



**IQRA NATIONAL UNIVERSITY PESHAWAR**

**DEPTT. B.E. (ELECTRICAL)**

**8<sup>TH</sup> SEMESTER**

**SPRING 2020**

**FINAL TERM EXAMINATION**

**DATA STRUCTURE AND ALGORITHMS**

**NAME : ABDUL MATEEN**

**ID : 13009**

**INSTRUCTOR:**

Muhammad Adil Asst. Prof

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## Task# 1

Design a linear array B [ ] of size 7 elements. Put the following elements in it.

**s, u, g, a, z, e, y**

a. Implement the Linear Search Algorithm on it to find “g” and display the message

Element g is found successfully

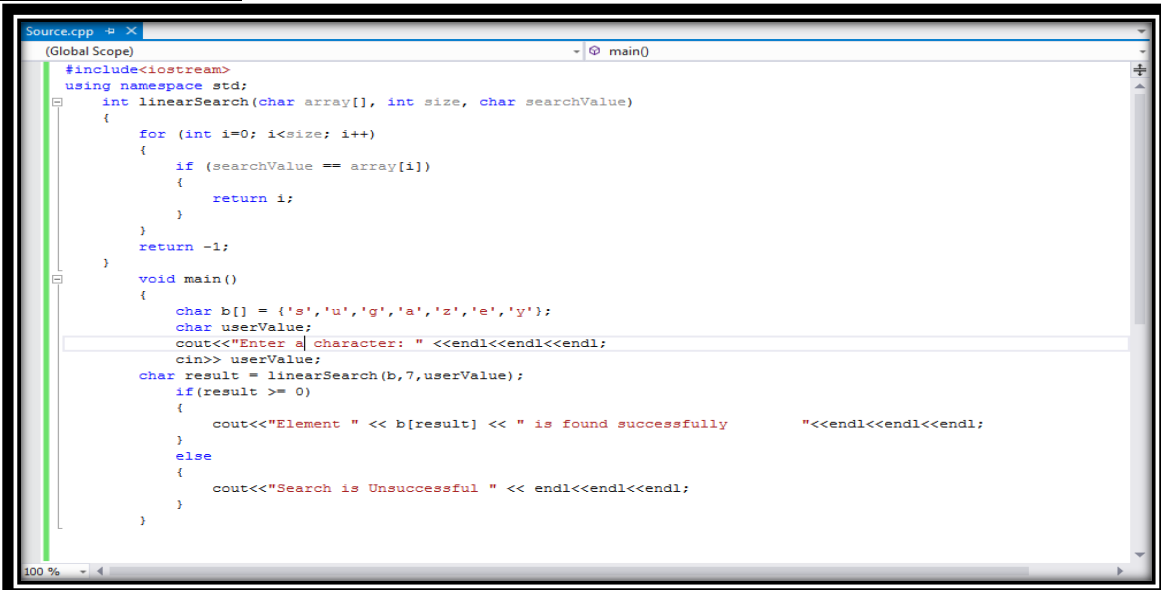
b. Search for element “m” and message should be displayed

