**Data Structures**

Sorting of a linked list

**Sorting of a linked list:**

 3 add 2nd 2 add 3rd 1 NULL   

 2 add 2nd 3 add 3rd 1 NULL   

 2 add 2nd 1 add 3rd 3 NULL   

 1 add 2nd 2 add 3rd 3 NULL  

* Bubble sort for sorting of the linked list.
* Traverse each node of linked list .
* Inside the while loop ,again start traversing from head node using another

While loop till last but one node.

* Compare the values of data in consecutive nodes.
* After comparing swap the data between consecutive nodes if needed.
* Complexity is n2 where n is the total no of nodes.

**Function to sort the elements of a linked list.**

* return type is void.

//bubble sort of linked list  
**void** sort(lin\_list \*head){  
 lin\_list \*temp,\*temp1;  
 temp=head;  
 **while**(temp){  
 temp1=head;  
 **while**(temp1->next!=NULL){  
 **if**(temp1->data > temp1->next->data){  
 swap(temp1,temp1->next);  
 }  
 temp1=temp1->next;  
 }  
 temp=temp->next;  
 }  
}

**Swap function:**

* swap data between the two nodes
* return type is void.

//swaping of data of two nodes.  
**void** swap(lin\_list \*temp,lin\_list \*temp1){  
 **int** tempo=temp->data;  
 temp->data=temp1->data;  
 temp1->data=tempo;  
}

**Whole program:**

#include<stdio.h>  
#include<stdlib.h>  
//creating a node.  
**typedef struct** lin\_list{  
 **int** data;  
 **struct** lin\_list \*next;  
}lin\_list;  
  
//inserting nodes  
lin\_list \*insertnode(lin\_list \*head,**int** data) {  
 lin\_list \*newnode=(lin\_list\*)malloc(**sizeof**(lin\_list));  
 newnode->data=data;  
 newnode->next=head;  
 head=newnode;  
 **return** head;  
}  
//printing the linked list.  
**void** PrintElements(lin\_list \*head){  
 //base condition  
 **if**(head==NULL){  
 **return**;  
 }  
 printf("%d ",head->data);  
 PrintElements(head->next);  
}  
  
//swaping of data of two nodes.  
**void** swap(lin\_list \*temp,lin\_list \*temp1){  
 **int** tempo=temp->data;  
 temp->data=temp1->data;  
 temp1->data=tempo;  
}  
  
//bubble sort of linked list  
**void** sort(lin\_list \*head){  
 lin\_list \*temp,\*temp1;  
 temp=head;  
 **while**(temp){  
 temp1=head;  
 **while**(temp1->next!=NULL){  
 **if**(temp1->data > temp1->next->data){  
 swap(temp1,temp1->next);  
 }  
 temp1=temp1->next;  
 }  
 temp=temp->next;  
 }  
}  
//main  
**int** main(){  
 lin\_list \*head=NULL;  
 head=insertnode(head,1);  
 head=insertnode(head,2);  
 head=insertnode(head,3);  
 head=insertnode(head,4);  
 PrintElements(head);printf("\n");  
 sort(head);  
 PrintElements(head);  
 **return** 0;  
}

**Output:**

4 3 2 1

1 2 3 4