



## **ASSIGNMENT # 01**

**Submitted to :** Mam Yasmeen Jana

**Submitted by :** M.Subhan Nagra

**Roll No :** FA21-BCS-054

**Subject :** DSA-LAB

## Program 01:

```
#include <iostream>
```

```
int main () {
```

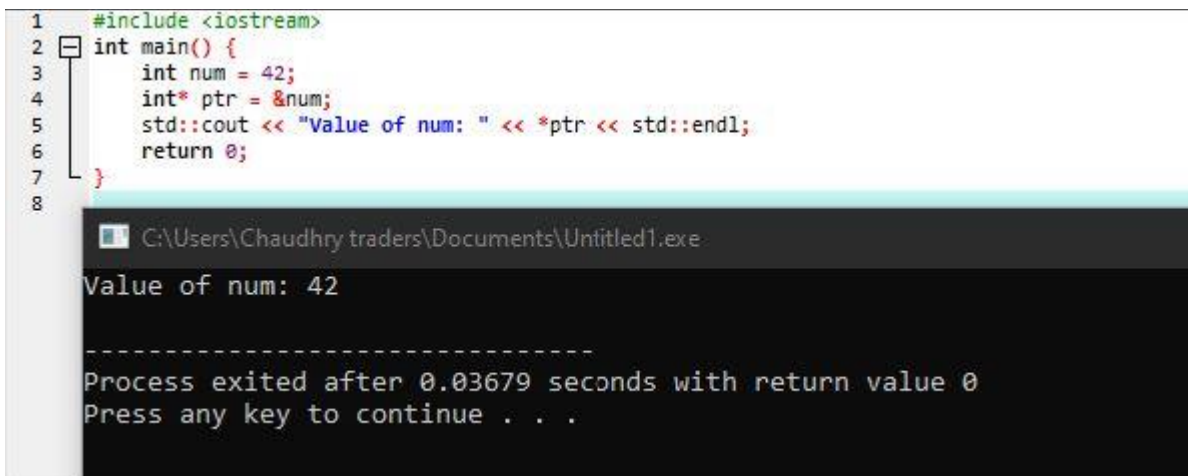
```
    int num = 42;
```

```
    int* ptr = &num;
```

```
    std::cout << "Value of num: " << *ptr << std::endl;
```

```
    return 0;
```

```
}
```



```
1  #include <iostream>
2  int main() {
3      int num = 42;
4      int* ptr = &num;
5      std::cout << "Value of num: " << *ptr << std::endl;
6      return 0;
7  }
8
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Value of num: 42

-----

Process exited after 0.03679 seconds with return value 0

Press any key to continue . . .

## Program 02:

```
#include <iostream>
```

```
int main () {
```

```
    int arr[] = {1, 2, 3, 4, 5};
```

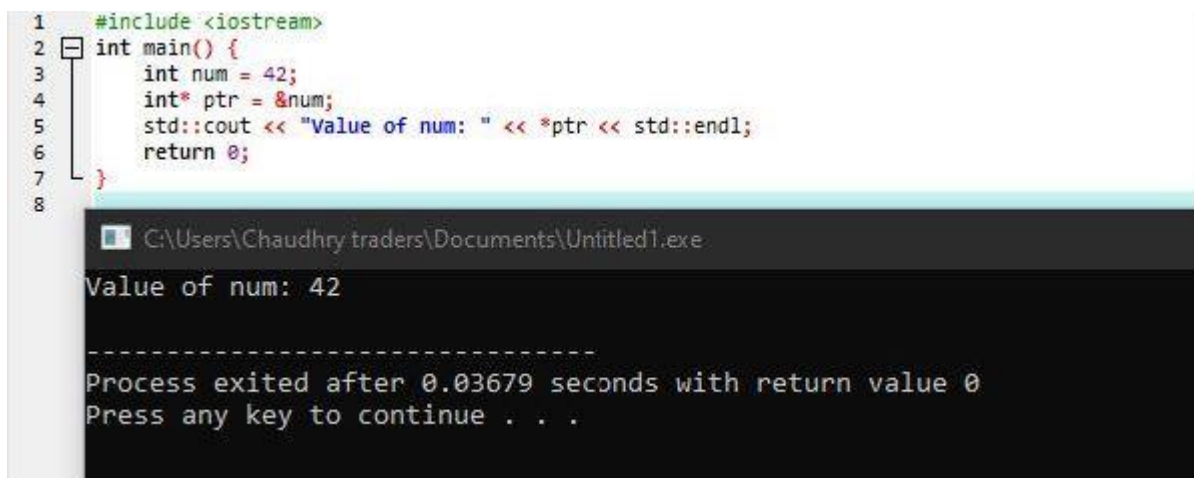
```
    int* ptr = arr;
```

