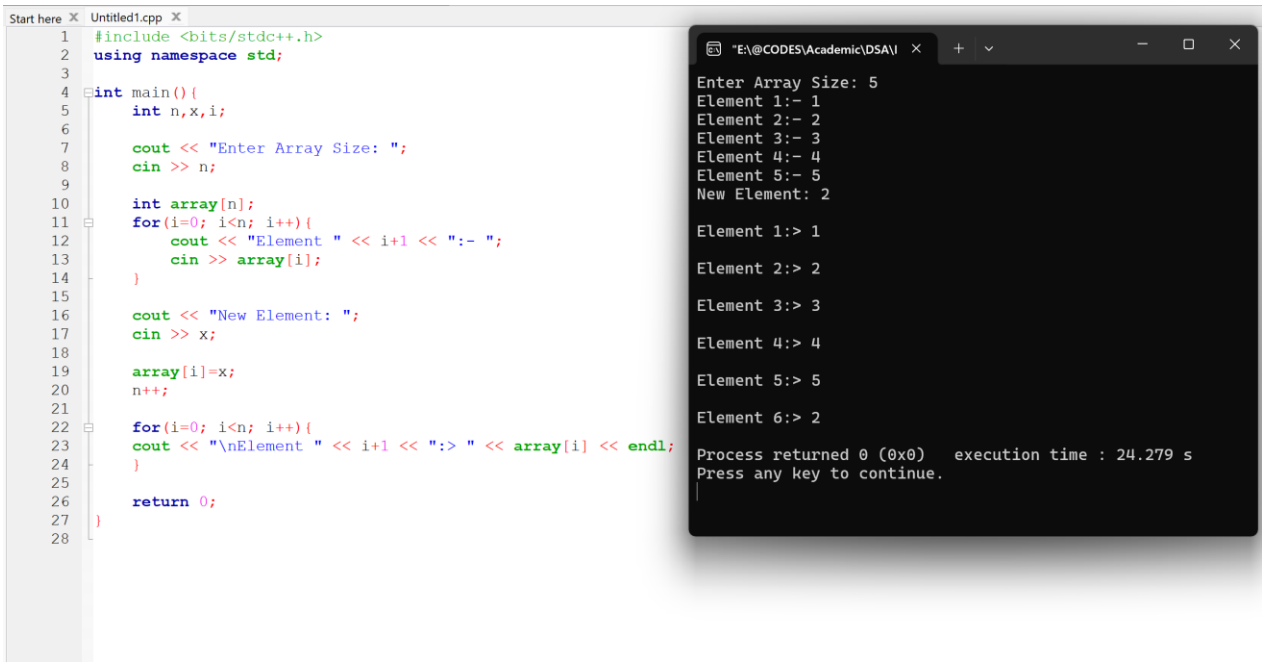
1. **Problem Name:** A program that attempts to add an element at the end of an array.

Problem Code & Output:

