1bm24cs174 ds lab 4.c - Code::Blocks 20.03

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


struct Node {
    int data;
    struct Node* next;
};

struct Node* head = NULL;


void createList(int n) {
    struct Node *newNode, *temp;
    int data, i;

    if (n <= 0) {
        printf("Number of nodes should be greater than zero.\n");
        return;
    }

    head = (struct Node*)malloc(sizeof(struct Node));
    if (head == NULL) {
        printf("Memory not allocated.\n");
        exit(0);
    }

    printf("Enter data for node 1: ");
    scanf("%d", &data);
    head->data = data;
    head->next = NULL;
    temp = head;

    for (i = 2; i <= n; i++) {
        newNode = (struct Node*)malloc(sizeof(struct Node));
        if (newNode == NULL) {
            printf("Memory not allocated.\n");
            break;
        }
        printf("Enter data for node %d: ", i);
        scanf("%d", &data);
        newNode->data = data;
        newNode->next = NULL;

        temp->next = newNode;
        temp = temp->next;
    }
}


void displayList() {
    struct Node* temp = head;
    if (head == NULL) {
        printf("List is empty.\n");
```


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```
52      struct Node* temp = head;
53      if (head == NULL) {
54          printf("List is empty.\n");
55          return;
56      }
57
58      printf("\nLinked List: ");
59      while (temp != NULL) {
60          printf("%d -> ", temp->data);
61          temp = temp->next;
62      }
63      printf("NULL\n");
64  }
65
66
67  void insertAtBeginning(int data) {
68      struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));
69      newNode->data = data;
70      newNode->next = head;
71      head = newNode;
72  }
73
74
75  void insertAtEnd(int data) {
76      struct Node *newNode, *temp;
77      newNode = (struct Node*)malloc(sizeof(struct Node));
78      newNode->data = data;
79      newNode->next = NULL;
80
81      if (head == NULL) {
82          head = newNode;
83          return;
84      }
85
86      temp = head;
87      while (temp->next != NULL)
88          temp = temp->next;
89
90      temp->next = newNode;
91  }
92
93
94  void insertAtPosition(int data, int position) {
95      struct Node *newNode, *temp;
96      int i;
97
98      newNode = (struct Node*)malloc(sizeof(struct Node));
99      newNode->data = data;
100
101     if (position == 1) {
102         newNode->next = head;
103         head = newNode;
104         return;
105     }
```


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```
103         head = newNode;
104         return;
105     }
106
107     temp = head;
108     for (i = 1; i < position - 1 && temp != NULL; i++) {
109         temp = temp->next;
110     }
111
112     if (temp == NULL) {
113         printf("Position out of range.\n");
114         free(newNode);
115     } else {
116         newNode->next = temp->next;
117         temp->next = newNode;
118     }
119 }
120
121
122 int main() {
123     int n, choice, data, pos;
124
125     printf("Enter number of nodes to create: ");
126     scanf("%d", &n);
127     createList(n);
128
129     while (1) {
130         printf("\n--- Linked List Menu ---\n");
131         printf("1. Display List\n");
132         printf("2. Insert at Beginning\n");
133         printf("3. Insert at End\n");
134         printf("4. Insert at Any Position\n");
135         printf("5. Exit\n");
136         printf("Enter your choice: ");
137         scanf("%d", &choice);
138
139         switch (choice) {
140             case 1:
141                 displayList();
142                 break;
143             case 2:
144                 printf("Enter data to insert at beginning: ");
145                 scanf("%d", &data);
146                 insertAtBeginning(data);
147                 break;
148             case 3:
149                 printf("Enter data to insert at end: ");
150                 scanf("%d", &data);
151                 insertAtEnd(data);
152                 break;
153             case 4:
154                 printf("Enter position and data: ");
155                 scanf("%d %d", &pos, &data);
156                 insertAtPosition(data, pos);
```


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```
            case 3:
                printf("Enter data to insert at end: ");
                scanf("%d", &data);
                insertAtEnd(data);
                break;
            case 4:
                printf("Enter position and data: ");
                scanf("%d %d", &pos, &data);
                insertAtPosition(data, pos);
                break;
            case 5:
                exit(0);
            default:
                printf("Invalid choice!\n");
        }
    }

    return 0;
}
```

"C:\Users\Admin\Desktop\1bm24cs174 ds lab 4.exe"

```
Enter number of nodes to create: 3
Enter data for node 1: 10
Enter data for node 2: 20
Enter data for node 3: 30

--- Linked List Menu ---
1. Display List
2. Insert at Beginning
3. Insert at End
4. Insert at Any Position
5. Exit
Enter your choice: 1

Linked List: 10 -> 20 -> 30 -> NULL

--- Linked List Menu ---
1. Display List
2. Insert at Beginning
3. Insert at End
4. Insert at Any Position
5. Exit
Enter your choice: 2
Enter data to insert at beginning: 5

--- Linked List Menu ---
1. Display List
2. Insert at Beginning
3. Insert at End
4. Insert at Any Position
5. Exit
Enter your choice: 1

Linked List: 5 -> 10 -> 20 -> 30 -> NULL

--- Linked List Menu ---
1. Display List
2. Insert at Beginning
3. Insert at End
4. Insert at Any Position
5. Exit
Enter your choice: 3
Enter data to insert at end: 40

--- Linked List Menu ---
1. Display List
2. Insert at Beginning
3. Insert at End
4. Insert at Any Position
5. Exit
Enter your choice: 1

Linked List: 5 -> 10 -> 20 -> 30 -> 40 -> NULL

--- Linked List Menu ---
1. Display List
2. Insert at Beginning
3. Insert at End
4. Insert at Any Position
5. Exit
Enter your choice: 4
Enter position and data: 3 15

--- Linked List Menu ---
```

"C:\Users\Admin\Desktop\1bm24cs174 ds lab 4.exe"

```
--- Linked List Menu ---
1. Display List
2. Insert at Beginning
3. Insert at End
4. Insert at Any Position
5. Exit
Enter your choice: 1

Linked List: 5 -> 10 -> 15 -> 20 -> 30 -> 40 -> NULL

--- Linked List Menu ---
1. Display List
2. Insert at Beginning
3. Insert at End
4. Insert at Any Position
5. Exit
Enter your choice:
```