```
    std::cout << "First element: " << *ptr << std::endl;
```

```
    std::cout << "Second element: " << *(ptr + 1) <<  
std::endl ;
```

```
    return 0;
```

```
}
```



The screenshot shows a C++ program in a code editor and its execution output in a terminal window. The code defines an array, a pointer, and prints the first two elements. The output shows the first element as 42 and the second element as 43, followed by a process exit message.

```
1  #include <iostream>
2  int main() {
3      int num = 42;
4      int* ptr = &num;
5      std::cout << "Value of num: " << *ptr << std::endl;
6      return 0;
7  }
8
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Value of num: 42

-----

Process exited after 0.03679 seconds with return value 0

Press any key to continue . . .

## Program 03:

```
#include <iostream>
```

```
int main () {
```

```
    int num = 42;
```

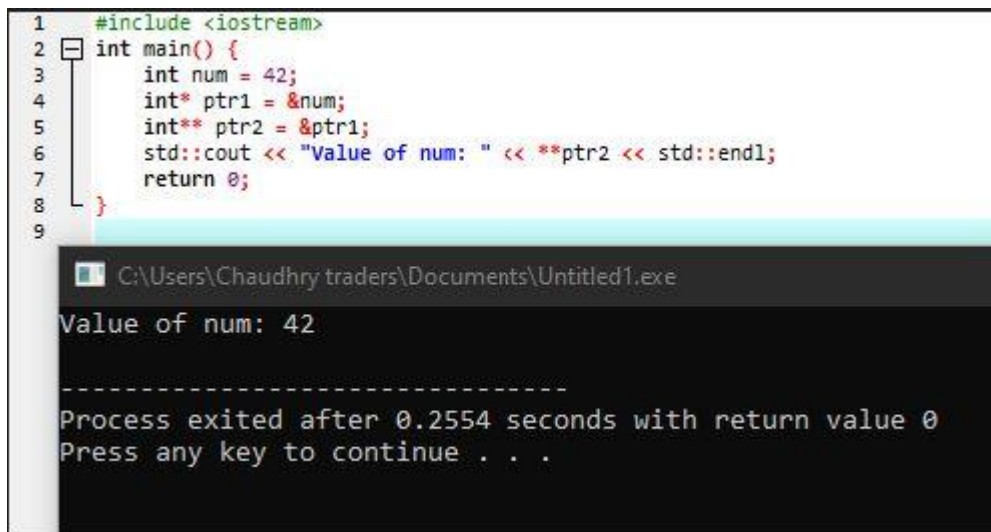
```
    int* ptr1 = &num;
```

```
    int** ptr2 = &ptr1;
```

```
    std::cout << "Value of num: " << **ptr2 << std::endl;
```

```
    return 0;
```

```
}
```



The screenshot shows a C++ program in a code editor and its execution output in a terminal window. The code defines a variable `num` with the value 42, a pointer `ptr1` that points to `num`, and a double pointer `ptr2` that points to `ptr1`. The program then prints the value of `**ptr2`, which is 42. The terminal output shows the program's execution path, the output "Value of num: 42", and a message indicating the process exited after 0.2554 seconds with a return value of 0.

```
1  #include <iostream>
2  int main() {
3      int num = 42;
4      int* ptr1 = &num;
5      int** ptr2 = &ptr1;
6      std::cout << "Value of num: " << **ptr2 << std::endl;
7      return 0;
8  }
9
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Value of num: 42

-----

Process exited after 0.2554 seconds with return value 0

Press any key to continue . . .

## Program 04:

```
#include <iostream>
```

```
void increment (int* num) {
```

```
    (*num)++;
```

```
}
```

```
int main() {
```

```
    int x = 5;
```

```
    increment(&x);
```

```
    std::cout << "Incremented value: " << x << std::endl;
```

```
    return 0;
```

```
1  #include <iostream>
2  void increment(int* num) {
3      (*num)++;
4  }
5  int main() {
6      int x = 5;
7      increment(&x);
8      std::cout << "Incremented value: " << x << std::endl;
9      return 0;
10 }
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Incremented value: 6

-----  
Process exited after 0.2561 seconds with return value 0  
Press any key to continue . . .

```
}
```

## Program 05:

```
#include <iostream>
```

```
int main () {
```

```
    int* num = new int;
```

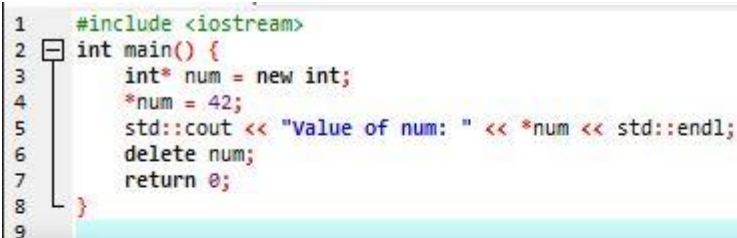
```
    *num = 42;
```

```
    std::cout << "Value of num: " << *num << std::endl;
```

```
    delete num;
```

```
    return 0;
```

```
}
```



```
1  #include <iostream>
2  int main() {
3      int* num = new int;
4      *num = 42;
5      std::cout << "Value of num: " << *num << std::endl;
6      delete num;
7      return 0;
8  }
9
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Value of num: 42

-----  
Process exited after 0.02185 seconds with return value 0  
Press any key to continue . . .

## Program 06:

```
#include <iostream>

int main () {

    int arr[] = {1, 2, 3};

    int* ptr[3];

    for (int i = 0; i < 3; i++) {

        ptr[i] = &arr[i];

        std::cout << "Value at index " << i << ": " << *ptr[i]
<< std::endl;

    }

    return 0;

}
```

```
1  #include <iostream>
2  int main() {
3      int arr[] = {1, 2, 3};
4      int* ptr[3];
5      for (int i = 0; i < 3; i++) {
6          ptr[i] = &arr[i];
7          std::cout << "Value at index " << i << ": " << *ptr[i] << std::endl;
8      }
9      return 0;
10 }
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

```
Value at index 0: 1
Value at index 1: 2
Value at index 2: 3
```

```
-----
Process exited after 0.2347 seconds with return value 0
Press any key to continue . . .
```

## Program 07:

```
#include <iostream>
```

```
int main () {
```

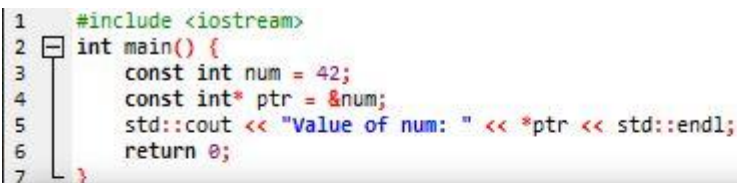
```
    const int num = 42;
```

```
    const int* ptr = &num;
```

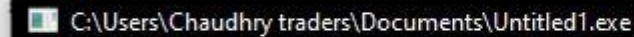
```
    std::cout << "Value of num: " << *ptr << std::endl;
```

```
    return 0;
```

```
}
```



```
1  #include <iostream>
2  int main() {
3      const int num = 42;
4      const int* ptr = &num;
5      std::cout << "Value of num: " << *ptr << std::endl;
6      return 0;
7  }
```



C:\Users\Chaudhry traders\Documents\Untitled1.exe

Value of num: 42

-----  
Process exited after 0.2318 seconds with return value 0  
Press any key to continue . . .



## Program 08:

```
#include <iostream>
```

```
int main () {
```

```
    int num = 42;
```

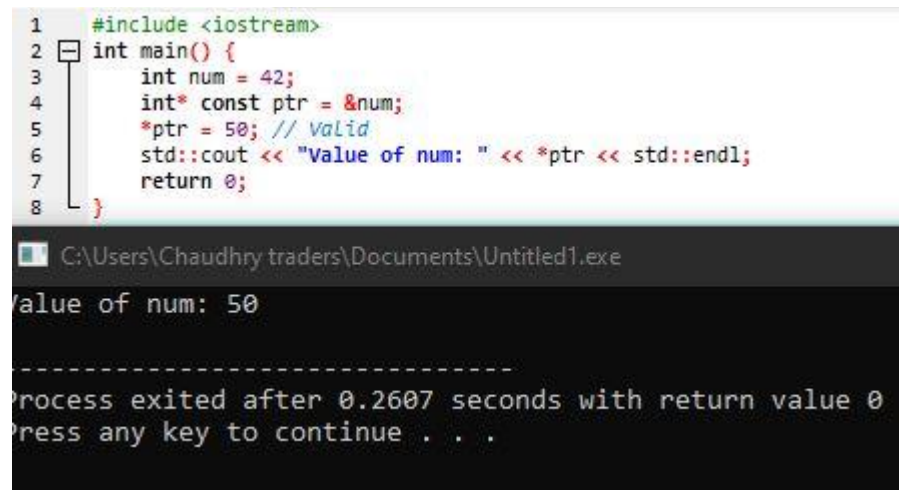
```
    int* const ptr = &num;
```

```
    *ptr = 50; // Valid
```

```
    std::cout << "Value of num: " << *ptr << std::endl;
```

```
    return 0;
```

```
}
```



