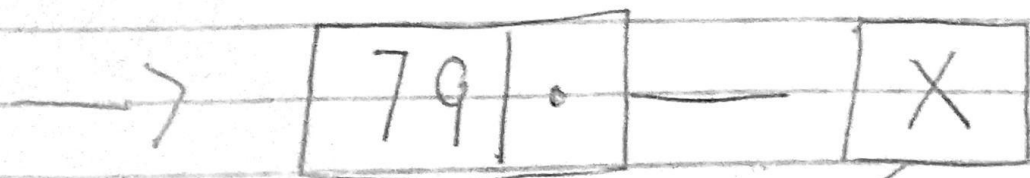
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The elements are not stored at contiguous memory locations but they are linked.

Example:

Suppose we want to save a file but we don't have a complete contiguous location. To solve this we save file in different locations and connect them using links.

In simple words, a linked list consists of nodes where each node contains data field and a reference to the next node in list.



Null.

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Advantages:

- * It is a dynamic data structure
- * Insertion and Deletion is easier than Array
- * It waste no memory
- * Stack queues can be easily implemented

Disadvantages:

- * It require more memory to store element
- * Traversing in linked list is difficult as these are not in continuous locations.
- * The reverse traversing is really difficult.

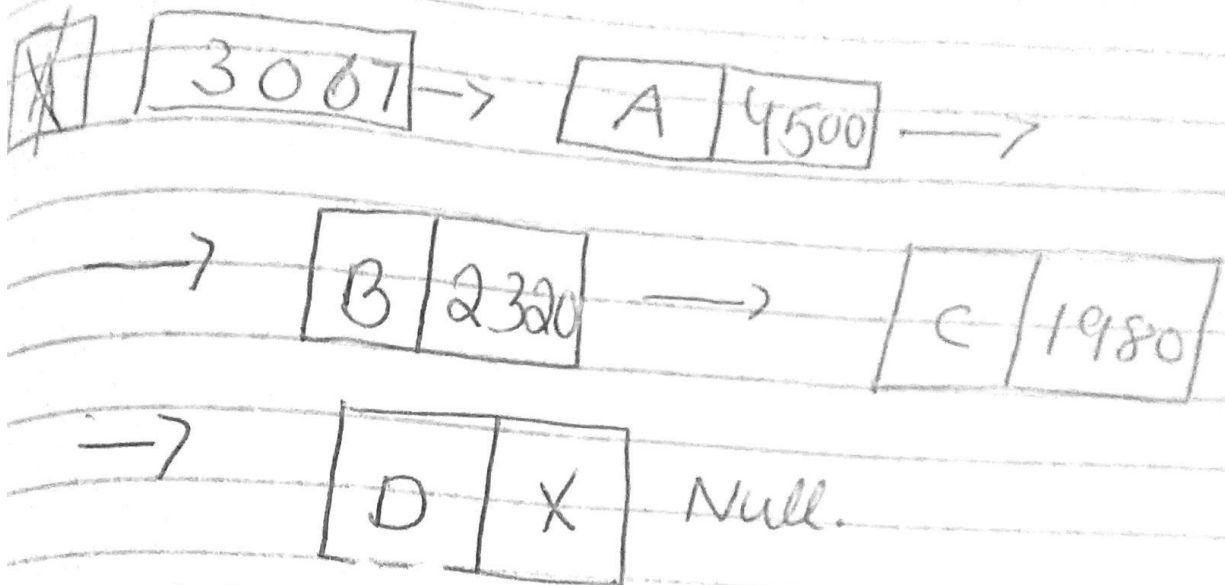
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PART "B"

Q:

Ans:

Diagram:



Algorithm:

(1) $P \leftarrow \text{getnode } 3067$

(2) $\text{Head} \leftarrow P$

(3) $\text{info}(P) \leftarrow \text{data}$

$3067 \leftarrow A$

$4500 \leftarrow B$

$2320 \leftarrow C$

$1980 \leftarrow D$

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(4) Link (0) $\in \emptyset$
3067

4500

2320

1980 $\rightarrow \emptyset$

(5) $q \in P$

[3067, 4500, 2320
1980
]

(6) $\bar{J}, \bar{J}, \bar{J}, \bar{J}, IV$

(7) $P \in \text{get node}$

[4500, 2320, 1980

(8) Link (q) $\in P$

[4500,

2320, 1980

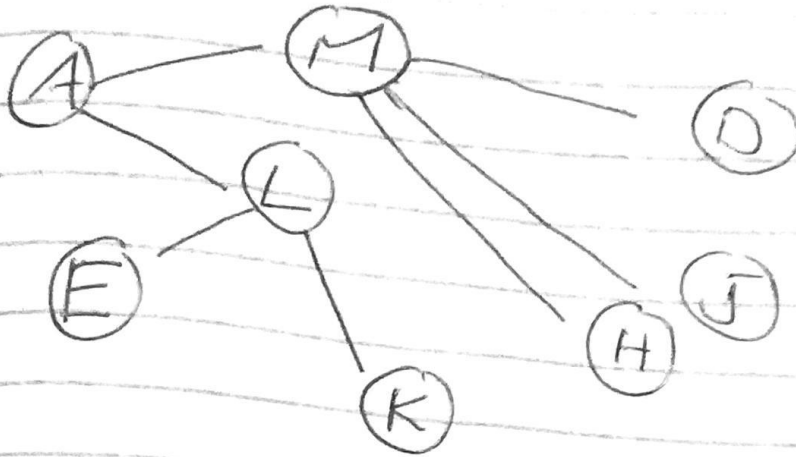
]

