# Singly linked list

Q Write a program to implement singly linked list with the following operations:

a Create a linked list

b Insertion of a node at first position, any position, at end of list.

c Display the contents of linked list

```
#include <stdio.h>
#include <stdlib.h>

struct Node {
        int data;
        struct Node *link;
};

typedef struct Node node;
node *new1, *curr, *ptr, *start = NULL;

void create();
void display();
void InsertStart();
void InsertPosition();
void InsertEnd();

void main(){
      int ch;
      while (1){
          printf("\n1. Create \n2. Display \n3. Insert at Beginning \n4.
           Insert at Position \n5. Insert at End \n6. Exit");
         printf("\nEnter Your choice: ");
         scanf("%d", &ch);
```

```
            switch(ch){
                case 1: create();
                        break;
                case 2: display();
                        break;
                case 3: InsertStart();
                        break;
                case 4: InsertPosition();
                        break;
                case 5: InsertEnd();
                        break;
                case 6: exit(0);
                        break;
            }
        }
}


void create(){
        char ch;

        do{
            new1 = (node *) malloc ( sizeof (node));
            printf("\n Enter Value: ");
            scanf("%d", &new1 -> data);
            if (start == NULL)
            {
                    start = new1;
                    curr = new1;
            }
            else
            {
                    curr -> link = new1;
            curr= new 1;
        }
        printf("Do You Want to Add an Element ? (Y/N) ");
        Scanf(" % c", &ch);
    }while (ch == 'Y' || ch=='y');
    curr→link = NULL;
}

void display(){
    if (start ==NULL){
        printf("Linked List is Empty. ");
        return;
    }

    ptr = start;
    print(" The Elements of Linked list are: ");

    while (ptr != NULL){
        printf("%d ", ptr -> data);
        ptr = ptr -> link;
    }
    printf(" \n");
}

void InsertStart(){
    new 1= (node *)malloc (sizeof (node));
    printf(" \n Enter Value: ");
    Scanf("%d", &new 1 -> data);
    if (start == NULL) {
        start = new 1;
        new1 -> link = NULL;
        return;
    }
```

```
        else{
            new1 -> link = start;
            start= new1;
            return;
        }
}


void InsertEnd(){
        new1 = (node *) malloc (sizeof (node));
        printf ("\n Enter Value: ");
        scanf ("%d", &new1 -> data);
        if (start == NULL){
                start=new1;
                new1-> link = NULL;
                return;
        }


        ptr = start;
        while(ptr -> link != NULL)
        {
                ptr=ptr -> link;
        }
        ptr -> link = new1;
        new1 -> link=NULL;
        return;
    }

void InsertPosition(){
        new1 = (node *) malloc (sizeof (node));
        printf("Enter Value: ");
        scanf(" %d", &new1 -> data );
        if (start ==NULL){
```

```
        start= new 1;
        new 1 ->link=NULL;
        return;
    }


    int i=1,pos;
    ptr=start;
    printf("\n Enter Position: ");
    scanf("%d", &pos);
    while (ptr != NULL && i< pos-1){
              ptr = ptr -> link;
              i++;
    }
    if (ptr==NULL){
              return;
    }
    new1 -> link=ptr -> link;
    ptr -> link=new1;
}
```

Output

```
1. Create
2. Display
3. Insert at Beginning
4. Insert at Position
5. Insert at End
6. Exit
Enter Your Choice: 1
Enter Value: 10
Do You Want to Add an Element (Y/N) ? Y
Enter Value: 20
Do You Want to Add an Element (Y/N)? n
```

```
1. Create
2. Display
3. Insert at Start
4. Insert at Position
5. Insert at End
6. Exit
Enter Your Choice: 2
Elements in Linked List:
10    20

→ Enter Your Choice: 3
  Enter Value: 30

→ Enter Your Choice: 4
  Enter Value: 40
  Enter Position: 2

→ Enter Your Choice: 5
  Enter Value: 50

→ Enter Your Choice: 2
  Elements in Linked List:
  30   40   10   20   50

→ Enter Your Choice: 6
```

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# Linked List - Deletion

Q2 Writee a program to implement Singly Linked List with the following operations:

a) Create a Linked List

b) Deletion of first element, specified element and last element

c) Display content

```
void DeleteStart(){
        if (start ==NULL){
                printf("\n Linked List is Empty.\n");
                return;
        }

        node *temp = start;
        start= start -> link;
        free (temp);
        printf("\n First Element Deleted.\n");
}

void DeletePosition(){
        int i=1, pos;
        if (start ==null){
                printf("\n Linked List is Empty. ");
                return;
        }

        printf("Enter Position: ");
        scanf("%d", &pos);
        node * temp = start;
        node * prev = NULL;
        if (pos==1){
                start = temp -> link;
                free (temp);
```

```
            printf ("Element at %d Deleted", pos);
            return;
        }
        while (temp != NULL && i<pos) {
            prev = temp;
            temp = temp -> link;
            i++;
        }
        if (temp == NULL){
            printf ("Position Not found");
            return;
        }
    prev -> link = temp -> link;
    free (temp);
    printf("Element at Position %d Deleted", pos);

Void DeleteEnd () {
    if (start == NULL){
        start = NULL;
        free (temp);
        printf("Last Element Deleted");
        return;
    }
    while (temp -> link != NULL){
        prev = temp;
        temp = temp -> link;
    }
    prev -> link = NULL;
    free (temp);
    printf("Last Element Deleted");
}
```

Output

```
1. Create
2. Display
3. Delete from Beginning
4. Delete from Position
5. Delete from End
6. Exit

→ Enter Your Choice : 1
  Enter Value: 10
  Enter Value: 20
  Enter Value: 30
  Enter Value: 40
  Enter Value: 50
  Enter Value: 60
  Do You Want to Add an Element (Y/N)? n

→ Enter Your Choice: 2
  Elements in Linked List:
  10   20   30   40   50   60

→ Enter Your Choice: 3
  First Element Deleted.

→ Enter Your Choice: 5
  Last Element Deleted.

→ Enter Your Choice: 4
  Enter Position: 2
  Element at Position 2 Deleted

→ Enter Your Choice: 2
```

```
Elements in Linked List:
20    40    50

Enter Your Choice: 6
```

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