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Link List
(CAT-201)

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Linked list

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- **A linked list** is a sequence of data structures, which are connected together via links.
- Linked List is a sequence of links which contains items. Each link contains a connection to another link. Linked list is the second most-used data structure after array. Following are the important terms to understand the concept of Linked List.

- **Link** − Each link of a linked list can store a data called an element.

- **Next** − Each link of a linked list contains a link to the next link called Next.

- **LinkedList** − A Linked List contains the connection link to the first link called First.

Linked list

- Linked list can be visualized as a chain of nodes, where every node points to the next node.
- As per the above illustration, following are the important points to be considered.
- Linked List contains a link element called first.
- Each link carries a data field(s) and a link field called next.
- Each link is linked with its next link using its next link.
- Last link carries a link as null to mark the end of the list.

https://www.tutorialspoint.com/data_structures_algorithms/linked_list_algorithms.htm

Linked list Types

Following are the various types of linked list.

- **Simple Linked List** − Item navigation is forward only.
- **Doubly Linked List** − Items can be navigated forward and backward.
- **Circular Linked List** − Last item contains link of the first element as next and the first element has a link to the last element as previous.

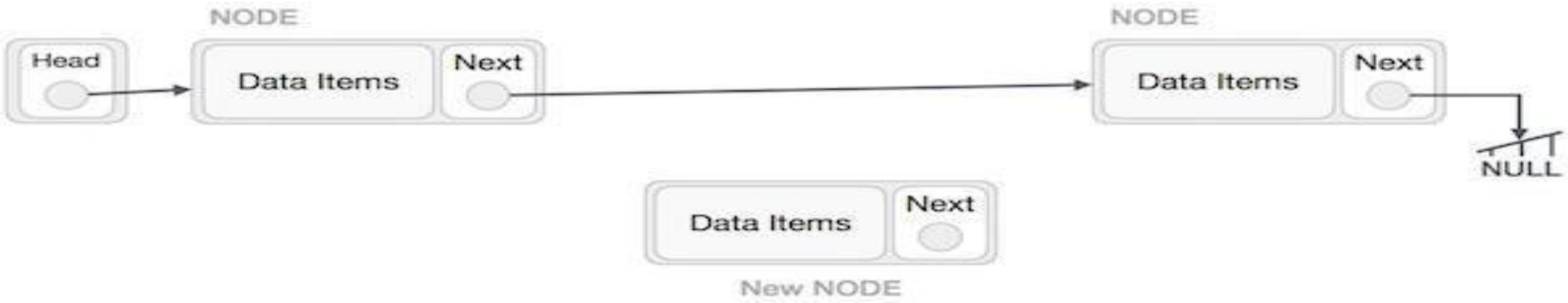
Linked list Operation

Following are the basic operations supported by a list.

- **Insertion** − Adds an element at the beginning of the list.
- **Deletion** − Deletes an element at the beginning of the list.
- **Display** − Displays the complete list.
- **Search** − Searches an element using the given key.
- **Delete** − Deletes an element using the given key

