Program - 05

Title : **Write a Program to Implement Stack Operations by using Linked List**

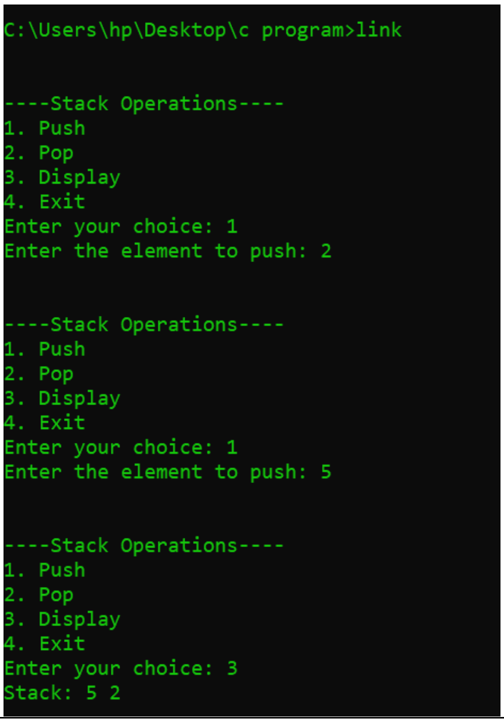
Code:

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

// Node structure
struct Node {
    int data;
    struct Node* next;
};

// Stack structure
struct Stack {
    struct Node* top;
};

// Initialize a new stack
void initStack(struct Stack* stack) {
    stack->top = NULL;
}

// Check if stack is empty
int isEmpty(struct Stack* stack) {
    return stack->top == NULL;
}

// Push an element onto the stack
void push(struct Stack* stack, int data) {
    struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));
    newNode->data = data;
    newNode->next = stack->top;
    stack->top = newNode;
}

// Pop an element from the stack
int pop(struct Stack* stack) {
    if (isEmpty(stack)) {
        printf("Stack is empty!\n");
        return -1;
    }
    struct Node* temp = stack->top;
    int data = temp->data;
    stack->top = temp->next;
    free(temp);
    return data;
}

// Display the contents of the stack
void display(struct Stack* stack) {
    struct Node* current = stack->top;
    printf("Stack: ");
    while (current != NULL) {
        printf("%d ", current->data);
        current = current->next;
    }
```

```c
    printf("\n");
}

// Main function
int main() {
    struct Stack stack;
    initStack(&stack);
    int choice, data;

    do {
        printf("\n\n----Stack Operations----\n");
        printf("1. Push\n");
        printf("2. Pop\n");
        printf("3. Display\n");
        printf("4. Exit\n");
        printf("Enter your choice: ");
        scanf("%d", &choice);

        switch (choice) {
            case 1:
                printf("Enter the element to push: ");
                scanf("%d", &data);
                push(&stack, data);
                break;
            case 2:
                data = pop(&stack);
                if (data != -1) {
                    printf("Popped element: %d\n", data);
                }
                break;
            case 3:
                display(&stack);
                break;
            case 4:
                printf("Exiting...\n");
                break;
            default:
                printf("Invalid choice!\n");
        }
    } while (choice != 4);

    return 0;
}
```

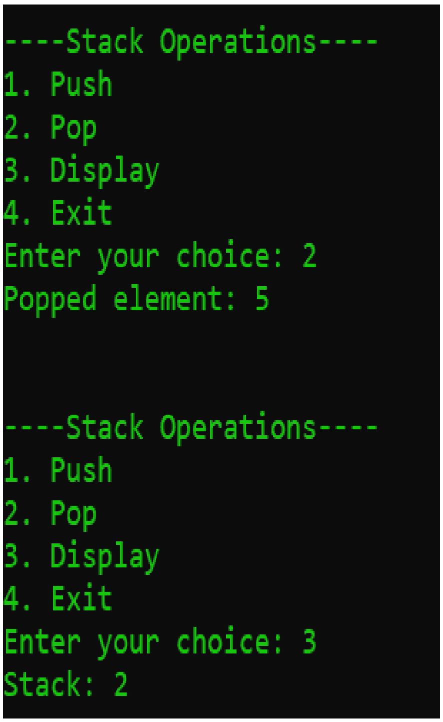
Output :

Push



```
C:\Users\hp\Desktop\c program>link


----Stack Operations----
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter the element to push: 2


----Stack Operations----
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter the element to push: 5


----Stack Operations----
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 3
Stack: 5 2
```

Pop



```
----Stack Operations----
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 2
Popped element: 5


----Stack Operations----
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 3
Stack: 2
```

Date : ___/____/______

Teacher Sign ………………………………………………………