(9) goto (3)

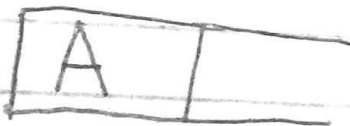
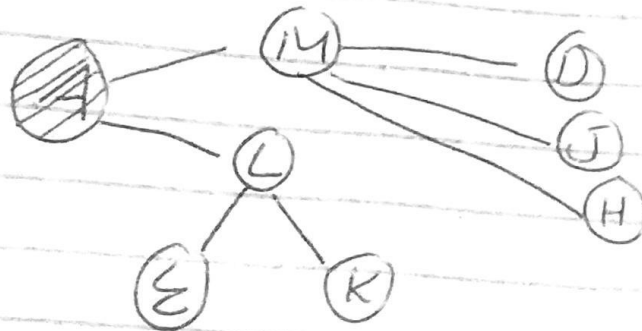
(10) Exit.

Q: NO: 02

Ans



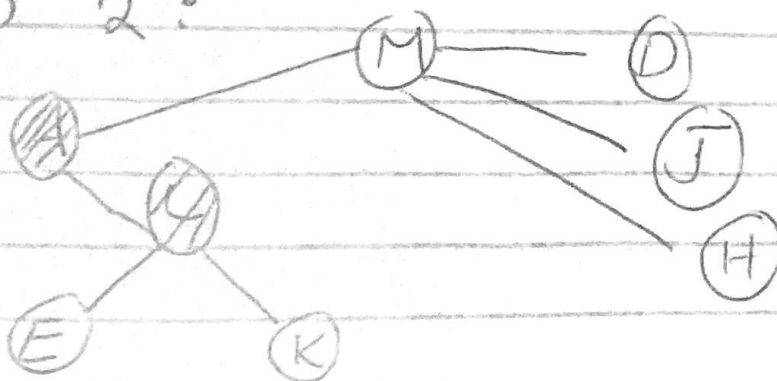
Step 1:



Output sequence

A

Step 2:

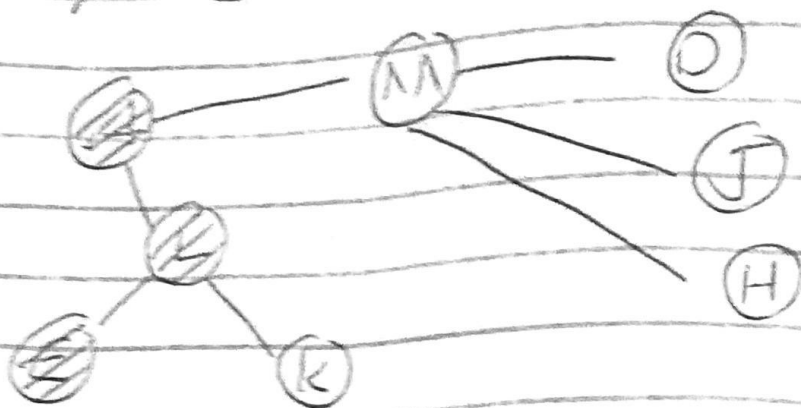




Output sequence.

A L

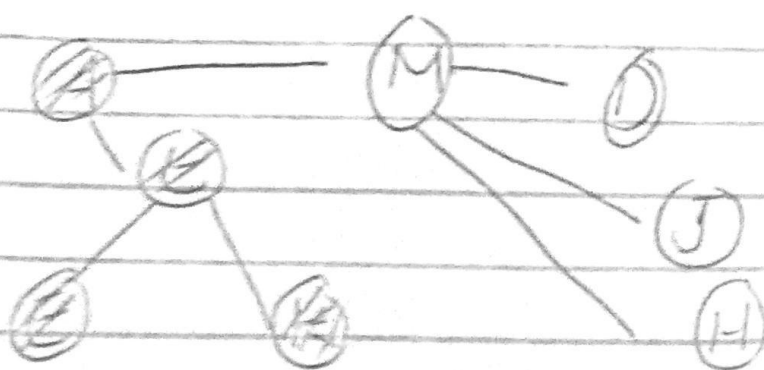
Step 3:



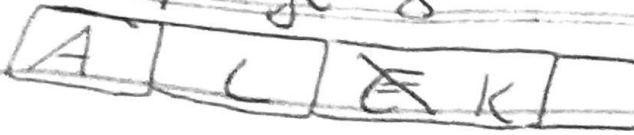
Output sequence

A, L, E

Step 4:



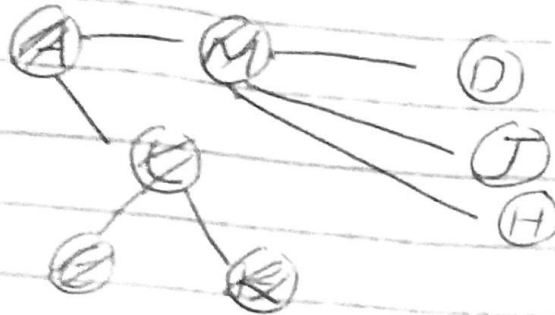
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Output Sequence:

A, L, E, K

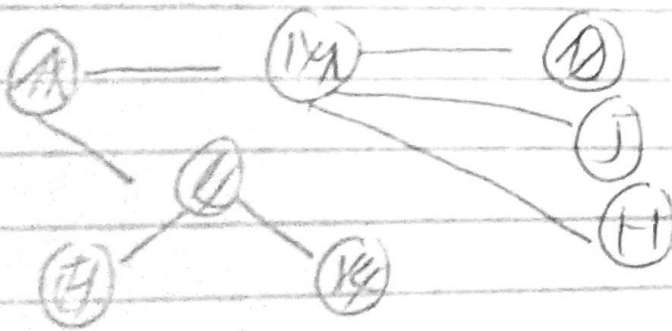
Step 5:



Output Sequence

A, L, E, K, M

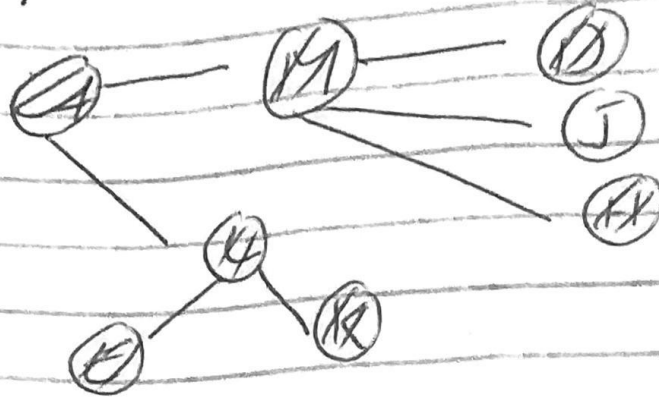
Step 6:



Output sequence

A, L, E, K, M, D

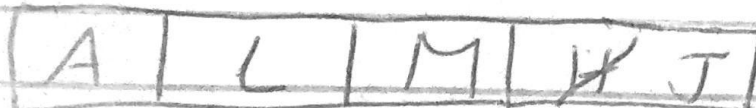
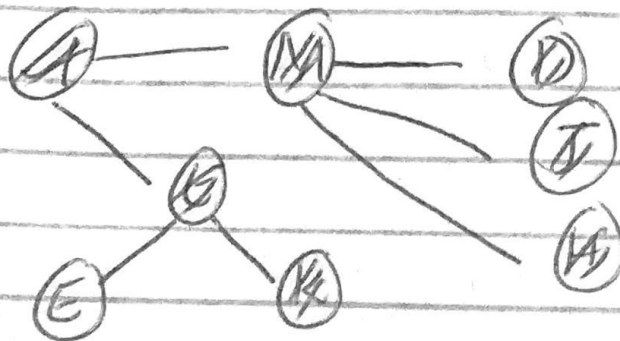
Step 7:



Output Sequence:

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

Step 8:



Output sequence:

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

Q: NO: 03:

Ans.

Queue:

A queue is a linear data structure which follows a particular order in which the operations are performed. The order is first in first out (FIFO).

Explanation:

A good example of a queue is any queue of consumers for a resource where the consumers come first or served first.

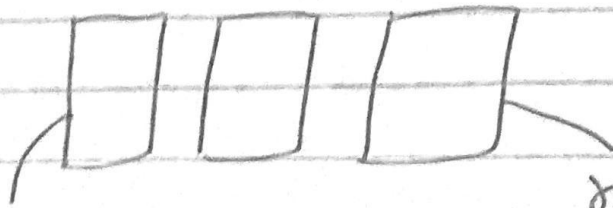
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The difference between stack and queue is in removing.

⇒ In a stack we remove the item that is most recently added.

⇒ In queue we remove item that is least recently added.

One end is always used to insert and the other to remove



insertion end
Enqueue

removing end
dequeue.

Memory Representation:

* "[] " A linear array is used to represent queue

Some of the basic operations are

- (1) Enqueue ()
- (2) Dequeue ()
- (3) Peek ()
- (4) Is full ()
- (5) Is empty ()

Real life example :

(1)

for example we are going to buy tickets and there is too much people so every one will have to wait in queue and who came first will get ticket first

(2)

The fuel filling :
The car that come first to the station will fill the tank first

(3)

Order of numbers as alphabets are also an example of queue (FIFO)