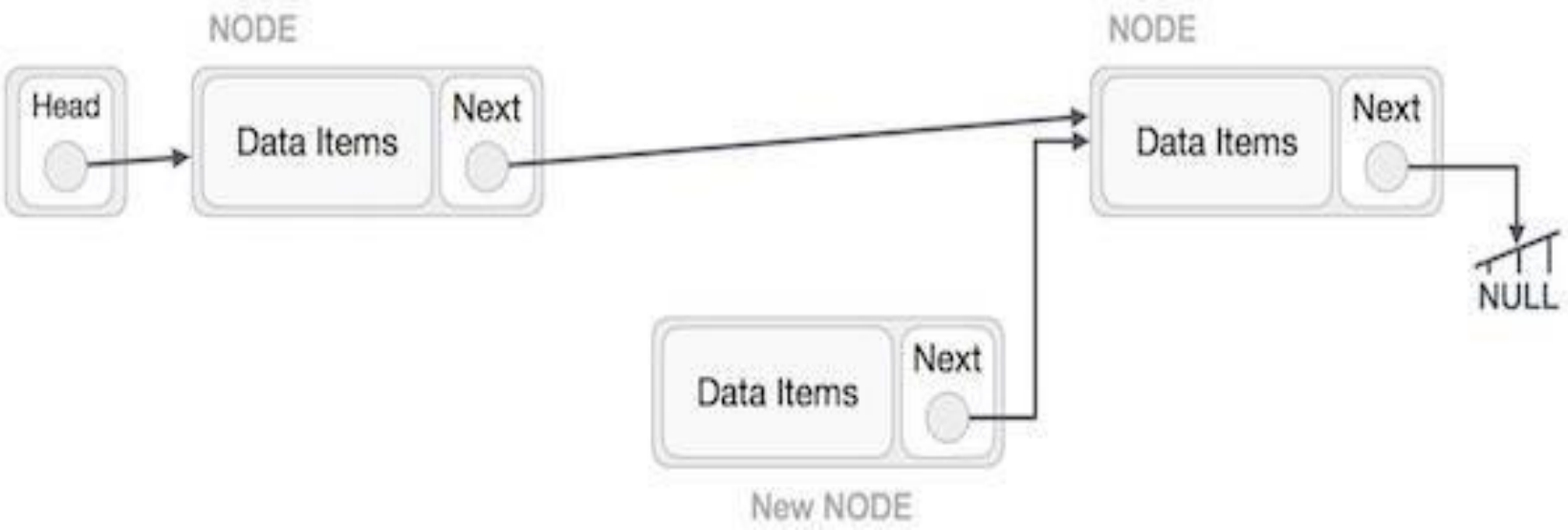
Linked list(insertion)

- Adding a new node in linked list is a more than one step activity. We shall learn this with diagrams here. First, create a node using the same structure and find the location where it has to be inserted.



- Imagine that we are inserting a node **B** (NewNode), between **A** (LeftNode) and **C** (RightNode). Then point B.next to C

Linked list(insertion)



Reference:

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Linked list(deletion)

Deletion is also a more than one step process. We shall learn with pictorial representation. First, locate the target node to be removed, by using searching algorithms.

The left (previous) node of the target node now should point to the next node of the target node −

Reference:https://www.tutorialspoint.com/data_structures_algorithms/linked_list_algorithms.htm

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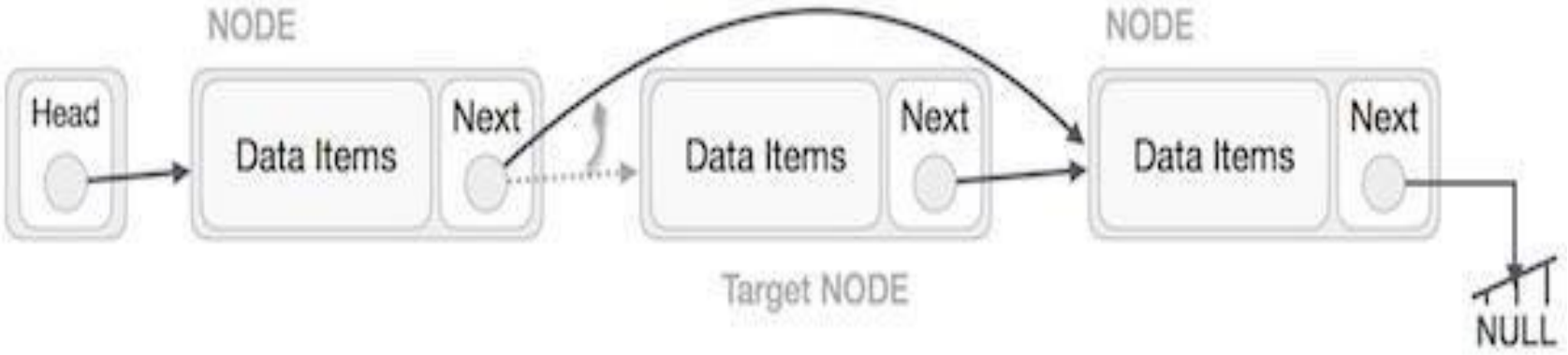
Linked list(deletion)

