CS-114 – Fundamental of Programing

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LAB MANUAL #6

Assignment # 1

ME 15 Section B

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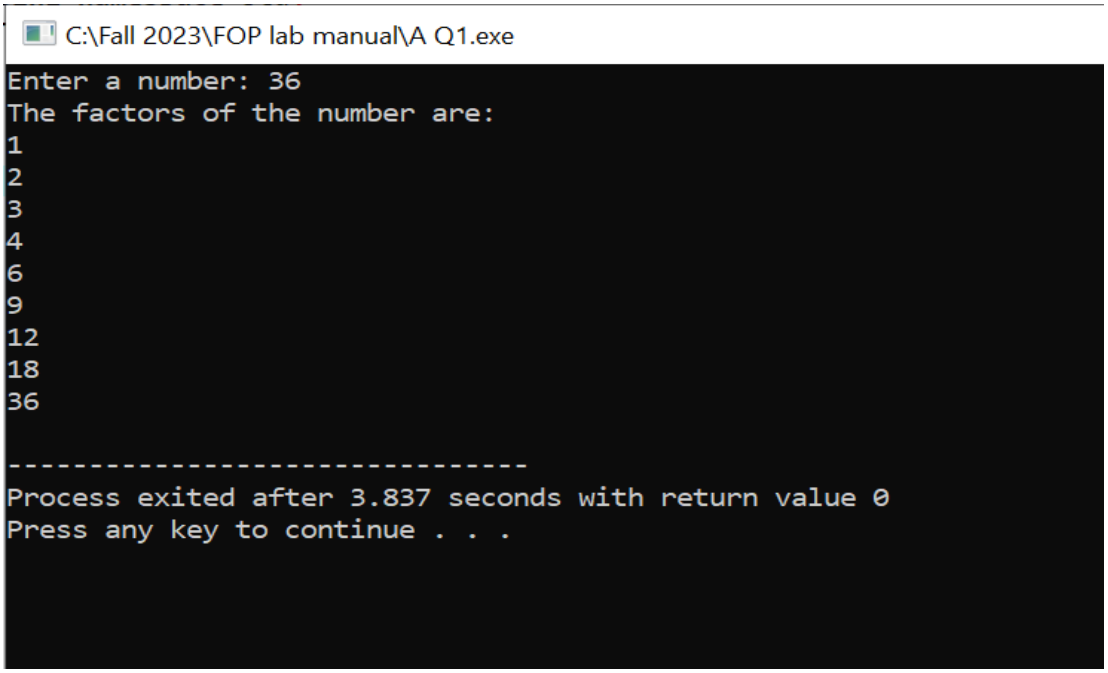
1. **Write a C++ program to display factors of a number using for loops.**

Code:

```
#include<iostream>
using namespace std;
int main()
{
    int n, i;
    cout<<"Enter a number: ";
    cin>>n;
    cout<<"The factors of the number are: \n";
    for(i=1;i<=n;i++)
    {
            if(n%i==0)
                    cout<<i<<endl;
    }
}
```

Output:



2. Write output to the following code.

```
#include <iostream>
int main() {
 int x = 5;
 int y = 10;
 if (x == 5)
 if (y == 10)
 std::cout << "x is 5 and y is 10" << std::endl;
 else
 std::cout << "x is not 5" << std::endl;
 return 0;
}
```

Output:

