COMSATS University Islamabad, Vehari Campus

Department of Computer Science

Class: BCS-SP22-4B **Submission Deadline: 10 Sep 2023**

Subject: Data Structures and Algorithms-Lab **Instructor: Yasmeen Jana**

Max Marks: 10 **Reg. No: SP22-BCS-116**

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You can ask queries related to Lab Activities on the above email.

Activity 1:

Create a GitHub Account. Make a repository with the name "**DSA_Lab". Mention the link here after the account creation.**

Activity 2:

Write any 15 programs that will explain the concepts of pointers.

In this file, you should place the code and its output screenshot.

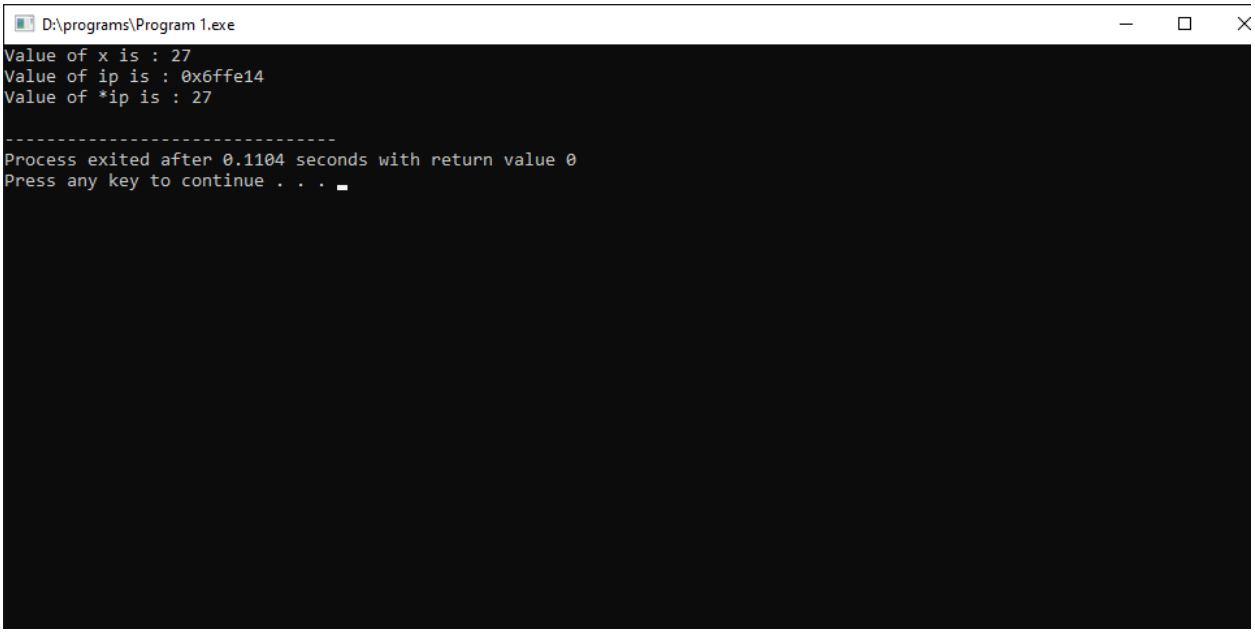
After completing the activities, Upload the final pdf and code to the "**DSA_Lab"** repository.

Solution:

Program 01

```
#include  <iostream>
using namespace std;
int main() {
        int x = 27;
        int *ip;
        ip = &x;
        cout << "Value of x is : ";
```

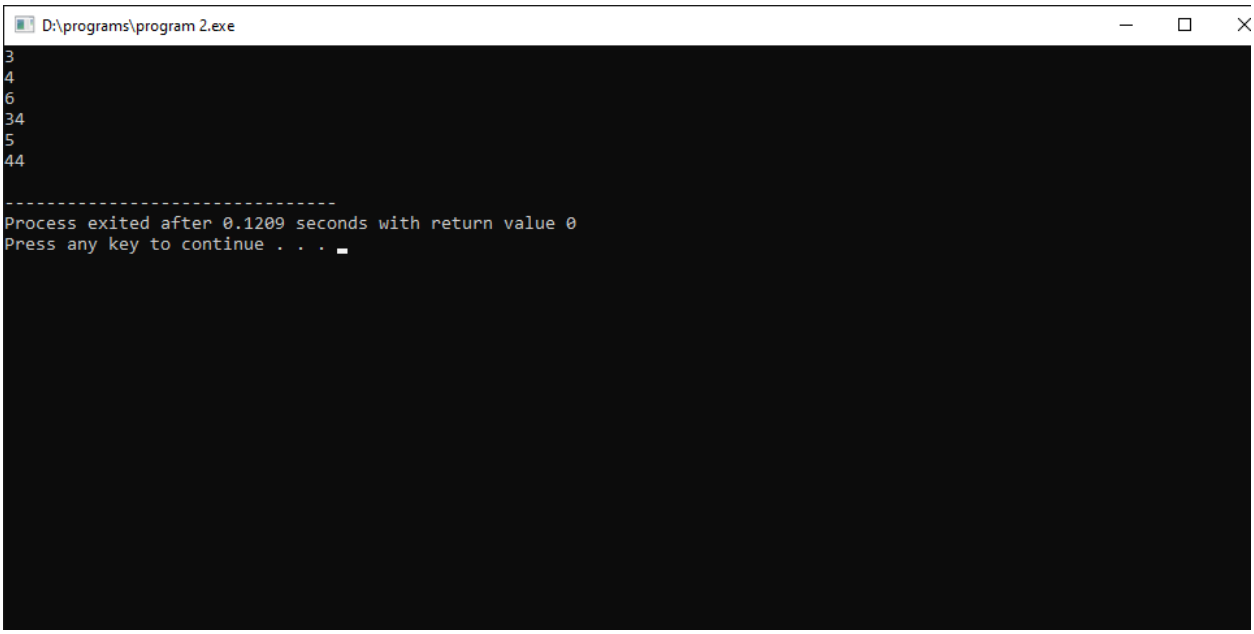
```
    cout << x << endl;
    cout << "Value of ip is : ";
    cout << ip<< endl;
    cout << "Value of *ip is : ";
    cout << *ip << endl;
    return 0;
}
```



Program 02

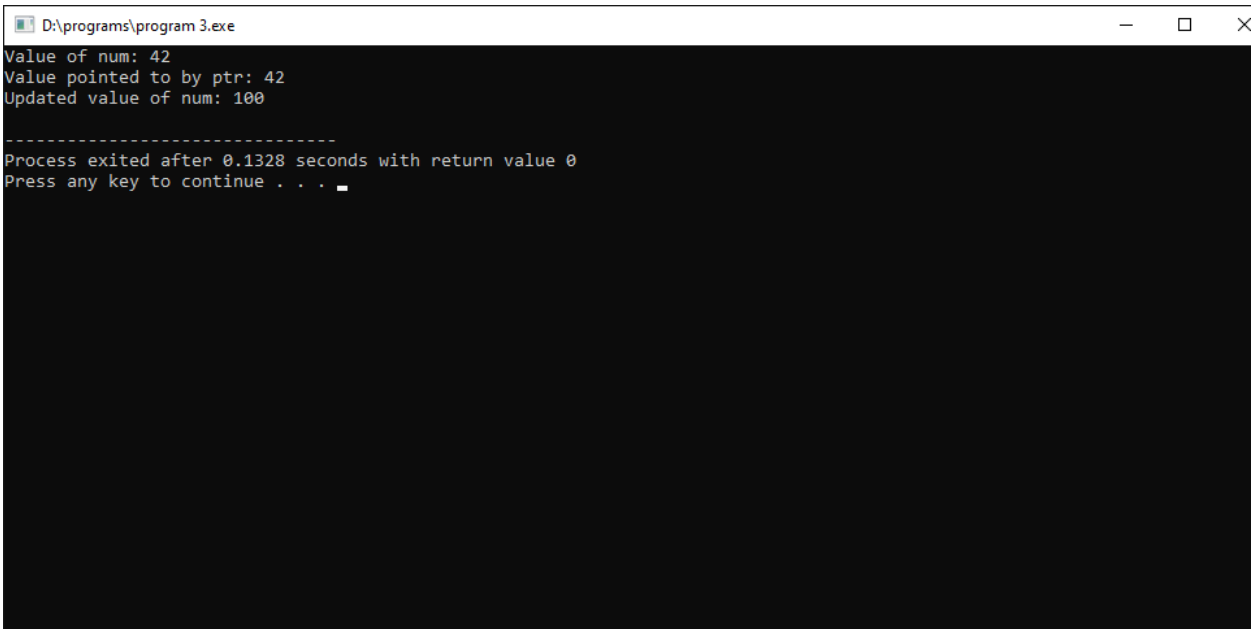
```
#include  <iostream>
using namespace std;
int main() {
    int *p;
    int arr[] = { 3, 4, 6, 34, 5, 44 };
    p = arr;
    for (int x = 0; x < 6; x++) {
        cout << *p << endl;
        p++;
    }
    return 0;
```

}



Program 03

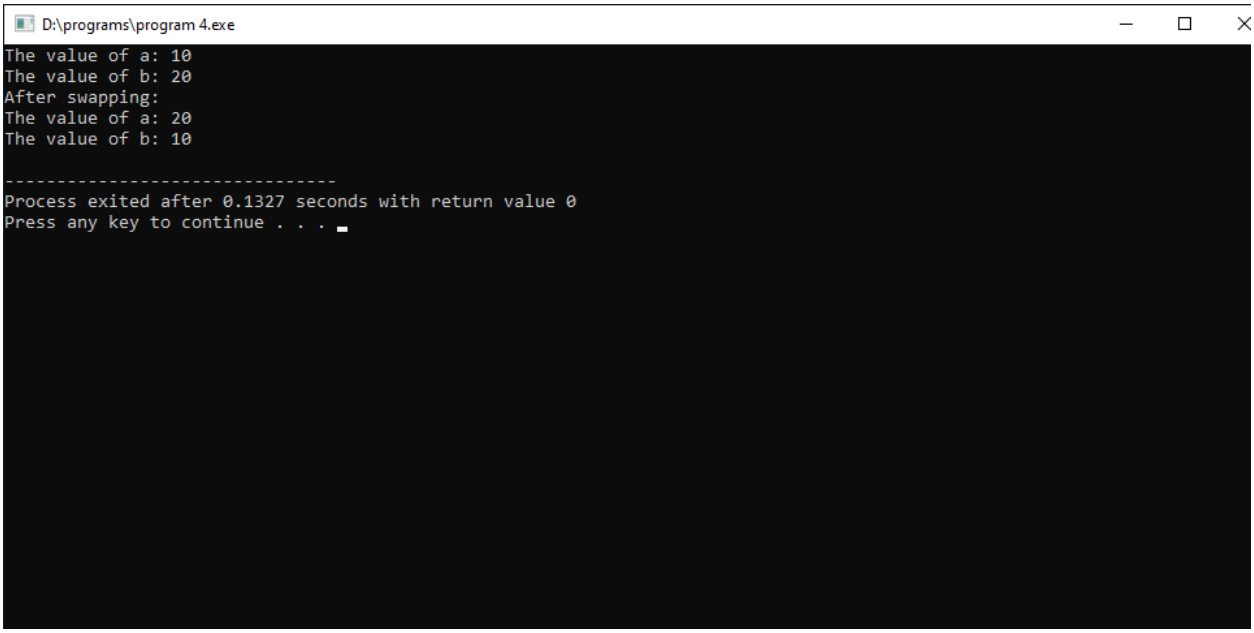
```
#include <iostream>

using namespace std;

int main() {
    int num = 42;
    int *ptr = &num;

    cout << "Value of num: " << num << endl;
    cout << "Value pointed to by ptr: " << *ptr << endl;

    *ptr = 100;

    cout << "Updated value of num: " << num << endl;

    return 0;
}
```



Program 04

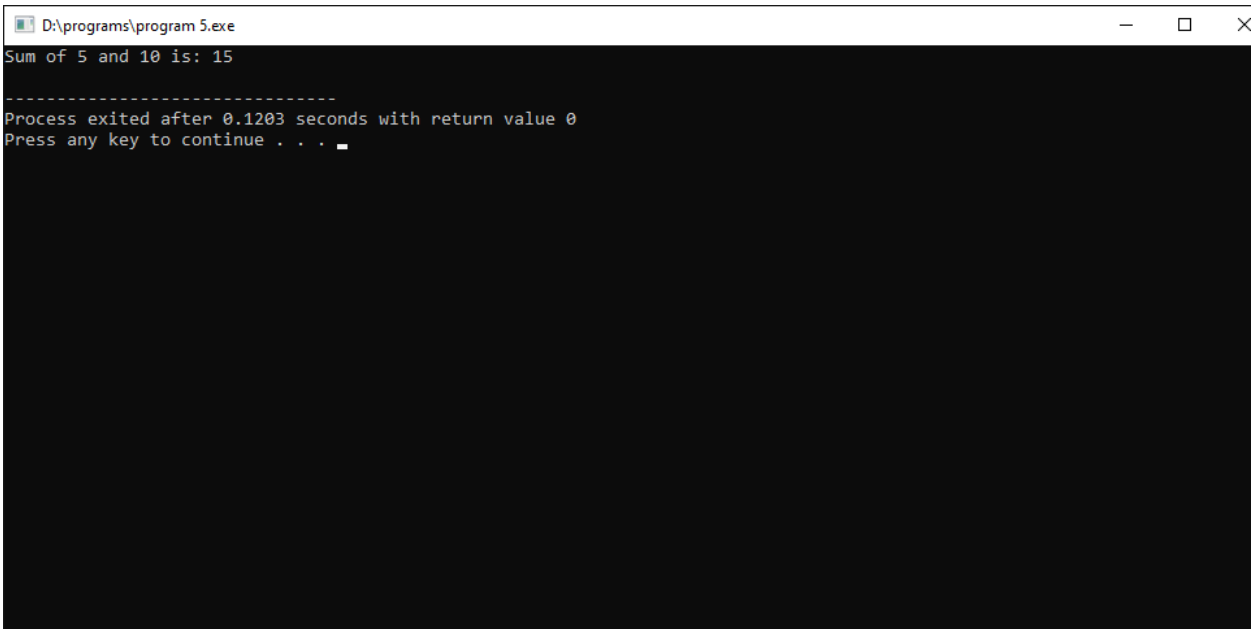
```
#include <iostream>

using namespace std;

int main() {
    int a = 10;
    int b = 20;

    int *ptr1 = &a;
    int *ptr2 = &b;

    cout << "The value of a: " << *ptr1 << endl;
    cout << "The value of b: " << *ptr2 << endl;

    int temp = *ptr1;
    *ptr1 = *ptr2;
    *ptr2 = temp;
```

```
    cout << "After swapping:" << endl;
    cout << "The value of a: " << *ptr1 << endl;
    cout << "The value of b: " << *ptr2 << endl;

    return 0;
}
```



Program 05

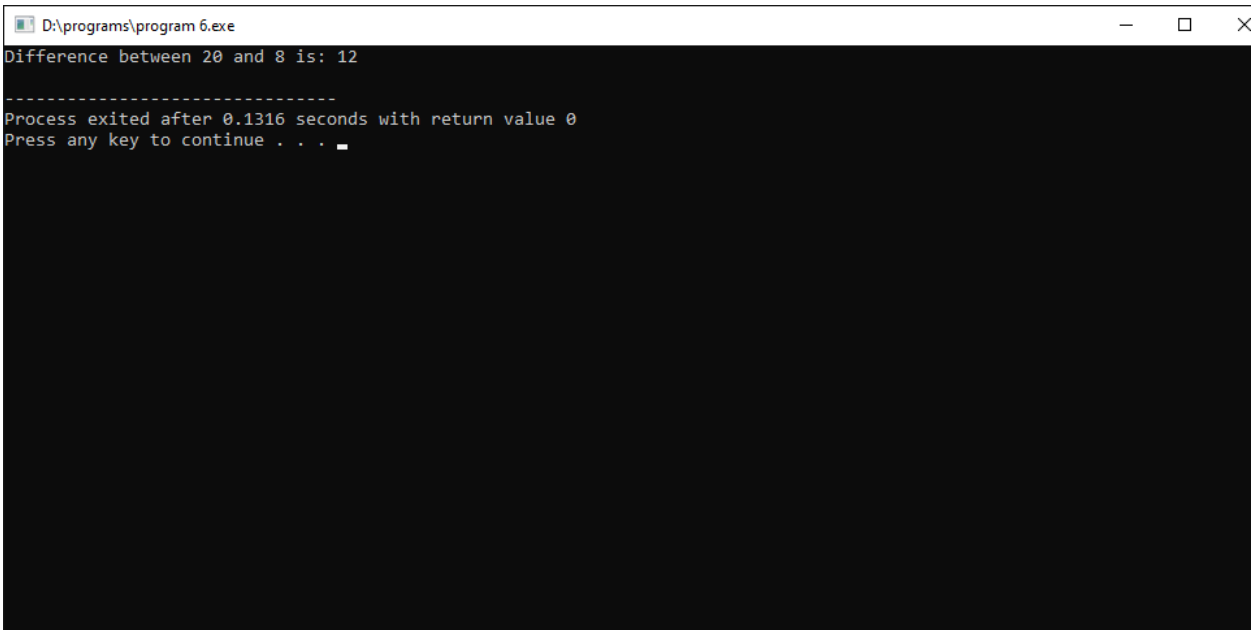
```
#include <iostream>
using namespace std;

int main() {
    int num1 = 5;
    int num2 = 10;
    int sum = 0;
    int  *ptr1  =  &num1;
    int  *ptr2  =  &num2;
    sum = *ptr1 + *ptr2;
    cout << "Sum of " << *ptr1 << " and " << *ptr2 << " is: " << sum << endl;
    return 0;
}
```



Program 06

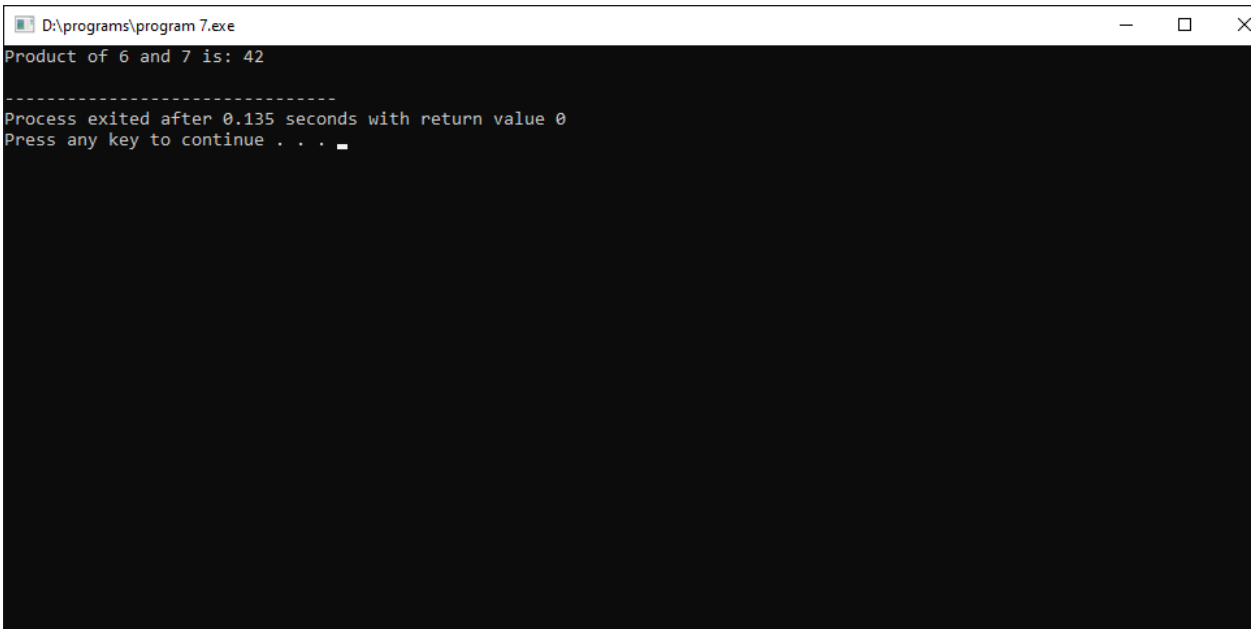
```
#include <iostream>
using namespace std;

int main() {
    int num1 = 20;
    int num2 = 8;
    int difference = 0;
    int *ptr1 = &num1;
    int *ptr2 = &num2;
    difference = *ptr1 - *ptr2;
    cout << "Difference between " << *ptr1 << " and " << *ptr2 << " is: " << difference << endl;
    return 0;
```

}



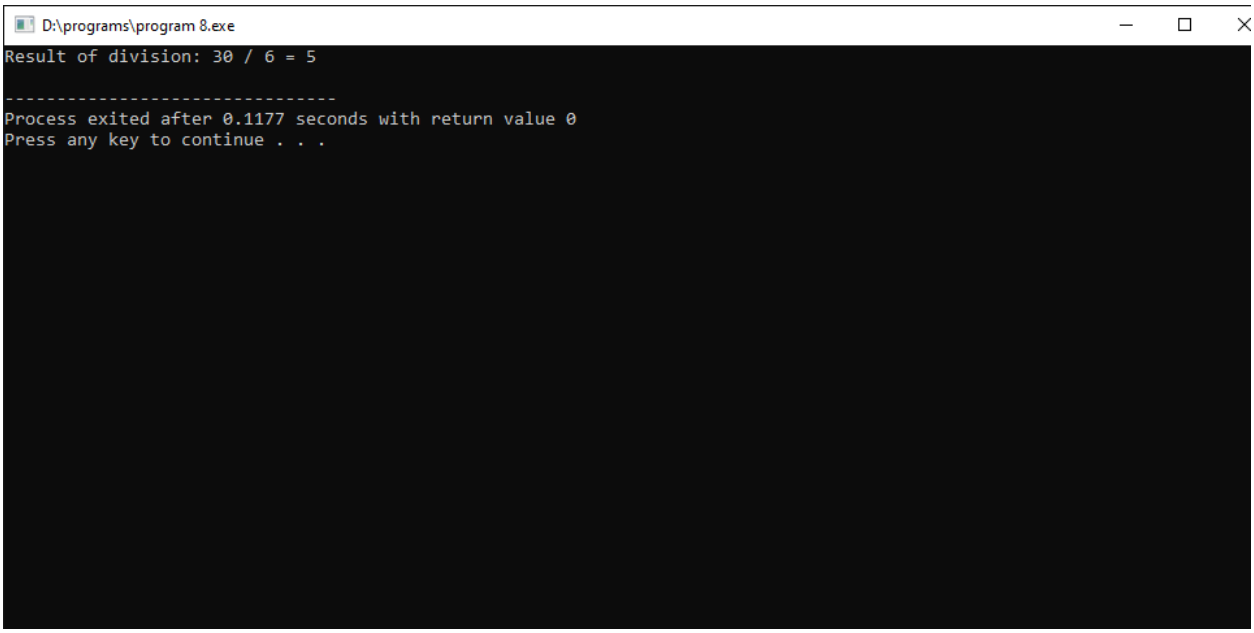
Program 07

```
#include <iostream>
using namespace std;

int main() {
    int num1 = 6;
    int num2 = 7;
    int product = 0;

    int *ptr1 = &num1;
    int *ptr2 = &num2;
    product = (*ptr1) * (*ptr2);

    cout << "Product of " << *ptr1 << " and " << *ptr2 << " is: " << product << endl;

    return 0;
}
```



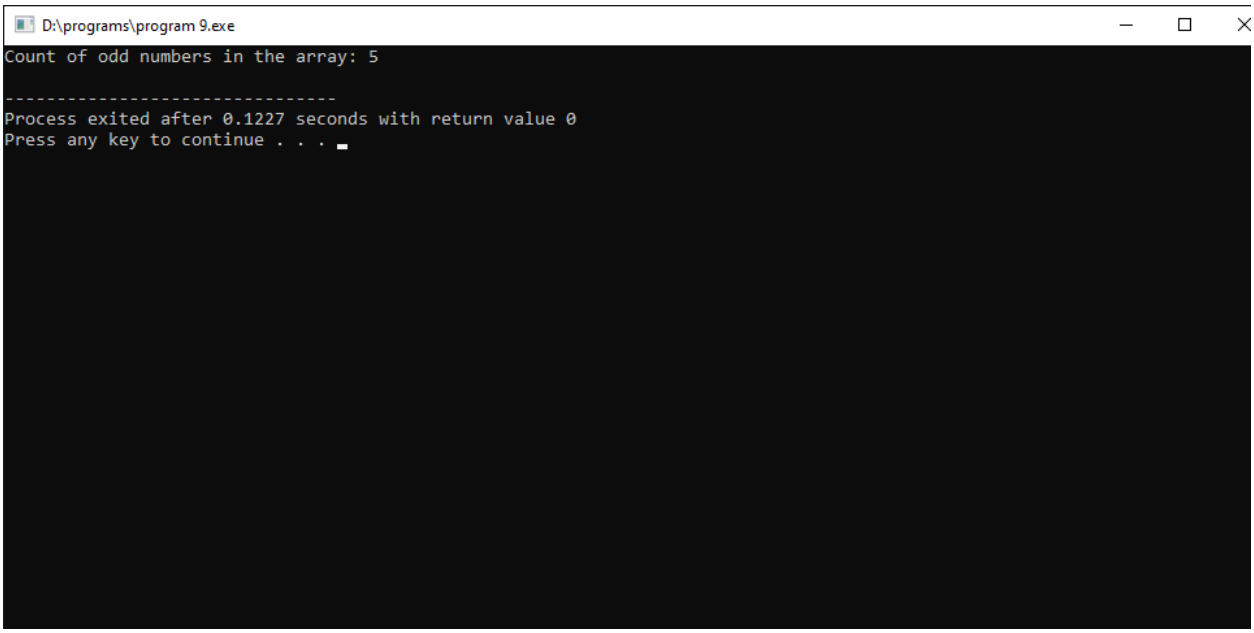
Program 08

```
#include <iostream>
using namespace std;

int main() {
    double num1 = 30.0;
    double num2 = 6.0;
    double result = 0.0;

    double *ptr1 = &num1;
    double *ptr2 = &num2;

    if (*ptr2 != 0.0) {
        result = *ptr1 / *ptr2;
        cout << "Result of division: " << *ptr1 << " / " << *ptr2 << " = " << result << endl;
    } else {
        cout << "Error: Division by zero is not allowed." << endl;
    }
    return 0;
}
```



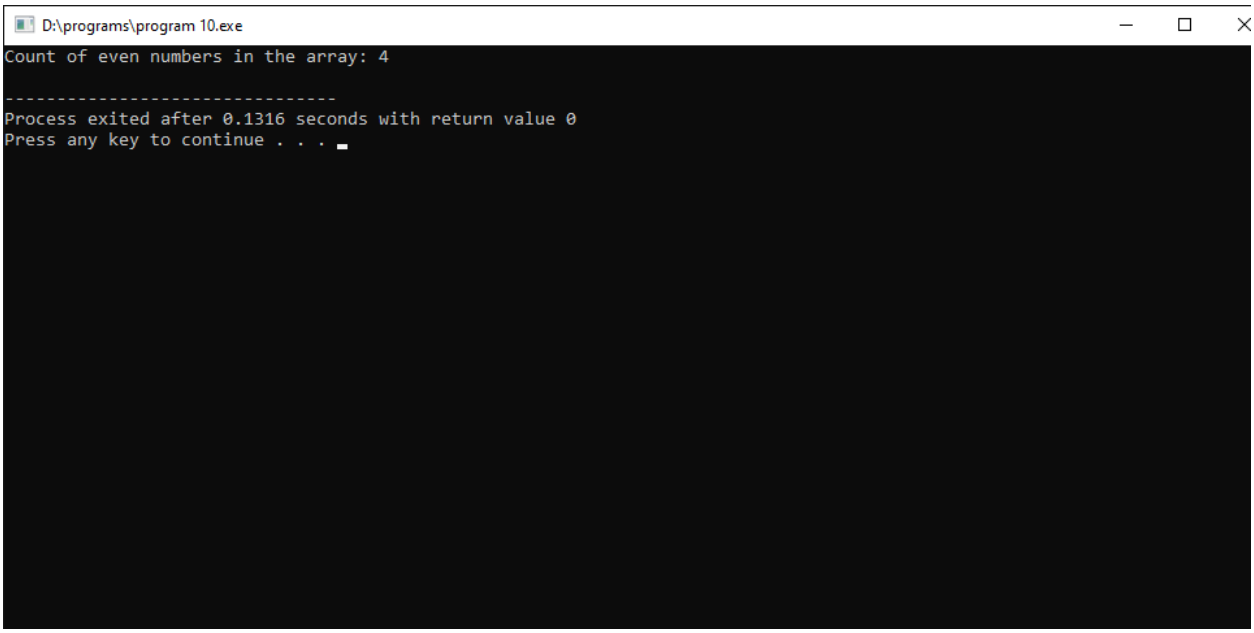
Program 09

```
#include <iostream>
using namespace std;

int main() {
    int numbers[] = {1, 2, 3, 4, 5, 6, 7, 8, 9};
    int countOdd = 0;

    int *ptr = numbers;

    for (int i = 0; i < sizeof(numbers) / sizeof(numbers[0]); i++) {
        if (*ptr % 2 != 0) {
            countOdd++;
        }
        ptr++;
    }

    cout << "Count of odd numbers in the array: " << countOdd << endl;
    return 0;
}
```



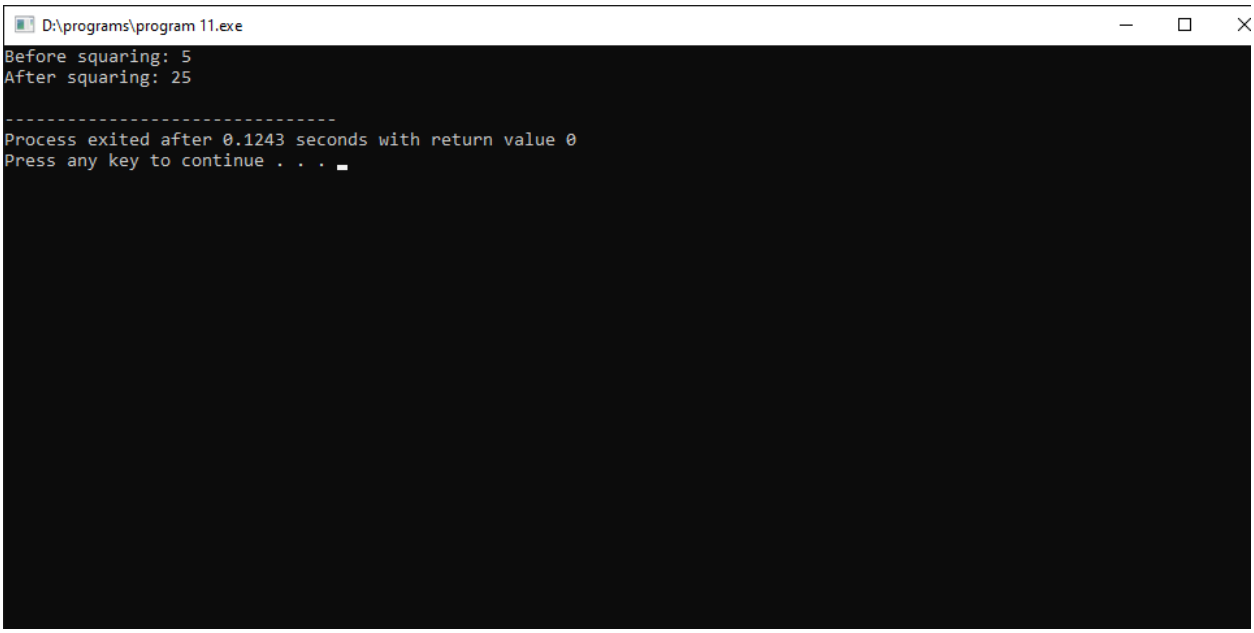
Program 10

```
#include <iostream>
using namespace std;

int main() {
    int numbers[] = {1, 2, 3, 4, 5, 6, 7, 8, 9};
    int countEven = 0;

    int *ptr = numbers;

    for (int i = 0; i < sizeof(numbers) / sizeof(numbers[0]); i++) {
        if (*ptr % 2 == 0) {
            countEven++;
        }
        ptr++;
    }

    cout << "Count of even numbers in the array: " << countEven << endl;
    return 0;
}
```



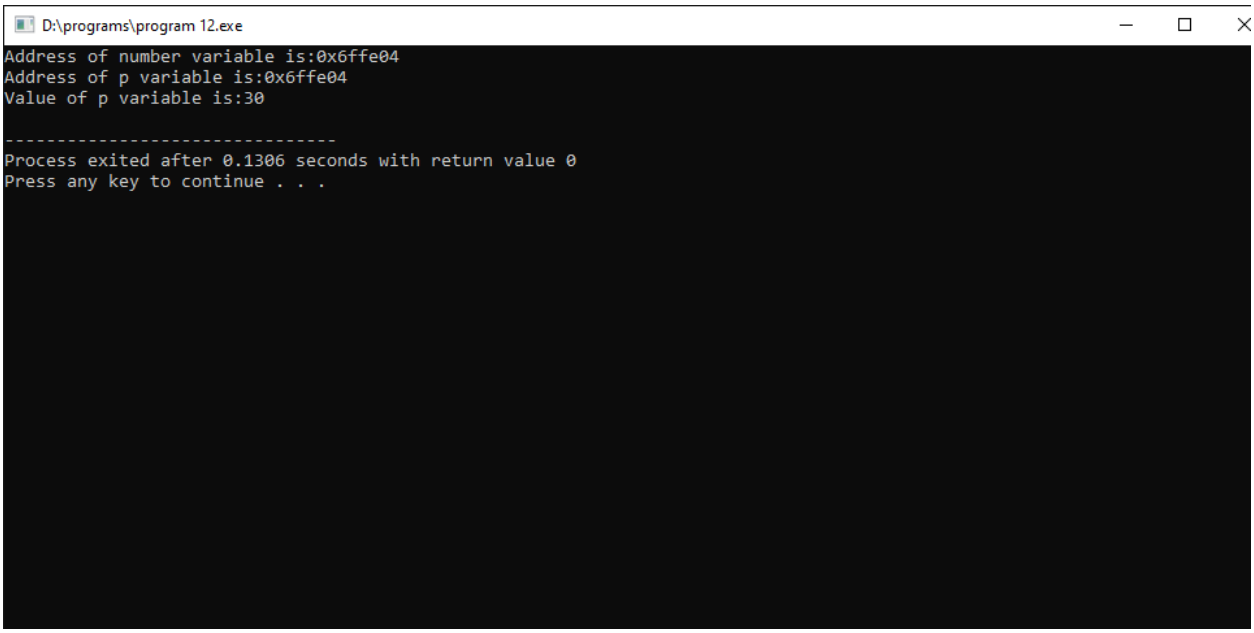
Program 11

```
#include <iostream>
using namespace std;

void square(int *num) {
   *num = (*num) * (*num);
}

int main() {
   int number = 5;

   cout << "Before squaring: " << number << endl;

   square(&number);

   cout << "After squaring: " << number << endl;

   return 0;
}
```



Program 12

```
#include <iostream>
using namespace std;

int main()
{

int number=30;
int * p;
p=&number;//stores the address of number variable
cout<<"Address of number variable is:"<<&number<<endl;
cout<<"Address of p variable is:"<<p<<endl;
cout<<"Value of p variable is:"<<*p<<endl;

  return 0;

}
```


D:\programs\program 12.exe
Address of number variable is:0x6ffe04
Address of p variable is:0x6ffe04
Value of p variable is:30

Process exited after 0.1306 seconds with return value 0
Press any key to continue . . .