

Rajalakshmi Engineering College

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 1_COD_Question 3

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Imagine you are working on a text processing tool and need to implement a feature that allows users to insert characters at a specific position.

Implement a program that takes user inputs to create a singly linked list of characters and inserts a new character after a given index in the list.

Input Format

The first line of input consists of an integer N, representing the number of characters in the linked list.

The second line consists of a sequence of N characters, representing the linked list.

The third line consists of an integer index, representing the index(0-based) after

which the new character node needs to be inserted.

The fourth line consists of a character value representing the character to be inserted after the given index.

Output Format

If the provided index is out of bounds (larger than the list size):

1. The first line of output prints "Invalid index".
2. The second line prints "Updated list: " followed by the unchanged linked list values.

Otherwise, the output prints "Updated list: " followed by the updated linked list after inserting the new character after the given index.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 5

a b c d e

2

X

Output: Updated list: a b c X d e

Answer

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

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

```
// Definition of a singly linked list node
```

```
struct Node {  
    char data;  
    struct Node* next;  
};
```

```
// Function to create a new node
```

```
struct Node* createNode(char data) {  
    struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));
```

```
newNode->data = data;
newNode->next = NULL;
return newNode;
}
```

```
// Function to print the linked list
void printList(struct Node* head) {
    struct Node* temp = head;
    while (temp != NULL) {
        printf("%c ", temp->data);
        temp = temp->next;
    }
    printf("\n");
}
```

```
// Function to insert a character after a given index
void insertAfterIndex(struct Node* head, int index, char value, int n) {
    if (index >= n) { // Check if index is out of bounds
        printf("Invalid index\n");
        printf("Updated list: ");
        printList(head); // Print unchanged list
        return;
    }
```

```
    struct Node* temp = head;
    for (int i = 0; i < index; i++) {
        temp = temp->next;
    }
```

```
    // Create a new node for the character
    struct Node* newNode = createNode(value);
    newNode->next = temp->next;
    temp->next = newNode;
```

```
    printf("Updated list: ");
    printList(head);
}
```

```
int main() {
    int n, index;
    char value;
```

```
// Input number of characters in the linked list
scanf("%d", &n);

if (n <= 0) {
    printf("Invalid list size\n");
    return 0;
}

// Input the linked list characters
struct Node* head = NULL;
struct Node* temp = NULL;
for (int i = 0; i < n; i++) {
    char ch;
    scanf(" %c", &ch);
    struct Node* newNode = createNode(ch);
    if (head == NULL) {
        head = newNode;
        temp = head;
    } else {
        temp->next = newNode;
        temp = newNode;
    }
}

// Input index and character value
scanf("%d", &index);
scanf(" %c", &value);

// Perform insertion
insertAfterIndex(head, index, value, n);

return 0;
}
```

Status : Correct

Marks : 10/10