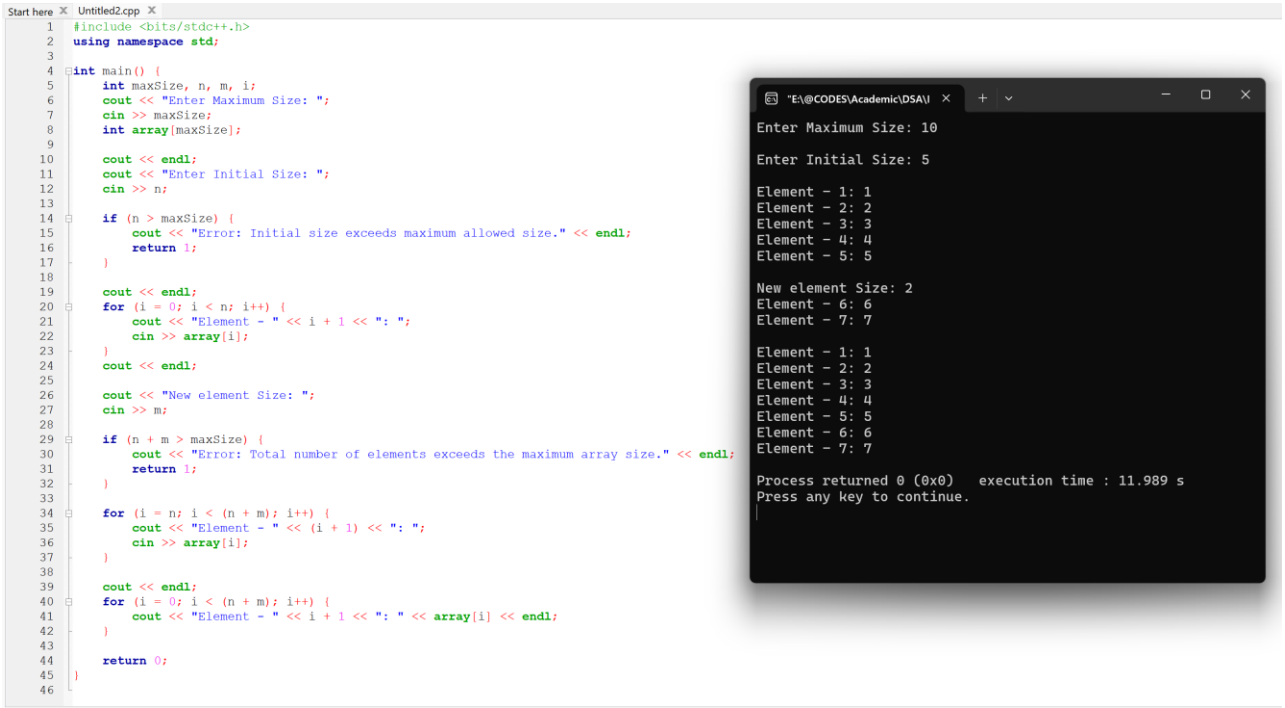


```cpp
#include <bits/stdc++.h>
using namespace std;

int main(){
    int n,x,i;

    cout << "Enter Array Size: ";
    cin >> n;

    int array[n];
    for(i=0; i<n; i++){
        cout << "Element " << i+1 << ":- ";
        cin >> array[i];
    }

    cout << "New Element: ";
    cin >> x;

    array[i]=x;
    n++;

    for(i=0; i<n; i++){
    cout << "\nElement " << i+1 << ":> " << array[i] << endl;
    }

    return 0;
}
```

```
"E:\@CODES\Academic\DSA\I
Enter Array Size: 5
Element 1:- 1
Element 2:- 2
Element 3:- 3
Element 4:- 4
Element 5:- 5
New Element: 2

Element 1:> 1

Element 2:> 2

Element 3:> 3

Element 4:> 4

Element 5:> 5

Element 6:> 2

Process returned 0 (0x0)   execution time : 24.279 s
Press any key to continue.
```

2. **Problem Name:** A program that allows adding multiple elements to the end of an array after its initial creation.

Problem Code & Output:

