4. WAP to Implement Singly Linked List with following operations:

a) Create a linked list.

b) Insertion of a node at first position, at any position and at end of list. Display the contents of the linked list.

Ans :
```c
#include <stdio.h>
#include <stdlib.h>

struct node
{
   /* data */
   int info;
   struct node *next;
};

struct node *insertAtBeg(struct node *start, int item)
{
   struct node *p;
   p = (struct node *)malloc(sizeof(struct node));
   p->info = item;
   if (start == NULL)
   {
      p->next = NULL;
      start = p;
   }
   else
   {
      p->next = start;
      start = p;
   }
   return start;
}
struct node *insertAtEnd(struct node *start, int item)
{
```

```c
    struct node *p, *temp;
    p = (struct node *)malloc(sizeof(struct node));
    p->info = item;
    p->next = NULL;
    if (start == NULL)
    {
        start = p;
    }
    else
    {
        temp = start;
        while (temp->next != NULL)
            temp = temp->next;
        temp->next = p;
    }
    return start;
}
struct node *insertAtPos(struct node *start, int item, int pos)
{
    struct node *p;
    p = (struct node *)malloc(sizeof(struct node));
    p->info = item;
    struct node *temp = start;
    int i;
    for (i = 0; i < pos - 1 && temp != NULL; i++)
    {
        temp = temp->next;
    }
    if (temp == NULL)
    {
        printf("Index out of bound");
        return start;
```

```c
        }
        p->next = temp->next;
        temp->next = p;
        return start;
}


void displayLinkedList(struct node *start)
{
    if (start == NULL)
    {
        printf("Linked List is Empty.");
    }
    else
    {

        struct node *temp;
        temp = start;
        printf("Elements of the Linked list are: ");
        while (temp != NULL)
        {
            printf("%d ", temp->info);
            temp = temp->next;
        }
    }
}
void main()
{
    struct node *start = NULL;

    int choice;
    while (1)
    {
```

```c
printf("\nChoose any one among the following Linked List Operations: ");

printf("\n1.Insertion at the beginning.\n2.Insertion at the end.\n3.Insertion at a given Index.\n4.Display the Linked List.\n");

scanf("%d", &choice);

if (choice == 1)

{

    int item;

    printf("Enter the element you want to insert: ");

    scanf("%d", &item);

    start = insertAtBeg(start, item);

    printf("%d inserted at the beginning of the Linked List.", item);

}

else if (choice == 2)

{

    int item;

    printf("Enter the element you want to insert: ");

    scanf("%d", &item);

    start = insertAtEnd(start, item);

    printf("%d inserted at the end of the Linked List.", item);

}

else if (choice == 3)

{

    int item, pos;

    printf("Enter the element you want to insert: ");

    scanf("%d", &item);

    printf("Enter the index at which you want to insert: ");

    scanf("%d", &pos);

    start = insertAtPos(start, item, pos);

    printf("%d inserted at %d index of the Linked List.", item, pos);

}

else if (choice == 4)

{

    displayLinkedList(start);
```

```
            }
        else if (choice == 5)
        {
            break;
        }
        else
        {
            printf("Enter a valid choice!!!");
        }
        }
    }
```

OUTPUT :

```
Choose any one among the following Linked List Operations:
1.Insertion at the beginning.
2.Insertion at the end.
3.Insertion at a given Index.
4.Display the Linked List.
2
Enter the element you want to insert: 10
10 inserted at the end of the Linked List.
Choose any one among the following Linked List Operations:
1.Insertion at the beginning.
2.Insertion at the end.
3.Insertion at a given Index.
4.Display the Linked List.
2
Enter the element you want to insert: 20
20 inserted at the end of the Linked List.
Choose any one among the following Linked List Operations:
1.Insertion at the beginning.
2.Insertion at the end.
3.Insertion at a given Index.
4.Display the Linked List.
3
Enter the element you want to insert: 15
Enter the index at which you want to insert: 1
15 inserted at 1 index of the Linked List.
Choose any one among the following Linked List Operations:
1.Insertion at the beginning.
2.Insertion at the end.
3.Insertion at a given Index.
4.Display the Linked List.
4
Elements of the Linked list are: 10 15 20
Choose any one among the following Linked List Operations:
1.Insertion at the beginning.
2.Insertion at the end.
3.Insertion at a given Index.
4.Display the Linked List.
1
Enter the element you want to insert: 5
5 inserted at the beginning of the Linked List.
```