Search is Unsuccessful

### Code:

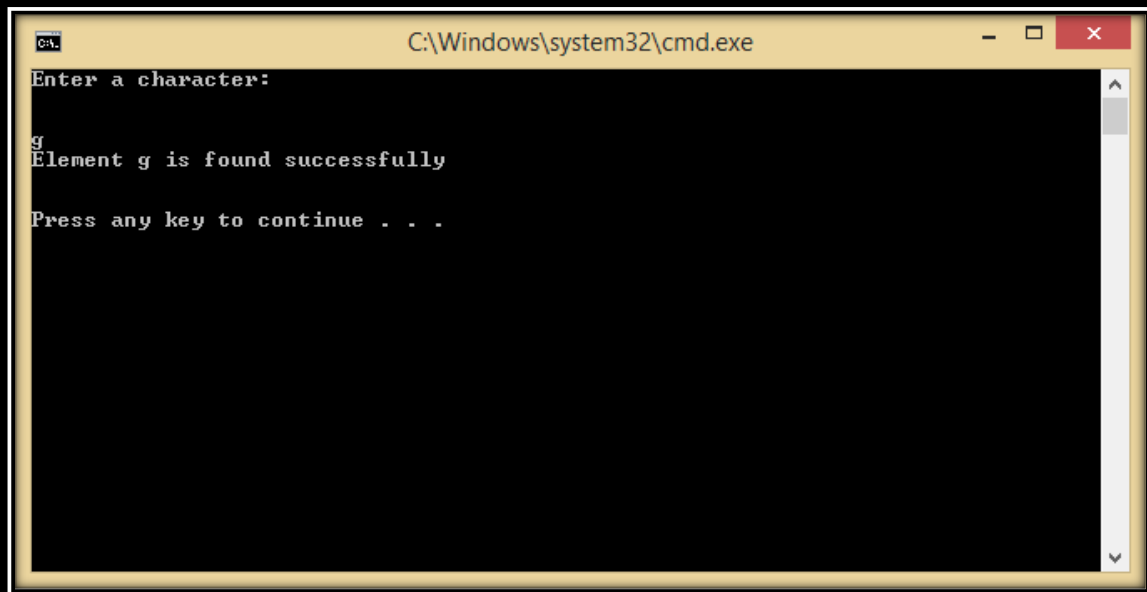
```
#include<iostream>
using namespace std;
int linearSearch(char array[], int size, char searchValue)
{
    for (int i=0; i<size; i++)
    {
        if (searchValue == array[i])
        {
            return i;
        }
    }
    return -1;
}
void main()
{
    char b[] = {'s','u','g','a','z','e','y'};
    char userValue;
    cout<<"Enter a character: " <<endl<<endl<<endl;
    cin>> userValue;
    char result = linearSearch(b,7,userValue);
    if(result >= 0)
    {
        cout<<"Element "<<b[result] <<" is found successfully ";
        cout<<endl<<endl<<endl;
    }
    else
    {
        cout<<"Search is Unsuccessful " << endl<<endl<<endl;
    }
}
```

### Code ScreenShots:



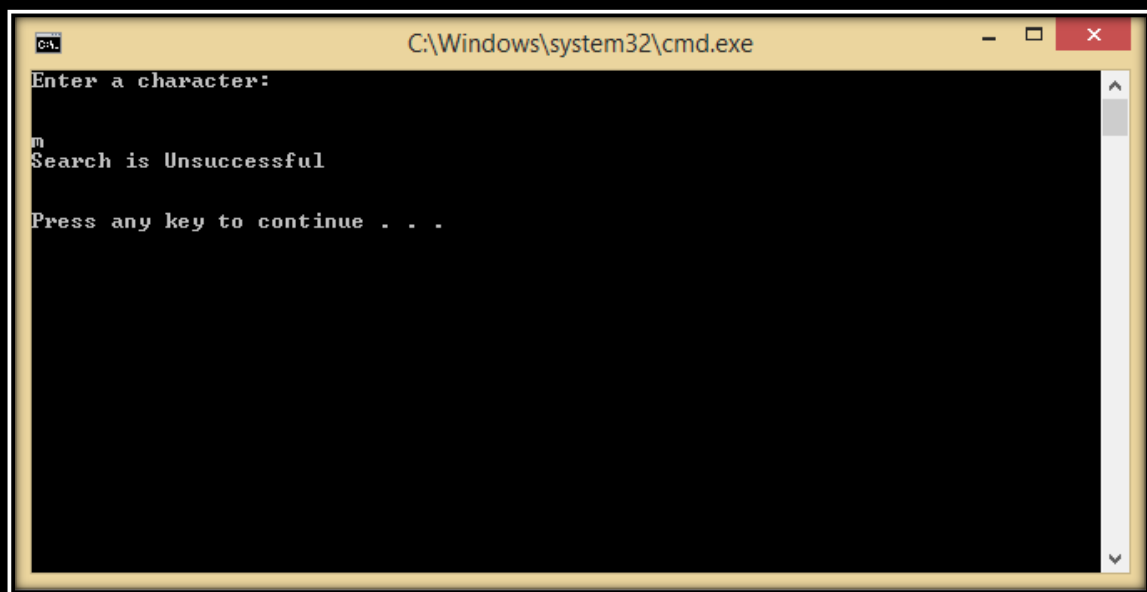
The screenshot shows a code editor window titled 'Source.cpp' with a tab for 'main()'. The code is identical to the one provided in the previous block. The editor has a light blue background and a dark border. The code is color-coded: keywords are in blue, strings and characters are in red, and comments are in green. The code is displayed in a monospaced font. The editor also shows a vertical line of green markers on the left side, indicating the current position of the cursor.

