Linear Search and Binary Search

```cpp
//Aneesh Panchal
//2K20/A6/56

#include<iostream>
using namespace std;

int linear_search(int arr[],int n,int x);
int binary_search(int arr[],int n,int x);

int main()
{
    int arr[101]={1,2,3,4,5,6,7,8,9,10};
    int x;
    cout<<"Enter element you want to search: ";
    cin>>x;
    int n=10;
    int L=linear_search(arr,n,x);
    int B=binary_search(arr,n,x);
    if((L!=-1) && (B!=-1))
        cout<<"Index by Linear Search is "<<L<<endl<<"Index by Binary Search is "<<B<<endl
<<endl;
    else
        cout<<"Error"<<endl<<endl;
    return 0;
}

int linear_search(int arr[],int n,int x)
{
    int result=-1;
    for(int i=0;i<n;++i)
    {
        if(arr[i]==x)
        {
            result=i;
            break;
        }
    }
    return result;
}

int binary_search(int arr[],int n,int x)
{
    int low=0,high=n;
    int mid;
    while (low<=high)
    {
        int middle=low+(high-low)/2;
        if (arr[middle]==x)
            return middle;
        if (arr[middle]<x)
            low=middle+1;
```
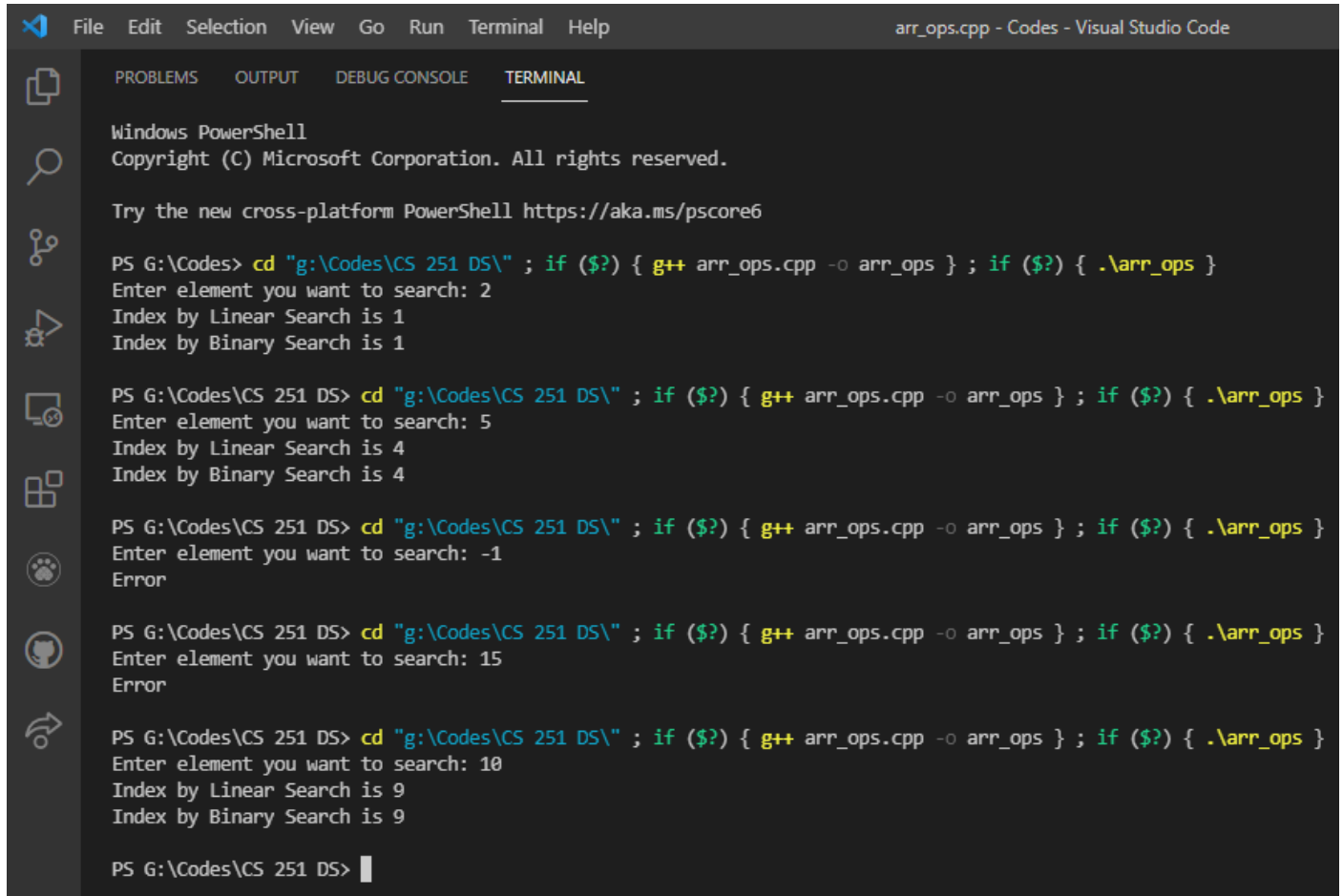
```
        else
            high=middle-1;
    }
    return -1;
}
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS G:\Codes> cd "g:\Codes\CS 251 DS\" ; if ($?) { g++ arr_ops.cpp -o arr_ops } ; if ($?) { .\arr_ops }
Enter element you want to search: 2
Index by Linear Search is 1
Index by Binary Search is 1

PS G:\Codes\CS 251 DS> cd "g:\Codes\CS 251 DS\" ; if ($?) { g++ arr_ops.cpp -o arr_ops } ; if ($?) { .\arr_ops }
Enter element you want to search: 5
Index by Linear Search is 4
Index by Binary Search is 4

PS G:\Codes\CS 251 DS> cd "g:\Codes\CS 251 DS\" ; if ($?) { g++ arr_ops.cpp -o arr_ops } ; if ($?) { .\arr_ops }
Enter element you want to search: -1
Error

PS G:\Codes\CS 251 DS> cd "g:\Codes\CS 251 DS\" ; if ($?) { g++ arr_ops.cpp -o arr_ops } ; if ($?) { .\arr_ops }
Enter element you want to search: 15
Error

PS G:\Codes\CS 251 DS> cd "g:\Codes\CS 251 DS\" ; if ($?) { g++ arr_ops.cpp -o arr_ops } ; if ($?) { .\arr_ops }
Enter element you want to search: 10
Index by Linear Search is 9
Index by Binary Search is 9

PS G:\Codes\CS 251 DS>
```

