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COURSE NAME: DATA STRUCTURES FOR MODERN COMPUTING SYSTEMS

COURSE CODE: CSA0302

Experiment 11: Linked List

Code:

```
#include <stdio.h>

#include <stdlib.h>

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

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;
}

void insertAtBeginning(struct Node** headRef, int data) {
    struct Node* newNode = createNode(data);
    newNode->next = *headRef;
    *headRef = newNode;
}

void insertAtEnd(struct Node** headRef, int data) {
    struct Node* newNode = createNode(data);
    if (*headRef == NULL) {
        *headRef = newNode;
    }
```

```

        return;
    }

    struct Node* last = *headRef;
    while (last->next != NULL) {
        last = last->next;
    }

    last->next = newNode;
}

void printList(struct Node* node) {
    printf("Linked List: ");
    while (node != NULL) {
        printf("%d -> ", node->data);
        node = node->next;
    }
    printf("NULL\n");
}

void freeList(struct Node* head) {
    struct Node* tmp;
    while (head != NULL) {
        tmp = head;
        head = head->next;
        free(tmp);
    }
}

int main() {
    struct Node* head = NULL;
    insertAtEnd(&head, 10);
    insertAtEnd(&head, 20);
    printList(head);
    insertAtBeginning(&head, 5);
    printList(head);
}

```

```
insertAtEnd(&head, 30);  
printList(head);  
freeList(head);  
return 0;  
}
```

Output:

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

```
=== Code Execution Successful ===
```