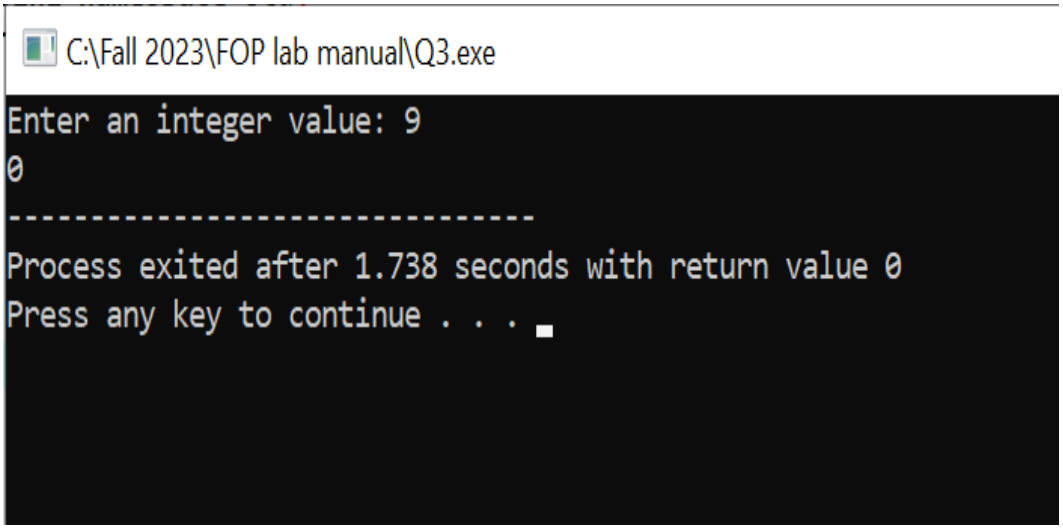
```
x is 5 and y is 10
```

3. Write a C++ program, take an integer value from user and check if it's greater than 10 and less than equal to 20. Print 1 if yes and print 0 if no. Use appropriate datatype for output.

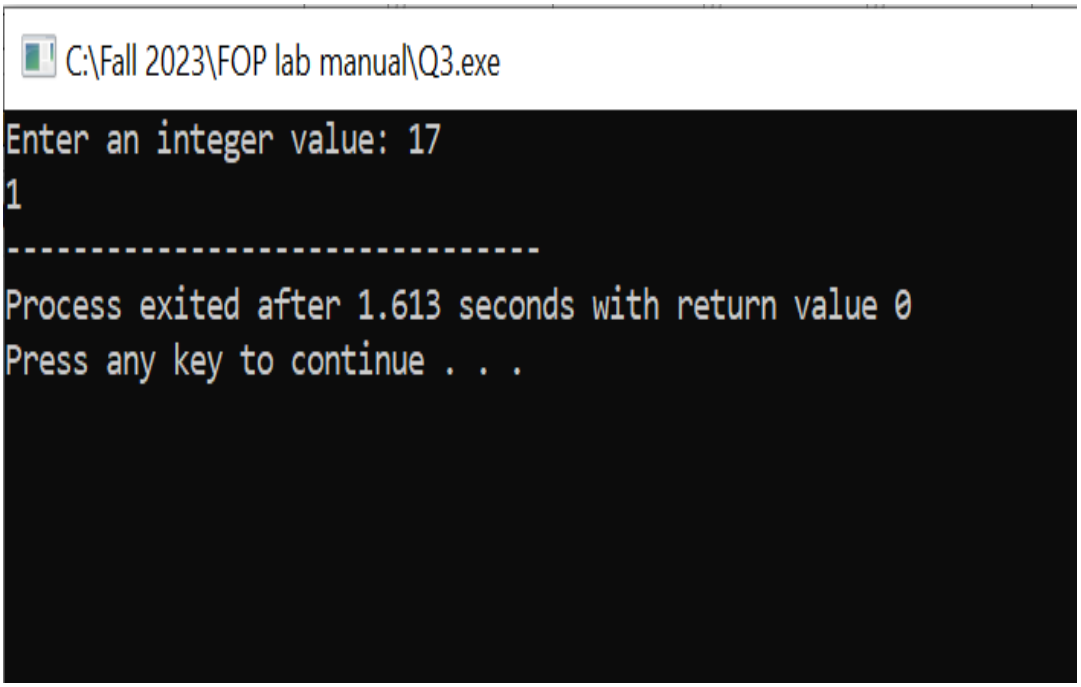
Code:

```
#include<iostream>
using namespace std;
int main()
{
	int n;
	bool x;
	cout<<"Enter an integer value: ";
	cin>>n;
	if(n>10 && n<=20)
		x=true;
	else
		x=false;
	cout<<x;
}
```

Output:


C:\Fall 2023\FOP lab manual\Q3.exe
Enter an integer value: 9
0

Process exited after 1.738 seconds with return value 0
Press any key to continue . . .


