Lab Manual 7, Lab Tasks – 1,2 and 3

Fundamentals of programming

ME-15

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Section: A

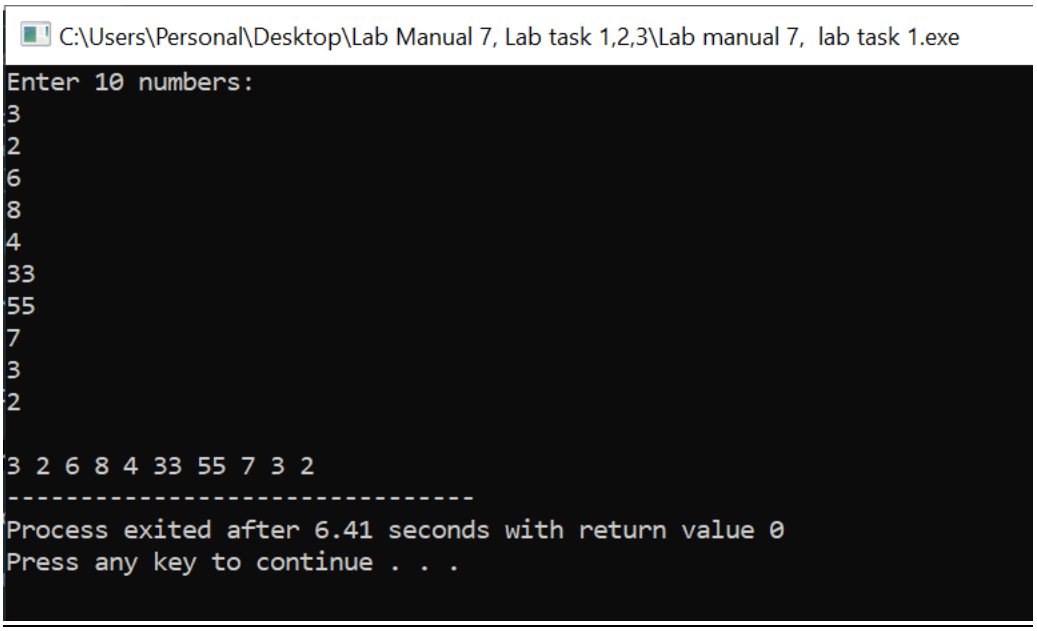
Task 1:

Take 10 integer inputs from user and store them in an array and print them on screen.

Code:

```
#include<iostream>

using namespace std;

int main() {


	int a[10];    // integer array is declared since we are only dealing with integers


	cout<<"Enter 10 numbers:"<<endl;   // this is a prompt that asks the user for 10 integer inputs


	for ( int i=0; i<10; i++ ) {      // this for loop is used to cycle through each space in the array so that it may be filled with user inputs

		cin>>a[i];

	}


	for ( int i=0; i<10; i++ ) {      // this loop prints each integer in the array from space 0 to 9 (total 10)

		cout<<a[i]<<" ";            // space is printed between each number so that its easier to distinguish between numbers

	}

	return 0;

}
```

Screenshot of execute:



Task 2:

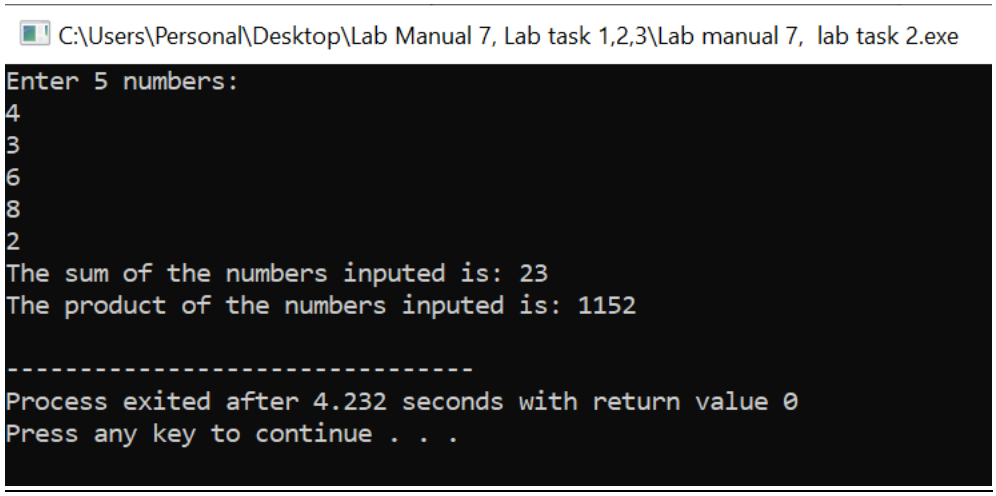
Write a program to find the sum and product of all elements of an array with 5 integer elements.

Code:

```
#include<iostream>

using namespace std;

int main() {


	int a[5], sum = 0, product = 1;     // integer array is declared since we are only dealing with integers


	cout<<"Enter 5 numbers:"<<endl;   // this is a prompt that asks the user for 10 integer inputs


	for ( int i=0; i<5; i++ ) {      // this for loop is used to cycle through each space in the array so that it may be filled with user inputs
		cin>>a[i];
	}


	for ( int i=0; i<5; i++ ) {
		sum = a[i] + sum;
		product = product * a[i];
	}
```

```
    cout<<"The sum of the numbers inputed is: "<<sum<<endl;
    cout<<"The product of the numbers inputed is: "<<product<<endl;
    return 0;
}
```

Screenshot of execute:



Task 3:

Print diamond pattern using a single array.

Code:

```
#include<iostream>
using namespace std;
int main() {

    int n, half;      // integer n represent the number of rows
                      // integer half represents the half of n, since its declared integer it will always be a number less then the actual half
                      // if n = 5 , n/2 = 2.5, half = 2
                    // this is strategic, since in a array the elements are labelled starting from zero, so the half of an array with n elements
                                                    // is (0,1,2,3,4) 2 hence half = 2

    cout<<"Enter the number of rows of your diamond"<<endl;                    // prompt asking for number of rows
```

```
cin>>n;
        // read number of rows
char a[n];                                                              // declaring a character array
half = n/2;                                                             // determining half

for ( int i = 0; i<n; i++ ) {                                   // this loop replaces all the elements of the array with ' ' (spaces)
        a[i] = ' ';
}

for ( int i = 0; i<= half; i++ ) {                      // this loop prints each row

a[half] = '*';          // in a diamond the middle element is always a '*' hence we replace the middle element with a '*'
a[half - i] = '*';      // replace the element on the left with a *, initial value of i is zero so the first row prints only with a * in the centre
a[half + i] = '*';                                      // replace the element on the right with a *

        for ( int j = 0; j<n; j++ ) {                   // this row prints each column
        cout<<a[j];
}
cout<<endl;                                                             // end line is used to move on to the next row
}

for ( int i = half; i >= 1; i-- ) {                     // this loop prints the rows below the middle row
                                                        // hence, we start from half and move backwords to 0, reverse the upper process
        a[half - i] = ' ';                              // replace the * with ' ' from the edges inwards ( both from left and right hand side
        a[half + i] = ' ';
        for ( int j = 0; j<n; j++) {    // print each column
                cout<<a[j];
        }
        cout<<endl;                             // endl used to move onto the next row
}
return 0;
}
```

Screenshot of execute: