LINKED LIST

```
#include<stdio.h>
#include<conio.h>
#include<alloc.h>
#include<process.h>
struct node
{
  int info;
  struct node *link;
};
typedef struct node *NODE;
NODE getnode()
{
  NODE x;
x = (NODE) malloc(sizeof(struct node));
if (x==NULL)
  {
  printf("memory full\n");
  exit(0);
}
return x;
}
void freenode(NODE x)
{
free(x);
}
NODE insert_front(NODE first, int item)
{
NODE temp;
temp=getnode();
temp -> info = item;
temp -> link = NULL;
if (first==NULL)
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return temp;
temp -> link = first;
first = temp;
return first;
}
NODE deletefront(NODE first)
{
NODE temp;
if (first == NULL)
{
printf("list is empty cannot delete\n");
return first;
}
temp = first;
temp = temp -> link;
printf("item deleted at front end is %d\n",
        first -> info);
free(first);
return temp;
}
NODE insert_rear(NODE first, int item)
{
NODE temp, cur;
temp = getnode();
temp -> info = item;
temp -> link = NULL;
if (first == NULL)
return temp;
cur = first;
while (cur -> link != NULL)
cur = cur -> link;
cur -> link = temp;
return first;
}
```

```
NODE delete_rear(NODE first)
{
 NODE cur, prev;
 if (first == NULL)
 {
 printf("list is empty cannot delete\n");
 return first;
 }
 if (first->link == NULL)
 {
 printf("item deleted is %d\n", first->info);
 free(first);
 return NULL;
 }
 prev = NULL;
 cur = first;
 while(cur->link != NULL)
 {
 prev = cur;
 cur = cur->link;
 }
 printf("item deleted at rear-end is %d",
 cur->info);
 free(cur);
 prev->link = NULL;
 return first;
 }
NODE insert_pos(int item, int pos, NODE first)
{
 NODE temp;
 NODE prev, cur;
 int count;
 temp = getnode();
 temp->info = item;
```

```
temp->link = NULL;
if (first == NULL && pos == 1)
return temp;
if (first == NULL)
{
printf ("invalid pos\n");
return first;
}
if (pos == 1)
{
temp->link = first;
return temp;
}
count = 1
prev = NULL;
cur = first;
while (cur != NULL && count != pos)
{
prev = cur;
cur = cur->link;
count++;
}
if (count == pos)
{
prev->link = temp;
temp->link = cur;
return first;
}
printf ("IP\n");
return first;
}
void display (NODE first)
{
NODE temp;
```

```
NODE IF(NODE second, int item)
{
NODE temp;
temp = getnode();
temp->info = item;
temp->link = NULL;
if (second == NULL)
return temp;
temp->link = second
second = temp;
return second;
}

NODE IR(NODE second, int item)
{
NODE temp, cur;
temp = getnode();
temp->info = item;
temp->link = NULL;
if (second == NULL)
return temp;
cur = second;
while (cur->link != NULL)
cur = cur->link;
cur->link = temp;
return second;
}
```

```
NODE delete_pos(int pos, NODE first)
{
NODE cur;
NODE prev;
int count;
if (first==NULL || pos<=0)
{
printf("invalid position\n");
return NULL;
}
if(pos==1)
{
cur = first;
first = first->link;
freenode(cur);
return first;
}
prev = NULL;
cur = first;
count = 1;
while(cur!=NULL)
{
if (count==pos)
break;
prev = cur;
cur = cur->link;
count++;
}
if (count!=pos)
{
printf("invalid position\n");
return first;
}
```

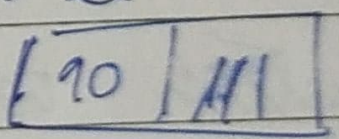
```
prev->link = cur->link;
freenode(cur);
return first;
}

NODE ASC(NODE first)
{
NODE prev=first;
NODE cur=NULL;
int temp;
if(first==NULL){
    return 0;
}
else {
    while(prev!=NULL){
    cur=prev->link;
    while(cur!=NULL){
    if(prev->info>cur->info){
        temp=prev->info;
        prev->info=cur->info;
        cur->info=temp;
    }
    cur=cur->link;
    }
    prev=prev->link;
}}
    return first;
}
```

```
DES
NODE (NODE first)
{
 NODE prev = first;
 NODE cur = NULL;
 int temp;
 if (first == NULL) {
    return 0;
   }
else {
   while (prev != NULL) {
   cur = prev -> link;
   while (cur != NULL) {
   if (prev -> info <> cur -> info) {
      temp = prev -> info;
      prev -> info = cur -> info;
     cur -> info = temp;
   }
  cur = cur -> link;
  }
  prev = prev -> link;
}}
    return first;
}
```

```
NODE reverse(NODE first)
{
NODE cur, temp;
cur = NULL;
while (first != NULL)
{
temp = first;
first = first -> link;
temp -> link = cur;
cur = temp;
}
return cur
}
```

```
NODE concate(NODE first, NODE second)
{
NODE cur;
if (first == NULL)
return second;
if (second == NULL)
return first;
cur = first;
while (cur -> link != NULL) {
cur = cur -> link; }
cur -> link = second;
return first;
}
```

so it will be



```
void display (NODE first)
{
  NODE temp;
```

```
if (first == NULL)
printf ("list empty cannot display items\n");
for (temp = first; temp != NULL; temp = temp->link)
{
    printf ("%d\n", temp->info);
}
}
```

```
void main()
{
int item, choice, pos, element, option, choice2,
    item1, num;
NODE first = NULL;
NODE second = NULL;
for(;;)
{
printf("\n1: insert_front\n2: Delete_front\n3:
    insert_rear\n4: delete_rear\n5: Random
    position\n6: reverse\n7: sort\n8. concate
    \n9: display_list\n10: Exit\n");
printf("enter the choice\n");
scanf("%d", &choice);
switch(choice)
{
case 1:
        printf("enter item at front end\n");
        scanf("%d", &item);
        first = insert_front(first, item);
        break;
case 2:
        first = delete_front(first);
        break;
case 3:
        printf("enter item at rear end\n");
        scanf("%d", &item);
        first = insert_rear(first, item);
        break;
case 4: first = delete_rear(first);
        break;
case 5: printf("press 1 to insert or 2 to
        delete at any desired position\n");
```

```
scanf("%d", &element);
if (element == 1){
    printf("enter position to insert \n");
    scanf("%d", &pos);
  printf("enter the item to insert \n");
  scanf("%d", &item);
  first = insert_pos(item, pos, first)

}
  if (element == 2){
printf("enter the position to delete \n");
scanf("%d", &pos);
  first = delete_pos(pos, first);
}
    break;

Case 6: first = reverse(first);
        break;

case 7: printf("press 1 for ascending sort
                and 2 for descending sort
scanf("%d", &option);
if (option == 1)
  first = asc(first);
  if (option == 2)
  first = des(first);
  break;

Case 8: printf("create a second list \n");
  printf("enter no of elements in second
          list \n");
  scanf("%d", &num);
for(int i=1; i<=num; i++)
    {
```

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```
printf("\n press 1 to insert front & 2 to
        insert rear \n");
scanf(" %d ", &choice2);
if (choice2 == 1) {
printf ("enter the item at front end \n");
scanf (" %d", &item1);
second = IF (second, item1);
}
 if (choice2 == 2) {
printf ("insert item at rearend \n");
 scanf (" %d ", &item1);
 second = IR( second, item1);
}
}
 first = concate (first, second);
break;
Case 9: display (first);
        break;

default : exit (0);
        break;
 }
}
 getch();
}
```