C:\Fall 2023\FOP lab manual\Q3.exe
Enter an integer value: 17
1

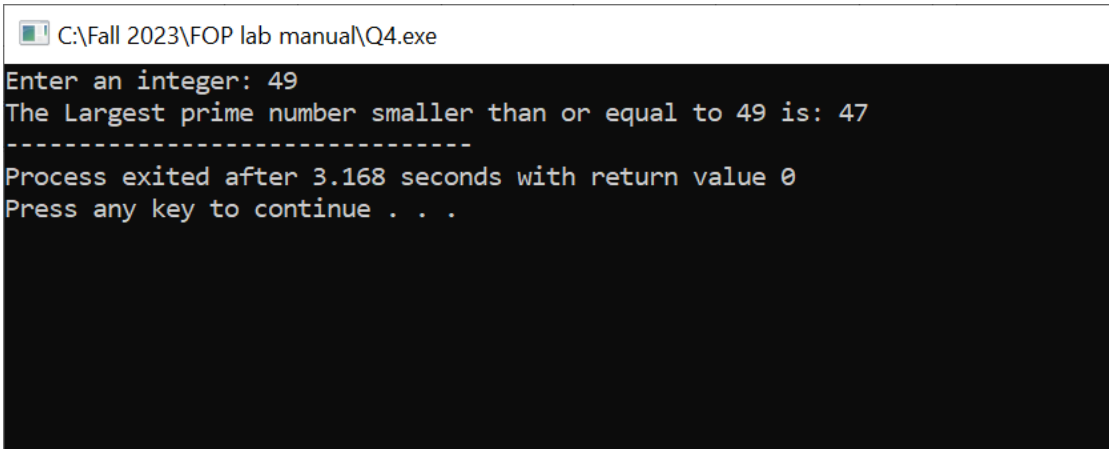
Process exited after 1.613 seconds with return value 0
Press any key to continue . . .

4. Write a C++ program that uses a while loop to find the largest prime number less than a given positive integer N. Your program should take the value of N as input from the user and then find the largest prime number less than or equal to N. You are not allowed to use any library or pre-existing functions to check for prime numbers.

Code:

```
#include<iostream>
using namespace std;
int main()
{
	int n, p, i, j=1;
	bool j_is_prime;
	cout<<"Enter an integer: ";
	cin>>n;
	while(j<=n)
	{
		j_is_prime=true;
		i=2;
		while(i<=j/2)
		{
			if(j%i==0)
			{
				j_is_prime=false;
				break;
			}
			i++;
		}
		if(j_is_prime==1)
			p=j;
		j++;
	}
	cout<<"The Largest prime number smaller than or equal to "<<n<<" is: "<<p;
}
```

Output:



5. Write a C++ program, take two string as input from user and check if both strings are equal or not. If they are equal make them unequal by rotating string. e.g., Hello is turned into olleH etc.

Code:

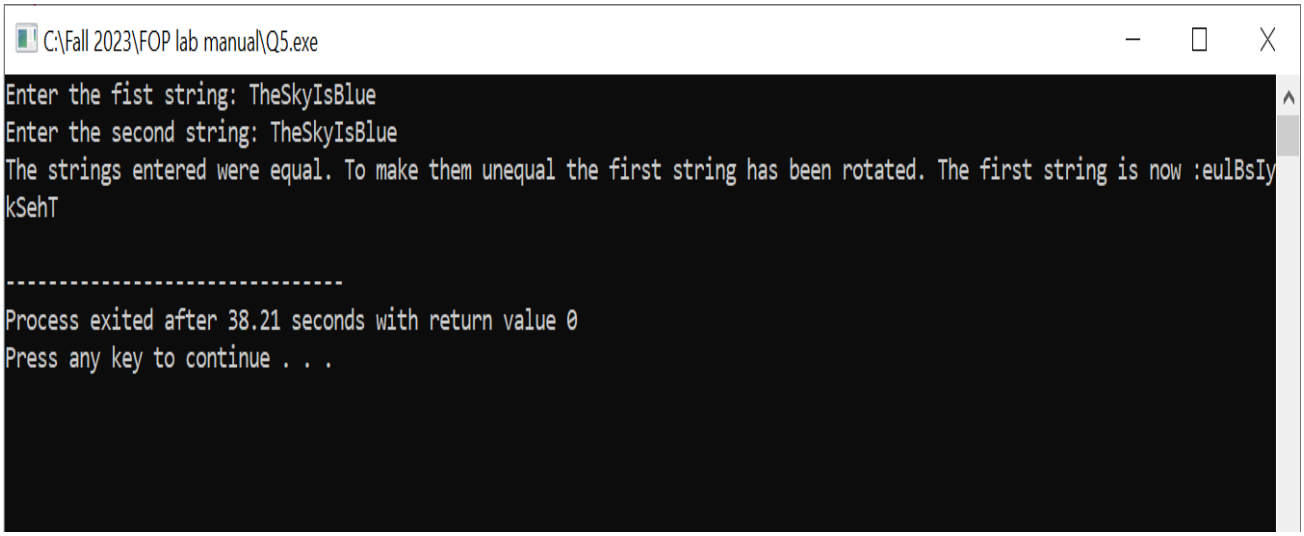
```
#include<iostream>
#include<string.h>
using namespace std;
int main()
{
	string s1, s2;
	int i;
	bool e=1;
	cout<<"Enter the fist string: ";
	cin>>s1;
	cout<<"Enter the second string: ";
	cin>>s2;
	if(s1.size()==s2.size())
	{
		for(i=0;i<s1.size();i++)
		{
			if(s1[i]!=s2[i])
				{ e=false;
				break;}
		}
		if(e==false)
			cout<<"The strings are not equal.";
		else
```

```
		{
			for(i=0;i<s1.size();i++)
			{
				s1[s1.size()-i-1]=s2[i];
			}
			cout<<"The strings entered were equal. To make them unequal the first string has been rotated. The first string is now :"<<s1<<endl;
		}

	}
	else
	cout<<"The strings are not equal.";

}
```

Output:



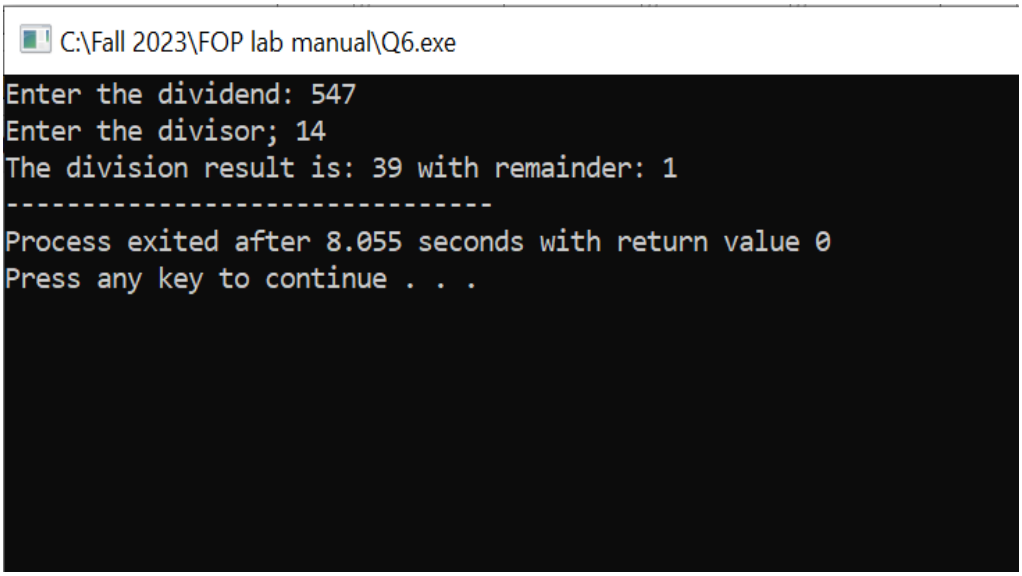
6. Perform division in C++ without / using for loops. You can use / only to display the final results. Your dividend must be greater than divisor.