Insertion and Deletion in Array

```cpp
//Aneesh Panchal
//2K20/A6/56

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

void insertion(int *arr,int x,int n);
void deletion(int *arr,int x,int n);

int main()
{
    int arr[101]={1,3,5,7,9};
    int x;

    int n=5;
    int num=0,y=0;
    cout<<"Enter number of elements you want to add: ";
    cin>>num;
    if(num>95)
    {
        cout<<"Error"<<endl<<endl;
        return 0;
    }

    for(int i=0;i<num;++i)
    {
        y=0;
        cout<<"Enter element you want to insert: ";
        cin>>y;
        fflush(stdin);
        insertion(arr,y,n);
        n++;
    }

    for(int i=0;i<n;++i)
    {
        cout<<arr[i]<<" ";
    }
    cout<<endl;

    num=0;
    cout<<"Enter number of elements you want to delete: ";
    cin>>num;
    if(num>n)
    {
        cout<<"Error"<<endl<<endl;
        return 0;
    }

    for(int i=0;i<num;++i)
    {
```

```cpp
            y=0;
            cout<<"Enter element you want to delete: ";
            cin>>y;
            fflush(stdin);
            deletion(arr,y,n);
            --n;
        }

    for(int i=0;i<n;++i)
    {
        cout<<arr[i]<<" ";
    }
    cout<<endl<<endl;
    return 0;
}

void insertion(int *arr,int x,int n)
{
    int index=(-1);
    for(int i=0;i<n;++i)
    {
        if((*(arr+i))>x)
        {
            index=i;
            break;
        }
        else
            continue;
    }
    if(index==(-1))
        index=(++n);
    for(int i=n;i>=index;i--)