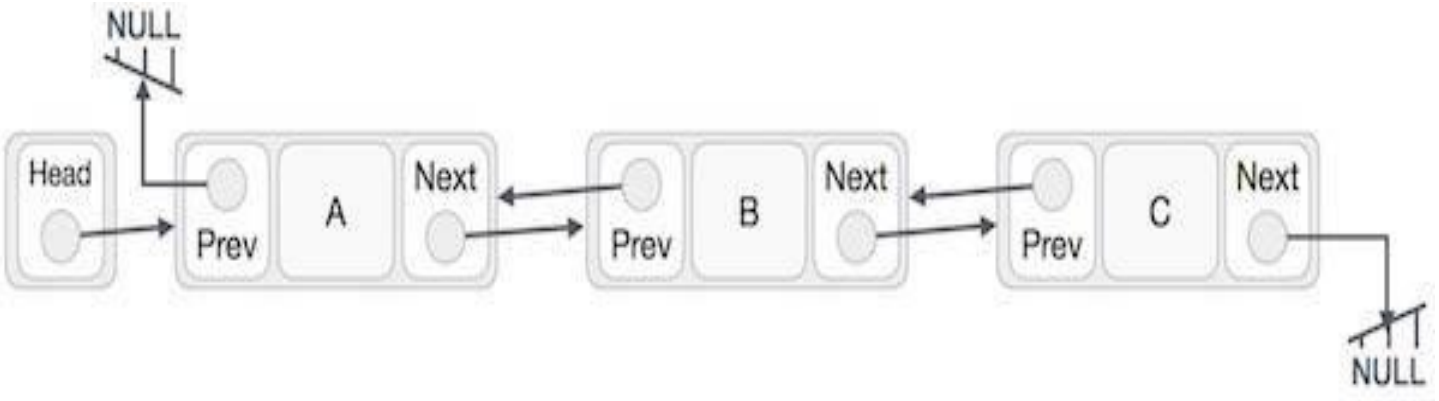


This will remove the link that was pointing to the target node. Now, using the following code, we will remove what the target node is pointing at.

Doubly Linked list

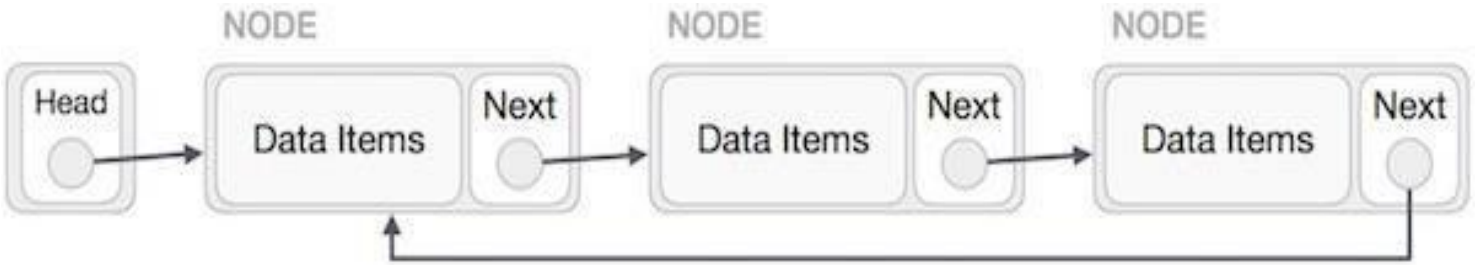
As per the above illustration, following are the important points to be considered.