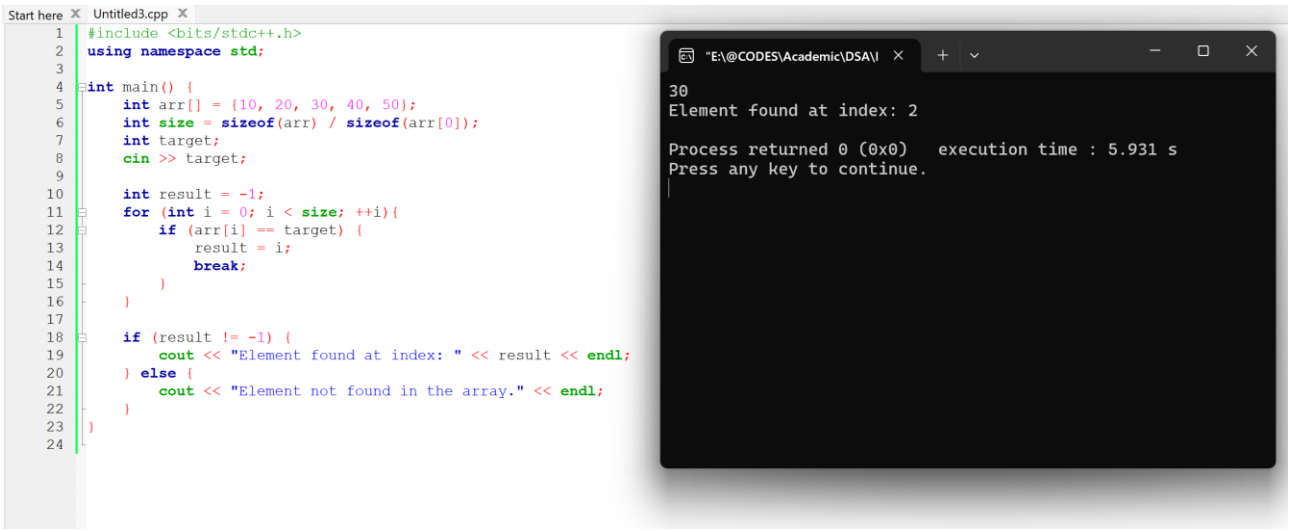


```cpp
#include <bits/stdc++.h>
using namespace std;

int main() {
    int maxSize, n, m, i;
    cout << "Enter Maximum Size: ";
    cin >> maxSize;
    int array[maxSize];

    cout << endl;
    cout << "Enter Initial Size: ";
    cin >> n;

    if (n > maxSize) {
        cout << "Error: Initial size exceeds maximum allowed size." << endl;
        return 1;
    }

    cout << endl;
    for (i = 0; i < n; i++) {
        cout << "Element - " << i + 1 << ": ";
        cin >> array[i];
    }
    cout << endl;

    cout << "New element Size: ";
    cin >> m;

    if (n + m > maxSize) {
        cout << "Error: Total number of elements exceeds the maximum array size." << endl;
        return 1;
    }

    for (i = n; i < (n + m); i++) {
        cout << "Element - " << (i + 1) << ": ";
        cin >> array[i];
    }

    cout << endl;
    for (i = 0; i < (n + m); i++) {
        cout << "Element - " << i + 1 << ": " << array[i] << endl;
    }

    return 0;
}
```

```
"E:\@CODES\Academic\DSA\I
Enter Maximum Size: 10

Enter Initial Size: 5

Element - 1: 1
Element - 2: 2
Element - 3: 3
Element - 4: 4
Element - 5: 5

New element Size: 2
Element - 6: 6
Element - 7: 7

Element - 1: 1
Element - 2: 2
Element - 3: 3
Element - 4: 4
Element - 5: 5
Element - 6: 6
Element - 7: 7

Process returned 0 (0x0)   execution time : 11.989 s
Press any key to continue.
```

3. **Problem Name:** A program that performs a linear search to find an element in an array.

Problem Code & Output:



Start here | Untitled3.cpp

```cpp
#include <bits/stdc++.h>
using namespace std;

int main() {
    int arr[] = {10, 20, 30, 40, 50};
    int size = sizeof(arr) / sizeof(arr[0]);
    int target;
    cin >> target;

    int result = -1;
    for (int i = 0; i < size; ++i){
        if (arr[i] == target) {
            result = i;
            break;
        }
    }

    if (result != -1) {
        cout << "Element found at index: " << result << endl;
    } else {
        cout << "Element not found in the array." << endl;
    }
}
```

```
"E:\@CODES\Academic\DSA\I
30
Element found at index: 2

Process returned 0 (0x0)   execution time : 5.931 s
Press any key to continue.
```