    {
        *(arr+i+1)=*(arr+i);
    }
    *(arr+index)=x;
}

void deletion(int *arr,int x,int n)
{
    int temp;
    int index=(-1);
    for(int i=0;i<n;++i)
    {
        if(*(arr+i)==x)
        {
            index=i;
            break;
        }
        else
            continue;
    }
    if(index==(-1))
        return;
```
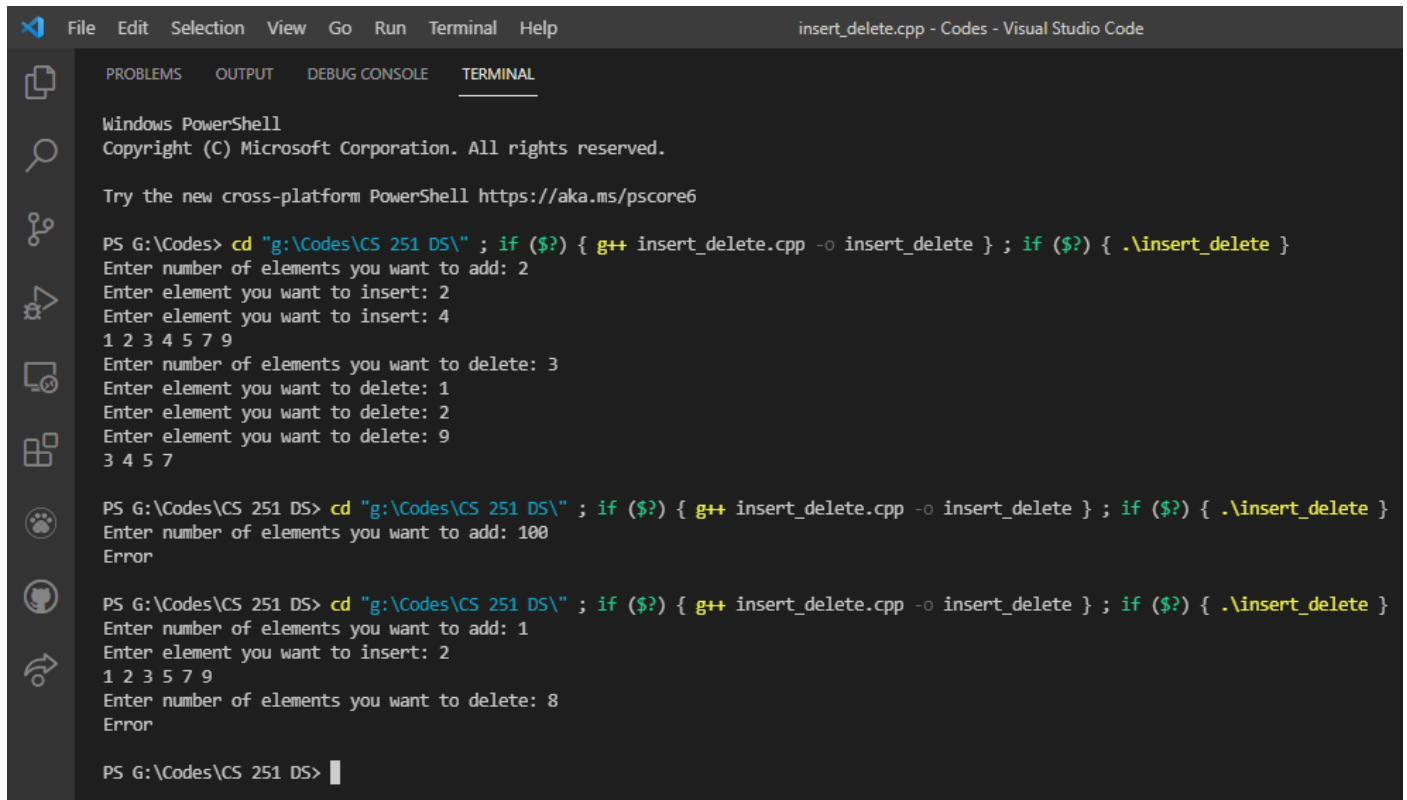
```
    n--;
    for(int i=index;i<=n-1;i++)
    {
        *(arr+i)=*(arr+i+1);
    }
}
```

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```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS G:\Codes> cd "g:\Codes\CS 251 DS\" ; if ($?) { g++ insert_delete.cpp -o insert_delete } ; if ($?) { .\insert_delete }
Enter number of elements you want to add: 2
Enter element you want to insert: 2
Enter element you want to insert: 4
1 2 3 4 5 7 9
Enter number of elements you want to delete: 3
Enter element you want to delete: 1
Enter element you want to delete: 2
Enter element you want to delete: 9
3 4 5 7

PS G:\Codes\CS 251 DS> cd "g:\Codes\CS 251 DS\" ; if ($?) { g++ insert_delete.cpp -o insert_delete } ; if ($?) { .\insert_delete }
Enter number of elements you want to add: 100
Error

PS G:\Codes\CS 251 DS> cd "g:\Codes\CS 251 DS\" ; if ($?) { g++ insert_delete.cpp -o insert_delete } ; if ($?) { .\insert_delete }
Enter number of elements you want to add: 1
Enter element you want to insert: 2
1 2 3 5 7 9
Enter number of elements you want to delete: 8
Error

PS G:\Codes\CS 251 DS>
```