- Doubly Linked List contains a link element called first and last.
- Each link carries a data field(s) and two link fields called next and prev.
- Each link is linked with its next link using its next link.
- Each link is linked with its previous link using its previous link.
- The last link carries a link as null to mark the end of the list.



Circular Linked list

- Circular Linked List is a variation of Linked list in which the first element points to the last element and the last element points to the first element. Both Singly Linked List and Doubly Linked List can be made into a circular linked list
- In singly linked list, the next pointer of the last node points to the first node.



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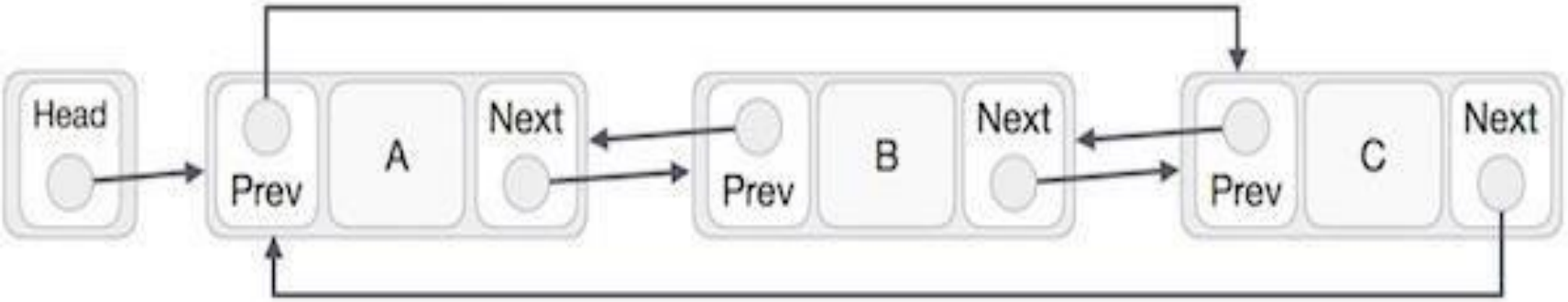
Doubly Linked list

- In doubly linked list, the next pointer of the last node points to the first node and the previous pointer of the first node points to the last node making the circular in both directions.



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FAQ

- In which way elements are inserted and deleted from stack?
- If the stack top=n then what it will print?
- what is the procedure to pop element?
- How the data is stored in linked list?
- What operation are performed on linked list?
- Differentiate doubly and circular linked list?

Bibliography

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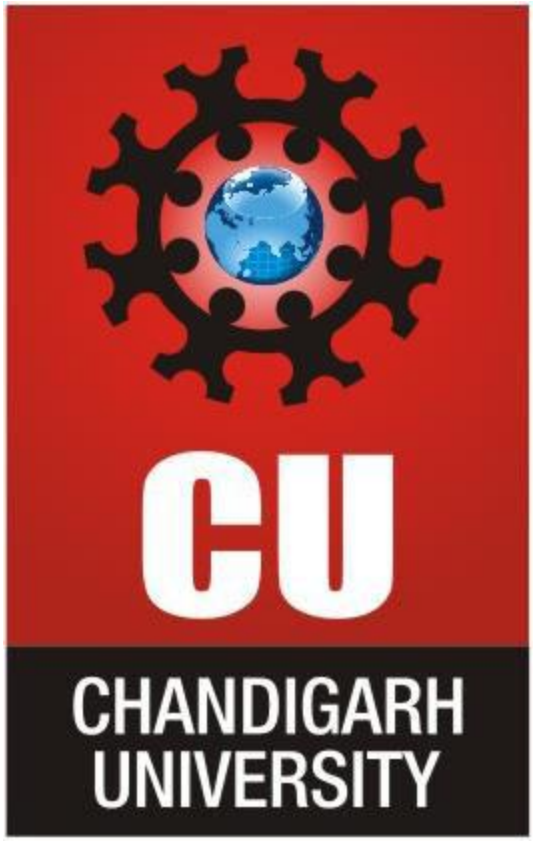

Thank You