

Lab 4

Question:

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.

Code:

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

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

```
typedef struct Node {  
    int data;  
    struct Node *next;  
}Node;
```

```
void InsertAtBeginning( Node **head_ref,int new_data);
```

```
void InsertAtEnd( Node **head_ref,int new_data);
```

```
void Insert( Node **prev_node,int new_data,int pos);
```

```
void PrintList(Node * next);
```

```
void InsertAtBeginning( Node **head_ref,int new_data)  
{  
    Node *new_node=(struct Node*)malloc(sizeof( Node));  
    new_node->data=new_data;  
    new_node->next=*head_ref;  
    *head_ref=new_node;  
}
```

```
void InsertAtEnd(Node **head_ref,int new_data)  
{  
    Node *new_node=(struct Node*)malloc(sizeof( Node));  
    Node *last=*head_ref;  
    new_node->data=new_data;  
    new_node->next=NULL;  
    if (*head_ref==NULL)  
    {  
        *head_ref=new_node;  
        return ;  
    }  
    while (last->next!=NULL)  
        last=last->next;  
    last->next=new_node;
```

```

}

void Insert(Node **head_ref,int new_data,int pos)
{
    if (*head_ref ==NULL)
    {
        printf("Cannot be NULL\n");
        return;
    }
    Node *temp = *head_ref;
    Node *newNode = ( Node *) malloc (sizeof ( Node));
    newNode->data = new_data;
    newNode->next = NULL;

    while (--pos>0)
    {
        temp = temp->next;
    }
    newNode->next = temp->next;
    temp->next = newNode;
}

```

```

void PrintList(Node *node)
{
    while (node!=NULL)
    {
        printf("%d\n",node->data);
        node=node->next;
    }
}

```

```

int main()
{
    int ch,new,pos;
    Node* head=NULL;
    while(ch!=5)
    {
        printf("Menu\n");
        printf("1.Insert at beginning\n");
        printf("2.Insert at a specific position\n");
        printf("3.Insert at end\n");
        printf("4.Display linked list\n");
        printf("5.Exit\n");
    }
}

```

```

printf("Enter your choice\n");
scanf("%d",&ch);
switch(ch)
{
    case 1:
    {
        printf("Enter the data you want to insert at beginning\n");
        scanf("%d",&new);
        InsertAtBeginning(&head,new);
        break;
    }
    case 2:
    {
        printf("Enter the data and position at which you want to insert \n");
        scanf("%d%d",&new,&pos);
        Insert(&head,new,pos);
        break;
    }
    case 3:
    {
        printf("Enter the data you want to insert at end\n");
        scanf("%d",&new);
        InsertAtEnd(&head,new);
        break;
    }
    case 4:
    {
        printf("Created linked list is:\n");
        PrintList(head);
        break;
    }
    case 5:
    {
        return 0;
        break;
    }
    case 6:
    {
        printf("Invalid data!");
        break;
    }
}
return 0;
}

```

Output:

```
Menu
1.Insert at beginning
2.Insert at a specific position
3.Insert at end
4.Display linked list
5.Exit
Enter your choice
1
Enter the data you want to insert at beginning
12
Menu
1.Insert at beginning
2.Insert at a specific position
3.Insert at end
4.Display linked list
5.Exit
Enter your choice
3
Enter the data you want to insert at end
15
Menu
1.Insert at beginning
2.Insert at a specific position
3.Insert at end
4.Display linked list
5.Exit
Enter your choice
1
Enter the data you want to insert at beginning
11
Menu
1.Insert at beginning
2.Insert at a specific position
3.Insert at end
4.Display linked list
5.Exit
Enter your choice
2
Enter the data and position at which you want to insert
13
2
Menu
1.Insert at beginning
2.Insert at a specific position
3.Insert at end
4.Display linked list
5.Exit
Enter your choice
4
Created linked list is:
11
12
13
15
Menu
1.Insert at beginning
2.Insert at a specific position
3.Insert at end
4.Display linked list
5.Exit
Enter your choice
5
```