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Department of Computer Science
Level: 2nd Year LMD Computer Science
Course: Algorithms and Data Structures 03
Lab Work No. 4

(Stack & Queue)

Objective

Write a C program that checks whether a given string is a palindrome using:

- A stack implemented as a linked list
- A queue implemented as a linked list
- Ignoring spaces while checking

A string is a **palindrome** if it reads the same forward and backward.

Basic Structure of the Stack and Queue

```c
// Stack Node
typedef struct SNode {
    char data;
    struct SNode *next;
} SNode;

// Queue Node
typedef struct QNode {
    char data;
    struct QNode *next;
} QNode;

// Queue structure
typedef struct {
    QNode *front;
    QNode *rear;
} Queue;
```

Program Requirements

What Your Program Must Do

1. Read a full line of text from the user.
2. Convert the string to uppercase (for uniform comparison).
3. For each alphabetic character:
   - Push it into the stack.
   - Enqueue it into the queue.
4. Compare:
   - Each pop from the stack.
   - With each dequeue from the queue.
5. If all characters match: print Palindrome, Otherwise -: print Not Palindrome.

```
Using Pointers Only

Your push() must return the new top of the stack:

top = push(top, ch);
```

```
And your pop() must return the new top as well:

top = pop(top, &value);
```

- Queue uses only single pointers in its struct.