### Output 1 ScreenShot:



```
C:\Windows\system32\cmd.exe
Enter a character:
g
Element g is found successfully
Press any key to continue . . .
```

### Output 2 ScreenShot:



```
C:\Windows\system32\cmd.exe
Enter a character:
m
Search is Unsuccessful
Press any key to continue . . .
```

## Task# 2

Suppose there is a list of 6 unsorted elements.

15, 10, 12, 11, 9, 10

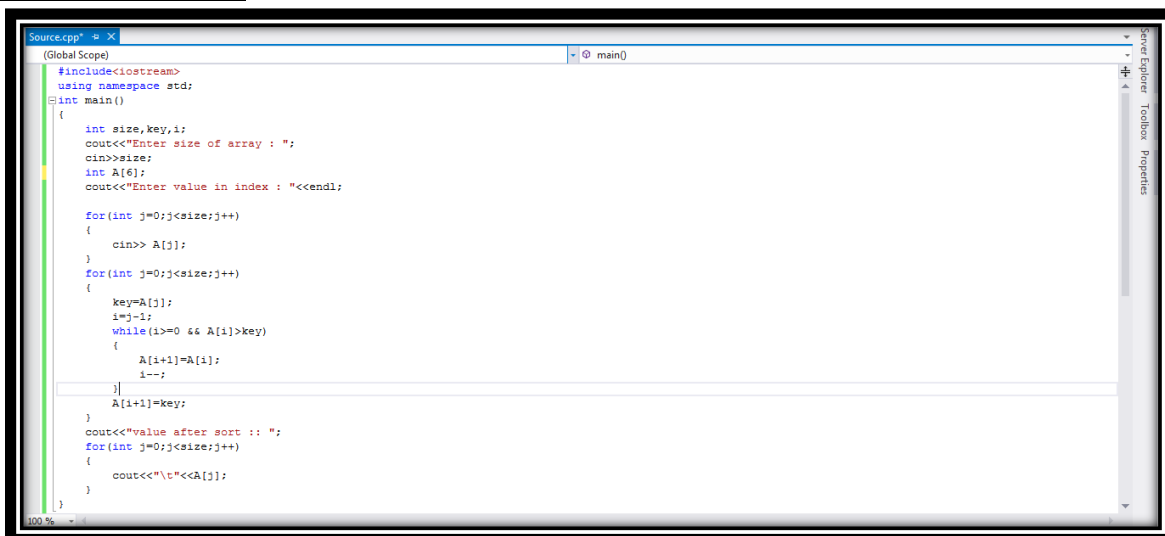
Design a Program to create an array A [ ] and store this list in it, and then apply Insertion Sort Algorithm to Sort the list.