Code:

```
#include<iostream>
using namespace std;
int main()
{
	int n, d, res, rem;
	cout<<"Enter the dividend: ";
	cin>>n;
```

```
        cout<<"Enter the divisor: ";
        cin>>d;
        while(n>=d)
        {
                n-=d;
                res++;
        }
        rem=n;
        cout<<"The division result is: "<<res<<" with remainder: "<<rem;
}
```

Output:



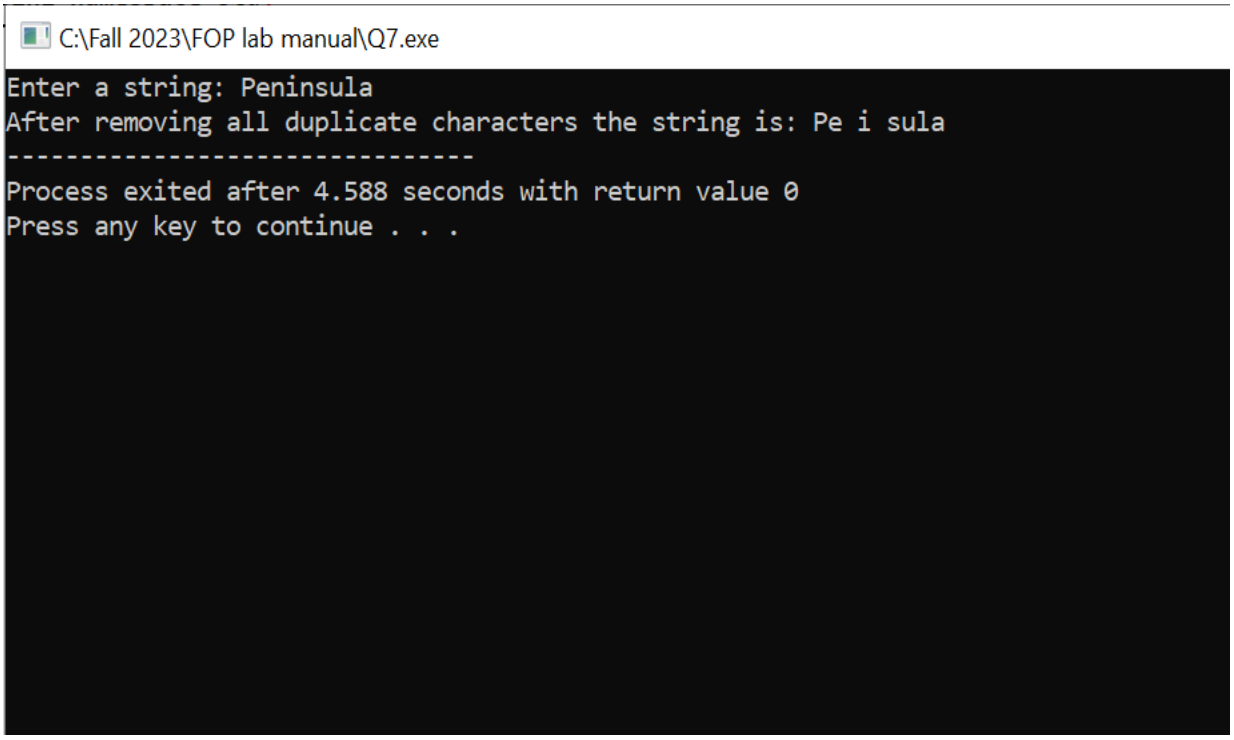
7. Write a C++program for a string which may contain lowercase and uppercase characters. The task is to remove all duplicate characters from the string and find the resultant string.

Code:

```
#include<iostream>
#include<cctype>
#include<string.h>
using namespace std;
int main()
{
        string s;
        int i, j;
```

```
        cout<<"Enter a string: ";
        cin>>s;
        string s1=s;
        for(i=0;i<s1.size();i++)
        {
                s1[i]=tolower(s[i]);
        }
        for(i=0;i<s1.size();i++)
        {
                for(j=i+1;j<s1.size();j++)
                {
                        if(s1[i]==s1[j])
                        {
                                s[i]=' ';
                                s[j]=' ';
                        }
                }
        }
        cout<<"After removing all duplicate characters the string is: "<<s;
}
```

Output:

