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1  #include <stdio.h>
2  #include <stdlib.h>
3
4  typedef struct _listnode{
5      int item;
6      struct _listnode *next;
7  } ListNode;
8
9
10 void printList(ListNode *cur);
11 ListNode * findNode(ListNode *cur, int index);
12 int insertNode(ListNode **ptrHead, int index, int item);
13
14 int removeNode(ListNode **ptrHead, int index);
15
16 int main()
17 {
18     ListNode *head=NULL;
19     int size =0;
20     int item;
21     int index;
22
23     printf("Enter a list of numbers, terminated by any non-digit character: \n");
24     while(scanf("%d",&item))
25         if(insertNode(&head,size, item)) size++;
26     scanf("%*s");
27
28     printList(head);
29
30     while(1){
31         printf("Enter the index of the node to be removed: ");
32         scanf("%d",&index);
33
34         if(removeNode(&head,index))
35             size--;
36         else{
37             printf("The node cannot be removed.\n");
38             break;
39         }
40
41         printf("After the removal operation,\n");
42         printList(head);
43     }
44
45     printList(head);
46     return 0;
47 }
48
49 void printList(ListNode *cur){
50     printf("Current List: ");
51     while (cur != NULL){
52         printf("%d ", cur->item);
53         cur = cur->next;
54     }
55     printf("\n");
56 }
57
58 ListNode *findNode(ListNode* cur, int index)
59 {
60     if (cur==NULL || index<0)
61         return NULL;
62     while(index>0){
63         cur=cur->next;
64         if (cur==NULL)
65             return NULL;
66         index--;

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67     }
68     return cur;
69 }
70
71 int insertNode(ListNode **ptrHead, int index, int item){
72     ListNode *pre, *newNode;
73     // If empty list or inserting first node, update head pointer
74     if (index == 0){
75         newNode = malloc(sizeof(ListNode));
76         newNode->item = item;
77         newNode->next = *ptrHead;
78         *ptrHead = newNode;
79         return 1;
80     }
81     // Find the nodes before and at the target position
82     // Create a new node and reconnect the links
83     else if ((pre = findNode(*ptrHead, index-1)) != NULL){
84         newNode = malloc(sizeof(ListNode));
85         newNode->item = item;
86         newNode->next = pre->next;
87         pre->next = newNode;
88         return 1;
89     }
90     return 0;
91 }
92
93 int removeNode(ListNode **ptrHead, int index)
94 {
95     /* Write your program code here */
96     ListNode *currentNode, *previousNode;
97
98     // This is the prof answer
99     // Checking if the LinkedList is empty:
100    if (*ptrHead == NULL)
101        return -1;
102
103    // Edge case: removing node at index 0
104    if (index == 0){
105        currentNode = *ptrHead;
106        *ptrHead = currentNode -> next;
107        free(currentNode);
108        return 0;
109    }
110
111    // Find the nodes before and after the target position
112    // Free the target node and reconnect the links
113    if ((previousNode = findNode(*ptrHead, index-1)) != NULL)
114    {
115        if (previousNode -> next == NULL)
116            return -1;
117        currentNode = previousNode -> next;
118        free(currentNode);
119        return 0;
120    }
121    return -1;
122
123 }
124

```