

Assignment 4



Shri G.S Institute of Technology & Science

Data Structure

Assignment 4 – INDEX

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P1 Write a program for creation of singly linked list.

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

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

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

Node* insert(Node* head, int value) {
    Node* newNode = createNode(value);
    if (head == NULL) {
        return newNode;
    }
    Node* temp = head;
    while (temp->next != NULL) {
        temp = temp->next;
    }
    temp->next = newNode;
    return head;
}

void display(Node* head) {
    if (head == NULL) {
        printf("List is empty.\n");
        return;
    }
    Node* temp = head;
    printf("Linked List: ");
    while (temp != NULL) {
        printf("%d -> ", temp->data);
        temp = temp->next;
    }
    printf("\n");
}

int main() {
    printf("Shiv Arora\n");
    Node* head = NULL;
    int choice, value;
    printf("\nMenu:\n");
    printf("1. Insert\n2. Display\n3. Exit\n");
    while (1) {
        printf("Enter your choice: ");
        scanf("%d", &choice);
        switch (choice) {
            case 1:
                printf("Enter value to insert: ");
```

```

        scanf("%d", &value);
        head = insert(head, value);
        break;
    case 2:
        display(head);
        break;
    case 3:
        printf("Dead\n");
        return 0;
    default:
        printf("Invalid choice. Please try again.\n");
    }
}
return 0;
}

```

OUTPUT:

```

Shiv Arora

Menu:
1. Insert
2. Display
3. Exit
Enter your choice: 1
Enter value to insert: 1
Enter your choice: 1
Enter value to insert: 3
Enter your choice: 1
Enter value to insert: 5
Enter your choice: 2
Linked List: 1 -> 3 -> 5 ->
Enter your choice: 3
Dead
PS D:\DSA Assignments\Assignment 4\Code>

```

P2 Write a program for creation of doubly linked list.

```

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

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

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

```

```

    return newNode;
}

Node* insert(Node* head, int value) {
    Node* newNode = createNode(value);
    if (head == NULL) {
        return newNode;
    }
    Node* temp = head;
    while (temp->next != NULL) {
        temp = temp->next;
    }
    temp->next = newNode;
    newNode->prev = temp;
    return head;
}

void display(Node* head) {
    if (head == NULL) {
        printf("List is empty.\n");
        return;
    }
    Node* temp = head;
    printf("Linked List: ");
    while (temp != NULL) {
        printf("%d <-> ", temp->data);
        temp = temp->next;
    }
    printf("\n");
}

int main() {
    printf("Shiv Arora\n");
    Node* head = NULL;
    int choice, value;
    printf("\nMenu:\n");
    printf("1. Insert\n2. Display\n3. Exit\n");
    while (1) {
        printf("Enter your choice: ");
        scanf("%d", &choice);
        switch (choice) {
            case 1:
                printf("Enter value to insert: ");
                scanf("%d", &value);
                head = insert(head, value);
                break;
            case 2:
                display(head);
                break;
            case 3:
                printf("Dead\n");
                return 0;
            default:
                printf("Invalid choice. Please try again.\n");
        }
    }
}

```

```

    }
    return 0;
}

```

OUTPUT:

```

Shiv Arora

Menu:
1. Insert
2. Display
3. Exit
Enter your choice: 1
Enter value to insert: 76
Enter your choice: 1
Enter value to insert: 77
Enter your choice: 1
Enter value to insert: 78
Enter your choice: 2
Linked List: 76 <-> 77 <-> 78 <->
Enter your choice: 3
Dead
PS D:\DSA Assignments\Assignment 4\Code>

```

P3 Write a program for creation of circular singly linked list.

```

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

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

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

Node* insert(Node* head, int value) {
    Node* newNode = createNode(value);
    if (head == NULL) {
        newNode->next = newNode;
        return newNode;
    }
    Node* temp = head;
    while (temp->next != head) {
        temp = temp->next;
    }

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

```

```
        return newNode;
    }

void display(Node* head) {
    if (head == NULL) {
        printf("List is empty.\n");
        return;
    }
    Node* temp = head;
    printf("Linked List: ");
    do {
        printf("%d -> ", temp->data);
        temp = temp->next;
    } while (temp != head);
    printf("(head)\n");
}

int main() {
    printf("Shiv Arora\n");
    Node* head = NULL;
    int choice, value;
    printf("\nMenu:\n");
    printf("1. Insert\n2. Display\n3. Exit\n");
    while (1) {
        printf("Enter your choice: ");
        scanf("%d", &choice);
        switch (choice) {
            case 1:
                printf("Enter value to insert: ");
                scanf("%d", &value);
                head = insert(head, value);
                break;
            case 2:
                display(head);
                break;
            case 3:
                printf("Dead\n");
                return 0;
            default:
                printf("Invalid choice. Please try again.\n");
        }
    }
    return 0;
}
```

OUTPUT:

```
Shiv Arora

Menu:
1. Insert
2. Display
3. Exit
Enter your choice: 1
Enter value to insert: 55
Enter your choice: 1
Enter value to insert: 56
Enter your choice: 1
Enter value to insert: 66
Enter your choice: 2
Linked List: 66 -> 56 -> 55 -> (head)
Enter your choice: 3
Dead
PS D:\DSA Assignments\Assignment 4\Code> |
```