### Code:

```
#include<iostream>
using namespace std;
int main()
{
    int size,key,i;
    cout<<"Enter size of array : ";
    cin>>size;
    int A[size];
    cout<<"Enter value in index : "<<endl;

    for(int j=0;j<size;j++)
    {
        cin>> A[j];
    }
    for(int j=0;j<size;j++)
    {
        key=A[j];
        i=j-1;
        while(i>=0 && A[i]>key)
        {
            A[i+1]=A[i];
            i--;
        }
        A[i+1]=key;
    }
    cout<<"value after sort :: ";
    for(int j=0;j<size;j++)
    {
        cout<<"\t"<<A[j];
    }
}
```

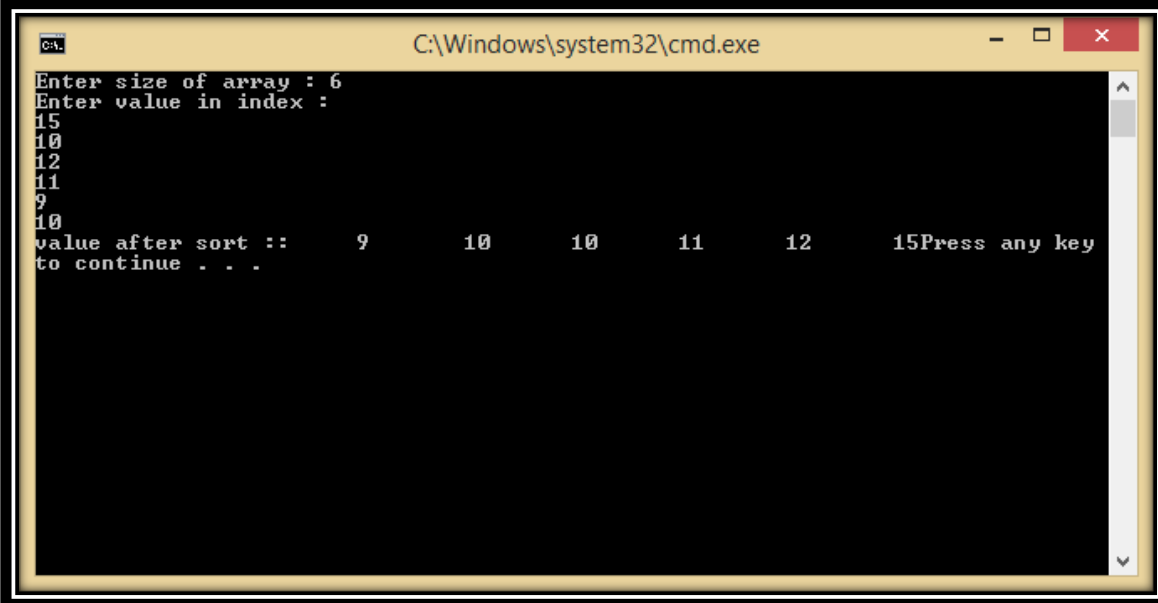
### Code Screenshots:

A screenshot of a code editor window titled "Source.cpp" showing the C++ code for Insertion Sort. The code is displayed in a monospaced font with syntax highlighting. The editor interface includes a toolbar on the right with icons for "Server Explorer", "Toolbox", and "Properties". The code is as follows:

```
#include<iostream>
using namespace std;
int main()
{
    int size,key,i;
    cout<<"Enter size of array : ";
    cin>>size;
    int A[6];
    cout<<"Enter value in index : "<<endl;

    for(int j=0;j<size;j++)
    {
        cin>> A[j];
    }
    for(int j=0;j<size;j++)
    {
        key=A[j];
        i=j-1;
        while(i>=0 && A[i]>key)
        {
            A[i+1]=A[i];
            i--;
        }
        A[i+1]=key;
    }
    cout<<"value after sort :: ";
    for(int j=0;j<size;j++)
    {
        cout<<"\t"<<A[j];
    }
}
```

## Output ScreenShot:



```
C:\Windows\system32\cmd.exe
Enter size of array : 6
Enter value in index :
15
10
12
11
9
10
value after sort :: 9 10 10 11 12 15
Press any key
to continue . . .
```