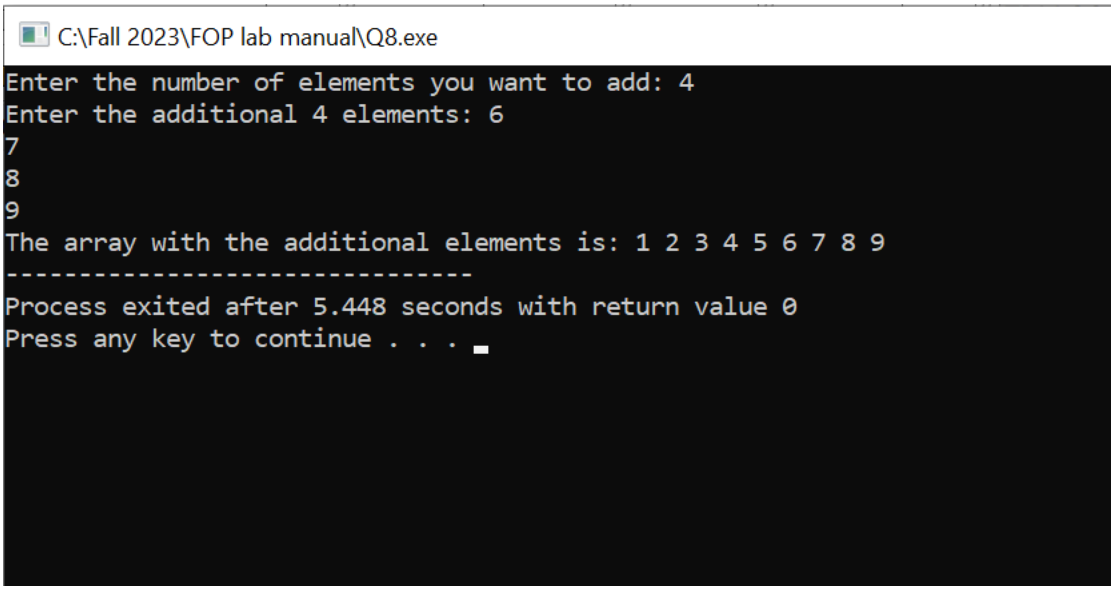


8. Suppose an integer array a[5] = {1,2,3,4,5}. Add more elements to it and display them in C++.

Code:

```
#include<iostream>
using namespace std;
int main()
{
	int n, i, a[5]={1,2,3,4,5};
	cout<<"Enter the number of elements you want to add: ";
	cin>>n;
	int b[5+n];
	for(i=0;i<5;i++)
	{
		b[i]=a[i];
	}
	cout<<"Enter the additional "<<n<<" elements: ";
	for(i=1;i<=n;i++)
		cin>>b[4+i];
	cout<<"The array with the additional elements is: ";
	for(i=0;i<5+n;i++)
		cout<<b[i]<<" ";
}
```

Output:

