

Code

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// Author: Gokul Raj, 235, R3A, CSE
// QUESTION: Store string in doubly linked list. Check if palindrome.

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

#define ARR_LEN 256

// Structure to hold Doubly Linked list for string.
struct Node{
    char data;
    struct Node *prev;
    struct Node *next;
};

// Variables to hold HEAD, TAIL and LENGTH of string.
struct Node *str_head = NULL;
struct Node *str_tail = NULL;
int len = 1;

void loadString(){
    printf("Enter string: ");
    // Load first charecter to list
    struct Node *firstNode = malloc(sizeof(struct Node));
    char c = getc(stdin);
    firstNode->data = c;
    firstNode->next = NULL;
    firstNode->prev = NULL;
    str_tail = firstNode;
    str_head = firstNode;
    c = getc(stdin);
    // Input charecters until end of input string
    // Set tail as the new node, increment length
    while(c != '\n'){
        struct Node *newNode = malloc(sizeof(struct Node));
        newNode->data = c;
        newNode->next = NULL;
        newNode->prev = str_tail;
        str_tail->next = newNode;
        str_tail = newNode;
        len++;
        c = getc(stdin);
    }
}
```

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int checkPalindrome(struct Node *head, struct Node*tail, int len){
    struct Node *f = head, *r = tail;
    // Check chars from front and rear simultaneously, until reaching mid
    int i = 0;
    while(i < len/2){
        // if mismatched anywhere, not a palindrome
        if(f->data != r->data)
            return 0;
        f = f->next;
        r = r->prev;
        i++;
    }
    return 1;
}

// Driver code
void main(){
    loadString();
    if(checkPalindrome(str_head, str_tail, len))
        printf("Palindrome!!\n\n");
    else
        printf("Not Palindrome!!\n\n");
}

```

Output

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PS Z:\DSLlab> gcc .\palindrome_ll.c; .\a.exe
Enter string: hello
Not Palindrome!!

PS Z:\DSLlab> gcc .\palindrome_ll.c; .\a.exe
Enter string: abcdcba
Palindrome!!

PS Z:\DSLlab> gcc .\palindrome_ll.c; .\a.exe
Enter string: malayalam
Palindrome!!

PS Z:\DSLlab> gcc .\palindrome_ll.c; .\a.exe
Enter string: datastruct
Not Palindrome!!

```