Laboratory Component 8:

Design, Develop and Implement a menu driven Program in C for the following operations on Doubly Linked List (DLL) of Employee Data with the fields: SSN, Name, Dept, Designation, Sal, PhNo

a. Create a DLL of N Employees Data by using end insertion.
b. Display the status of DLL and count the number of nodes in it
c. Perform Insertion and Deletion at End of DLL
d. Perform Insertion and Deletion at Front of DLL
e. Demonstrate how this DLL can be used as Double Ended Queue
f. Exit

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

struct node
{
        char ssn[25],name[25],dept[10],designation[25];
        int sal;
        long int phone;
        struct node *llink;
        struct node *rlink;
};
typedef struct node* NODE;

NODE first = NULL;
int count=0;


NODE create()
{
         NODE enode;
         enode = (NODE)malloc(sizeof(struct node));
         if( enode== NULL)
         {
                 printf("\nRunning out of memory");
                 exit(0);
          }
          printf("\nEnter the ssn,Name,Department,Designation,Salary,PhoneNo of the employee: \n");

        scanf("%s %s %s %s %d %ld", enode->ssn, enode->name, enode->dept, enode->designation, &enode->sal,
&enode->phone);
          enode->llink=NULL;
          enode->rlink=NULL;
          count++;
          return enode;
}

NODE insertfront()
{
        NODE temp;
        temp = create();
         if(first == NULL)
        {
              return temp;
         }
```

```
        temp->rlink = first;
        first->llink = temp;
        return temp;
}

void display()
{
        NODE cur;
        int nodeno=1;
        cur = first;
        if(cur == NULL)
                printf("\nNo Contents to display in DLL");
        while(cur!=NULL)
        {
      printf("\nENode:%d||SSN:%s|Name:%s|Department:%s|Designation:%s|Salary:%d|Phone no:%ld", nodeno,
cur->ssn, cur->name,cur->dept, cur->designation, cur->sal, cur->phone);
                cur = cur->rlink;
                 nodeno++;
        }
        printf("\nNo of employee nodes is %d",count);
}

NODE deletefront()
{
       NODE temp;
       if(first == NULL)
       {
                printf("\nDoubly Linked List is empty");
                return NULL;
       }
       if(first->rlink== NULL)
      {
                printf("\nThe employee node with the ssn:%s is deleted", first->ssn);
               free(first);
               count--;
                return NULL;
       }
       temp = first;
       first = first->rlink;
       temp->rlink = NULL;
       first->llink = NULL;
       printf("\nThe employee node with the ssn:%s is deleted",temp->ssn);
       free(temp);
       count--;
       return first;
}

NODE insertend()
{
        NODE cur, temp;
        temp = create();

        if(first == NULL)
        {
                return temp;
        }
```

```
        cur= first;
        while(cur->rlink!=NULL)
        {
                cur = cur->rlink;
        }

        cur->rlink = temp;
        temp->llink = cur;
         return first;
}

NODE deleteend()
{
        NODE prev,cur;
        if(first == NULL)
        {
                printf("\nDoubly Linked List is empty");
                return NULL;
        }

        if(first->rlink == NULL)
        {
                 printf("\nThe employee node with the ssn:%s is deleted",first->ssn);
                 free(first);
                 count--;
                 return NULL;
        }

        prev=NULL;
        cur=first;

        while(cur->rlink!=NULL)
        {
                prev=cur;
                cur = cur->rlink;
        }

        cur->llink = NULL;
        printf("\nThe employee node with the ssn:%s is deleted",cur->ssn);
        free(cur);
        prev->rlink = NULL;
        count--;
        return first;
}

void deqdemo()
{
      int ch;
      while(1)
     {
            printf("\nDemo Double Ended Queue Operation");
     printf("\n1:InsertQueueFront\n 2: DeleteQueueFront\n 3:InsertQueueRear\n 4:DeleteQueueRear\n
5:DisplayStatus\n 6: Exit \n");
            scanf("%d", &ch);

            switch(ch)
```

```
            {
                  case 1: first=insertfront();
                            break;
                  case 2: first=deletefront();
                            break;
                  case 3: first=insertend();
                            break;
                  case 4: first=deleteend();
                           break;
                  case 5: display();
                            break;
                  default : return;
            }
      }
}

void main()
{
   int ch,i,n;
   while(1)
   {
      printf("\n\n~~~Menu~~~");
      printf("\n1:Create DLL of Employee Nodes");
      printf("\n2:DisplayStatus");
       printf("\n3:InsertAtEnd");
       printf("\n4:DeleteAtEnd");
       printf("\n5:InsertAtFront");
       printf("\n6:DeleteAtFront");
       printf("\n7:Double Ended Queue Demo using DLL");
       printf("\n8:Exit \n");
       printf("\nPlease enter your choice: ");
      scanf("%d",&ch);

      switch(ch)
      {
       case 1 : printf("\nEnter the no of Employees:    ");
                 scanf("%d",&n);
                 for(i=1;i<=n;i++)
                 first = insertend();
                 break;

       case 2:  display();
                 break;

        case 3: first = insertend();
                break;

        case 4: first = deleteend();
                break;

        case 5: first = insertfront();
                break;

        case 6: first = deletefront();
              break;
```

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        case 7: deqdemo();
                break;

        case 8 : exit(0);
      default: printf("\nPlease Enter the valid choice");
      }
   }
}
```