

In [1]: *# LINKED LIST*

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#A linked List is a linear data structure which is basically  
#collection of nodes where the nodes are allocated in the memory space  
#through dynamic memory allocation in discrete manner.  
  
#SINGLE LINKED LIST  
#Here, each node is classified into two parts,the first part is known as  
#info part that holds value of linked list.  
#whereas, the second part is known as the link part which holds  
# the address of its next node. The link part of the last node contains NULL value.  
#whereas address of the first node is stored in a special variable called HEAD.
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In [19]: class Node:  
    def __init__(self,data):  
        self.info=data  
        self.link=None  
  
    class Single_Linked_List:  
        def __init__(self):  
            self.head=None  
            self.tmp=None  
        def create(self,item):  
            new_node=Node(item)  
            if self.head is None: # It checks if linked list is initially empty.  
                self.head=new_node  
                self.tmp=self.head  
            else:  
                self.tmp.link=new_node  
                self.tmp=self.tmp.link  
        def display(self):  
            pt=self.head  
            print("\nElements in the Linked List are: ")  
            while pt is not None:  
                print(pt.info, end=" ")  
                pt=pt.link  
        def insert_at_beg(self,item):  
            new_node=Node(item)  
            if self.head is None:  
                self.head=new_node  
                return  
            else:  
                new_node.link=self.head  
                self.head=new_node  
  
        def insert_at_end(self,item):  
            new_node=Node(item)  
            tmp=self.head  
            while tmp.link:  
                tmp=tmp.link  
            tmp.link=new_node  
  
        def insert_at_pos(self,item,pos):  
            new_node=Node(item)  
            if (pos<1):
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        print("\nInsert a valid position: ")
        return
    if(pos==1):
        new_node.link=self.head
        self.head=new_node
    else:
        tmp=self.head
        for i in range(1,pos-1):
            tmp=tmp.link
        new_node.link=tmp.link
        tmp.link=new_node

    def insert_after(self,item,value):
        new_node=Node(item)
        tmp=self.head
        while(tmp.info!=value):
            tmp=tmp.link
        new_node.link=tmp.link
        tmp.link=new_node

    def insert_before(self,item,value):
        new_node=Node(item)
        tmp=self.head
        while(tmp.info!=value):
            tmp2=tmp
            tmp=tmp.link
        new_node.link=tmp2.link
        tmp2.link=new_node

if __name__=="__main__":
    sl=Single_Linked_List()
    n=int(input("\nHow many numbers you want to insert in the Linked List: "))
    for i in range (n):
        x=int(input("Enter the value of the node %d: "%(i+1)))
        sl.create(x)
    sl.display()
    sl.insert_at_beg(25)
    sl.display()
    sl.insert_at_end(15)
    sl.display()
    sl.insert_at_pos(50,3)
    sl.display()
    sl.insert_after(100,30)
    sl.display()

```

Elements in the Linked List are:

10 20 30

Elements in the Linked List are:

25 10 20 30

Elements in the Linked List are:

25 10 20 30 15

Elements in the Linked List are:

25 10 50 20 30 15

Elements in the Linked List are:

25 10 50 20 30 100 15