Institute of Computer Technology
B. Tech. Computer Science and Engineering
Sub: DS Branch: BDA Class: A

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Sem: 3
Class: A
Subject: DS
Practical: 09
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Write a program in C/C++ to create and display a Doubly Linked List.
Input data: 1, 6, 5, 9
Output: NULL > 1 > 6 > 5 > 9 > NULL

Code:

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

struct Node
{
    int data;
    struct Node *prev;
    struct Node *next;
};

struct Node *createNode(int data)
{
    struct Node *newNode = (struct Node *)malloc(sizeof(struct Node));
    newNode->data = data;
    newNode->prev = NULL;
    newNode->next = NULL;
    return newNode;
}

void append(struct Node **head_ref, int data)
{
    struct Node *newNode = createNode(data);
    struct Node *temp = *head_ref;
```

```
    if (*head_ref == NULL)
    {
        *head_ref = newNode;
        return;
    }

    while (temp->next != NULL)
    {
        temp = temp->next;
    }

    temp->next = newNode;
    newNode->prev = temp;
}

void displayList(struct Node *head)
{
    struct Node *temp = head;
    printf("NULL");

    while (temp != NULL)
    {
        printf(" > %d", temp->data);
        temp = temp->next;
    }

    printf(" > NULL\n");
}

int main()
{
    struct Node *head = NULL;
    int numNodes, data;

    printf("Enter the number of nodes: ");
    scanf("%d", &numNodes);

    for (int i = 0; i < numNodes; i++)
    {
        printf("Enter data for node %d: ", i + 1);
        scanf("%d", &data);
        append(&head, data);
    }

    displayList(head);

    return 0;
}
```

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

struct Node
{
    int data;
    struct Node *prev;
    struct Node *next;
};

struct Node *createNode(int data)
{
    struct Node *newNode = (struct Node *)malloc(sizeof(struct Node));
    newNode->data = data;
    newNode->prev = NULL;
    newNode->next = NULL;
    return newNode;
}

void append(struct Node **head_ref, int data)
{
    struct Node *newNode = createNode(data);
    struct Node *temp = *head_ref;

    if (*head_ref == NULL)
    {
        *head_ref = newNode;
        return;
    }

    while (temp->next != NULL)
    {
        temp = temp->next;
    }

    temp->next = newNode;
    newNode->prev = temp;
}

void displayList(struct Node *head)
{
    struct Node *temp = head;
    printf("NULL");

    while (temp != NULL)
    {
        printf(" > %d", temp->data);
        temp = temp->next;
    }

    printf(" > NULL\n");
}

int main()
{
    struct Node *head = NULL;
    int numNodes, data;

    printf("Enter the number of nodes: ");
    scanf("%d", &numNodes);

    for (int i = 0; i < numNodes; i++)
    {
        printf("Enter data for node %d: ", i + 1);
        scanf("%d", &data);
        append(&head, data);
    }

    displayList(head);

    return 0;
}
```

Output:

```
PS C:\Users\jatin\OneDrive\Desktop\Academics\SEM - 3\Practicals\DS\Practical-9> gcc .\Prac-9.c
PS C:\Users\jatin\OneDrive\Desktop\Academics\SEM - 3\Practicals\DS\Practical-9> ./a.exe
Enter the number of nodes: 4
Enter data for node 1: 59
Enter data for node 2: 17
Enter data for node 3: 42
Enter data for node 4: 99
NULL > 59 > 17 > 42 > 99 > NULL
PS C:\Users\jatin\OneDrive\Desktop\Academics\SEM - 3\Practicals\DS\Practical-9>
```