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DSA-LAB TASKS

Task 1:

```
#include <iostream>
using namespace std;
```

```
const int MAX_SIZE = 3;
char stack[MAX_SIZE];
int top = -1;
```

```
void push(char plate) {
    if (top == MAX_SIZE - 1) {
        cout << "Cannot add plate " << plate << " The stack is full." << endl;
        return;
    }
    stack[++top] = plate;
    cout << "Added plate " << plate << " to the stack." << endl;
}
```

```
char pop() {
    if (top == -1) {
        cout << "Cannot remove a plate the stack is empty." << endl;
        return 0;
    }
    cout << "Removed plate " << stack[top] << " from the stack." << endl;
    return stack[top--];
}
```

```
char peek() {
    if (top == -1) {
        cout << "The stack is empty" << endl;
        return 0;
    }
    return stack[top];
}
```

```
void display() {  
    if (top == -1) {  
        cout << "The stack is empty." << endl;  
        return;  
    }  
    cout << "Plates in the stack: ";  
    for (int i = top; i >= 0; --i) {  
        cout << stack[i] << " ";  
    }  
    cout << endl;  
}
```

```
int main() {  
    push('A');  
    push('B');  
    push('C');  
    push('D');  
  
    display();  
  
    cout << "Top plate: " << peek() << endl;  
  
    cout << "Popped: " << pop() << endl;  
    display();  
  
    pop();  
    pop();  
    pop();  
  
    return 0;  
}
```

OUTPUT:

```
search view Project Execute Tools AStyle Window Help
C:\Users\DELL\Documents\task 2.exe
Added plate 'A' to the stack.
Added plate 'B' to the stack.
Added plate 'C' to the stack.
Cannot add plate 'D' The stack is full.
Plates in the stack: C B A
Top plate: C
Popped: Removed plate 'C' from the stack.
C
Plates in the stack: B A
Removed plate 'B' from the stack.
Removed plate 'A' from the stack.
Cannot remove a plate the stack is empty.

-----
Process exited after 0.1122 seconds with return value 0
Press any key to continue . . .
```

Task 2:

```
#include <iostream>
#include <string>
using namespace std;
```

```
struct Node {
    string item;
    Node* next;
};
```

```
class GroceryList {
private:
    Node* head;
```

```
public:
```

```
    GroceryList() {
```

```
    head = nullptr;
}
```

```
void addItem(string newItem) {
    Node* newNode = new Node();
    newNode->item = newItem;
    newNode->next = nullptr;
```

```
    if (head == nullptr) {
        head = newNode;
        cout << "Add item: " << newItem << endl;
    } else {
```

```
        Node* temp = head;
        while (temp->next != nullptr) {
            temp = temp->next;
        }
        temp->next = newNode;
        cout << "Add item: " << newItem << endl;
    }
}
```

```
void removeItem(string removeItem) {
    if (head == nullptr) {
        cout << "The list is empty cannot remove item." << endl;
        return;
    }
```

```
    if (head->item == removeItem) {
        Node* temp = head;
        head = head->next;
        delete temp;
        cout << "Remove item: " << removeItem << endl;
        return;
    }
```

```

Node* current = head;
Node* previous = nullptr;
while (current != nullptr && current->item != removeItem) {
    previous = current;
    current = current->next;
}

if (current != nullptr) {
    previous->next = current->next;
    delete current;
    cout << "Remove item: " << removeItem << endl;
} else {
    cout << "Item: " << removeItem << " not found in the list." << endl;
}
}

void displayList() {
    if (head == nullptr) {
        cout << "The grocery list is empty." << endl;
        return;
    }

    Node* temp = head;
    cout << "Grocery list items: ";
    while (temp != nullptr) {
        cout << temp->item << " ";
        temp = temp->next;
    }
    cout << endl;
}

~GroceryList() {
    while (head != nullptr) {
        Node* temp = head;
        head = head->next;
        delete temp;
    }
}

```

```
};

int main() {
    GroceryList list;

    list.addItem("Apples");
    list.addItem("Bread");
    list.addItem("Milk");

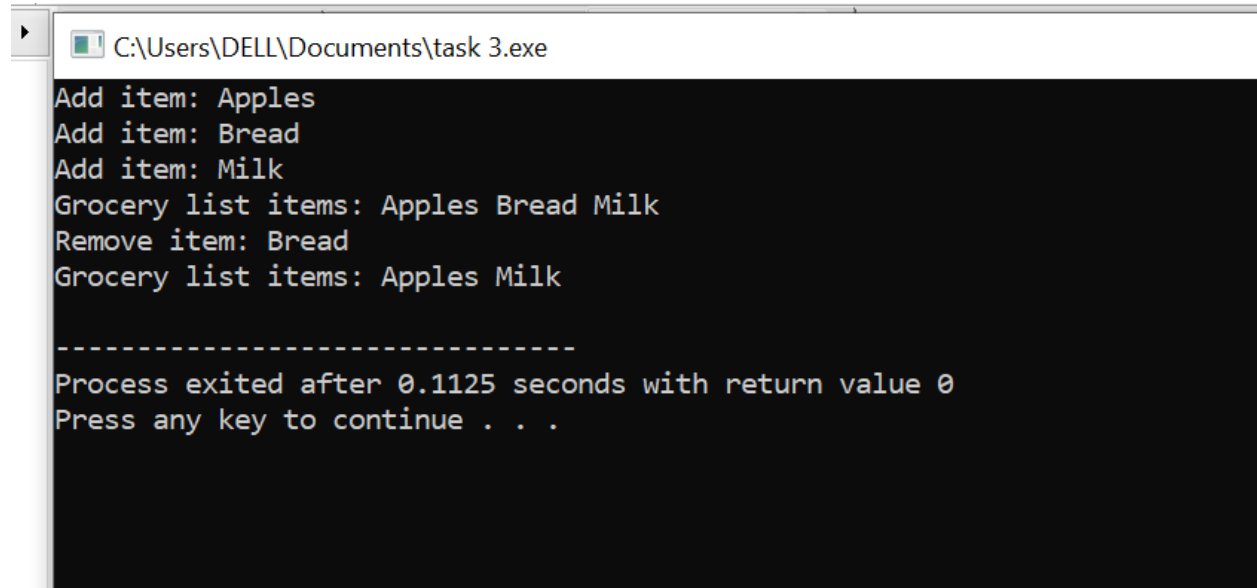
    list.displayList();

    list.removeItem("Bread");

    list.displayList();

    return 0;
}
```

OUTPUT:



```
C:\Users\DELL\Documents\task 3.exe
Add item: Apples
Add item: Bread
Add item: Milk
Grocery list items: Apples Bread Milk
Remove item: Bread
Grocery list items: Apples Milk

-----
Process exited after 0.1125 seconds with return value 0
Press any key to continue . . .
```