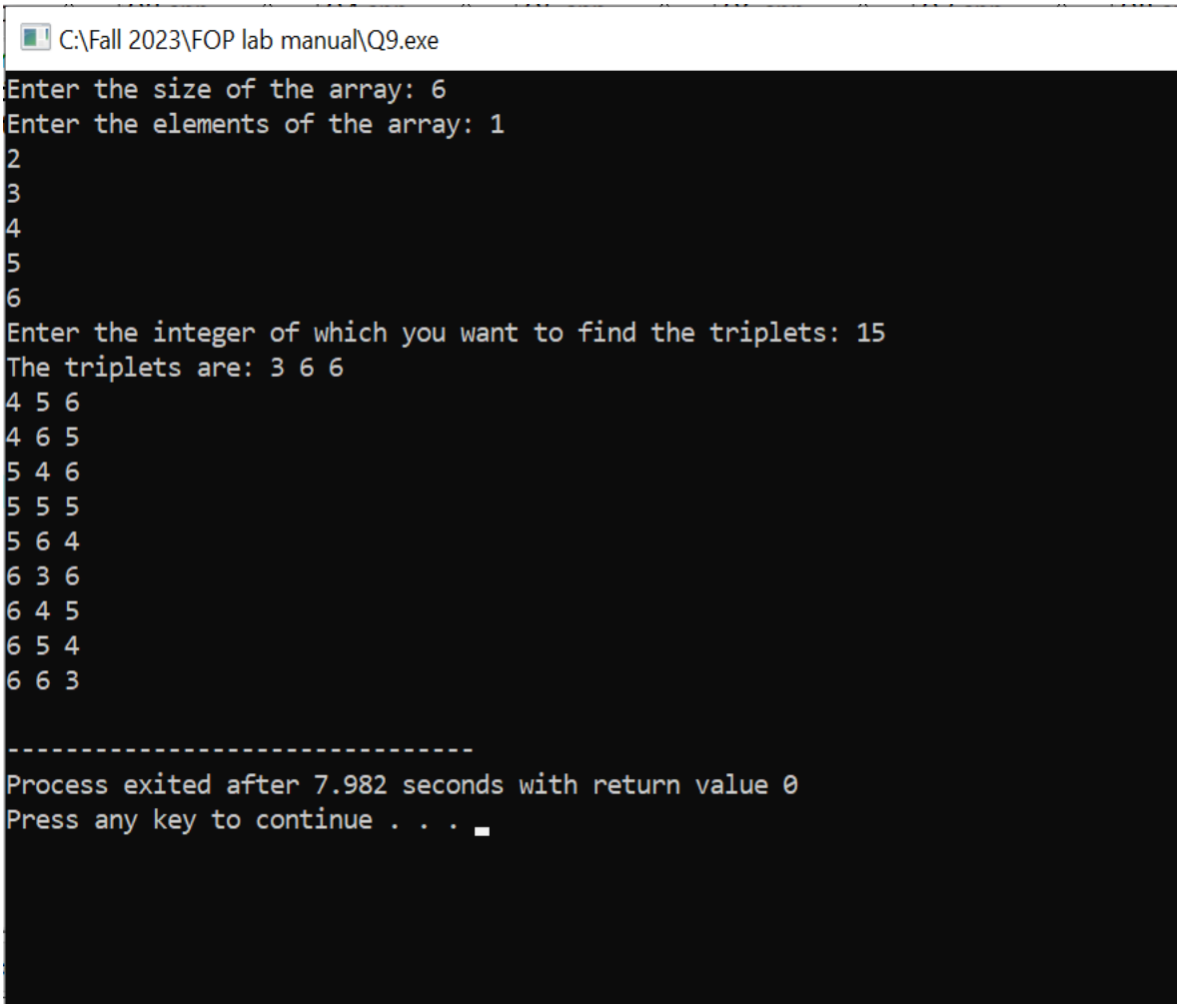


9. Given an integer array and an integer X. Find if there's a triplet in the array which sums up to the given integer X.

Code:

```
#include<iostream>
using namespace std;
int main()
{
	int n, x, i, j, k;
	cout<<"Enter the size of the array: ";
	cin>>n;
	int a[n];
	cout<<"Enter the elements of the array: ";
	for(i=0;i<n;i++)
		cin>>a[i];
	cout<<"Enter the integer of which you want to find the triplets: ";
	cin>>x;
	cout<<"The triplets are: ";
	for(i=0;i<n;i++)
	{
		for(j=0;j<n;j++)
		{
			for(k=0;k<n;k++)
			{
				if(a[i]+a[j]+a[k]==x)
					cout<<a[i]<<" "<<a[j]<<" "<<a[k]<<endl;
			}
		}
	}
}
```

Output:



10. Implement Bubble Sort on an array of 6 integers.

Code:

```
#include<iostream>
using namespace std;
int main()
{
	int n, i, j, swap;
	cout<<"Enter the size of the array: ";
```

```
        cin>>n;
        int a[n];
        cout<<"Enter the elements of the array: ";
        for(i=0;i<n;i++)
                cin>>a[i];
        for(i=0;i<n;i++)
        {
                for(j=i+1;j<n;j++)
                {
                        if(a[i]>a[j])
                        {
                                swap=a[i];
                                a[i]=a[j];
                                a[j]=swap;
                        }
                }
        }
        cout<<"The array after bubble sort is: ";
        for(i=0;i<n;i++)
        cout<<a[i]<<" ";
}
```

Output: