

```

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 void deleteList(ListNode **ptrHead);
14 int duplicateReverse(ListNode *cur, ListNode **ptrNewHead);
15
16 int main()
17 {
18     ListNode *head=NULL;
19     ListNode *dupRevHead=NULL;
20     int size =0;
21     int item;
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     printf("\nBefore duplicateReverse() is called:\n");
29     printList(head);
30
31     duplicateReverse(head,&dupRevHead);
32
33     printf("\nAfter duplicateReverse() was called:\n");
34     printf("The original list:\n");
35     printList(head);
36     printf("The duplicated reverse list:\n");
37     printList(dupRevHead);
38
39     if(head!=NULL)
40         deleteList(&head);
41     if(dupRevHead)
42         deleteList(&dupRevHead);
43
44     return 0;
45 }
46
47 void printList(ListNode *cur){
48     printf("Current List: ");
49     while (cur != NULL){
50         printf("%d ", cur->item);
51         cur = cur->next;
52     }
53     printf("\n");
54 }
55
56 ListNode *findNode(ListNode* cur, int index)
57 {
58     if (cur==NULL || index<0)
59         return NULL;
60     while(index>0){
61         cur=cur->next;
62         if (cur==NULL)
63             return NULL;
64         index--;
65     }
66     return cur;

```

```

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

```