Singly Linked List Operations (C Program)

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

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

struct LinkedList {
   struct Node* head;
   int size;
};

struct Node* createNode(int data) {
   struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));
   if (newNode == NULL) {
      printf("Memory allocation failed\n");
      exit(1);
   }
   newNode->data = data;
   newNode->next = NULL;
   return newNode;
}

struct LinkedList* initializeList() {
   struct LinkedList* list = (struct LinkedList*)malloc(sizeof(struct LinkedList));
   if (list == NULL) {
      printf("Memory allocation failed\n");
      exit(1);
   }
   list->head = NULL;
   list->size = 0;
   return list;
}

void insert(struct LinkedList* list, int data, int position) {
   if (position < 0 || position > list->size) {
      printf("Invalid position\n");
      return;
```

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    }

    struct Node* newNode = createNode(data);

    if (position == 0) {
        newNode->next = list->head;
        list->head = newNode;
    } else {
        struct Node* temp = list->head;
        for (int i = 0; i < position - 1; i++) {
            temp = temp->next;
        }
        newNode->next = temp->next;
        temp->next = newNode;
    }

    list->size++;
    printf("Element %d inserted at position %d\n", data, position);
}

void deleteNode(struct LinkedList* list, int position) {
    if (position < 0 || position >= list->size) {
        printf("Invalid position\n");
        return;
    }

    struct Node* temp = list->head;

    if (position == 0) {
        list->head = temp->next;
        free(temp);
    } else {
        struct Node* prev = NULL;
        for (int i = 0; i < position; i++) {
            prev = temp;
            temp = temp->next;
        }
        prev->next = temp->next;
        free(temp);
    }

    list->size--;
    printf("Element at position %d deleted\n", position);
```

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}

void reverse(struct LinkedList* list) {
   struct Node *prev = NULL, *curr = list->head, *next = NULL;

   while (curr != NULL) {
      next = curr->next;
      curr->next = prev;
      prev = curr;
      curr = next;
   }

   list->head = prev;
}

void display(struct LinkedList* list) {
   struct Node* temp = list->head;
   while (temp != NULL) {
      printf("%d -> ", temp->data);
      temp = temp->next;
   }
   printf("NULL\n");
}

void displayReversed(struct LinkedList* list) {
   reverse(list);
   display(list);
   reverse(list);
}
```