The screenshot shows a C++ program in a code editor and its execution output in a terminal window. The code defines a constant pointer 'ptr' that points to the memory address of 'num'. Although 'ptr' is declared as 'const', its value is modified to point to 50. The program then prints the value of 'num' through 'ptr', which outputs 50. The terminal also shows the process exit time and a prompt to press any key to continue.

```
1  #include <iostream>
2  int main() {
3      int num = 42;
4      int* const ptr = &num;
5      *ptr = 50; // Valid
6      std::cout << "Value of num: " << *ptr << std::endl;
7      return 0;
8  }
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Value of num: 50

-----

Process exited after 0.2607 seconds with return value 0

Press any key to continue . . .

## Program 09:

```
#include <iostream>
```

```
int main () {
```

```
    const int num = 42;
```

```
    const int* const ptr = &num;
```

```
    std::cout << "Value of num: " << *ptr << std::endl;
```

```
    return 0;
```

```
}
```

```
1  #include <iostream>
2  int main() {
3      const int num = 42;
4      const int* const ptr = &num;
5      std::cout << "Value of num: " << *ptr << std::endl;
6      return 0;
7  }
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Value of num: 42

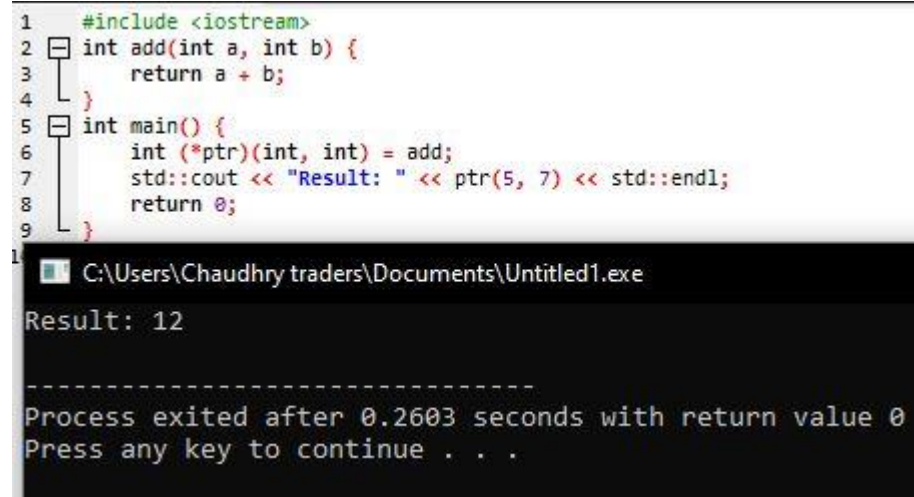
-----  
Process exited after 0.2299 seconds with return value 0  
Press any key to continue . . .

## Program 10:

```
#include <iostream>

int add (int a, int b) {
    return a + b;
}

int main() {
    int (*ptr)(int, int) = add;
    std::cout << "Result: " << ptr(5, 7) << std::endl;
    return 0;
}
```



The screenshot shows a C++ program in a code editor and its execution in a terminal window. The code defines a function `add` that takes two integers and returns their sum. In the `main` function, a function pointer `ptr` is declared and assigned the address of the `add` function. Then, `ptr(5, 7)` is called, which outputs "Result: 12". The terminal window shows the output and a message indicating the process exited after 0.2603 seconds with a return value of 0.

```
1  #include <iostream>
2  int add(int a, int b) {
3      return a + b;
4  }
5  int main() {
6      int (*ptr)(int, int) = add;
7      std::cout << "Result: " << ptr(5, 7) << std::endl;
8      return 0;
9  }
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Result: 12

-----

Process exited after 0.2603 seconds with return value 0

Press any key to continue . . .

## Program 11:

```
#include <iostream>
```

```
int main () {
```

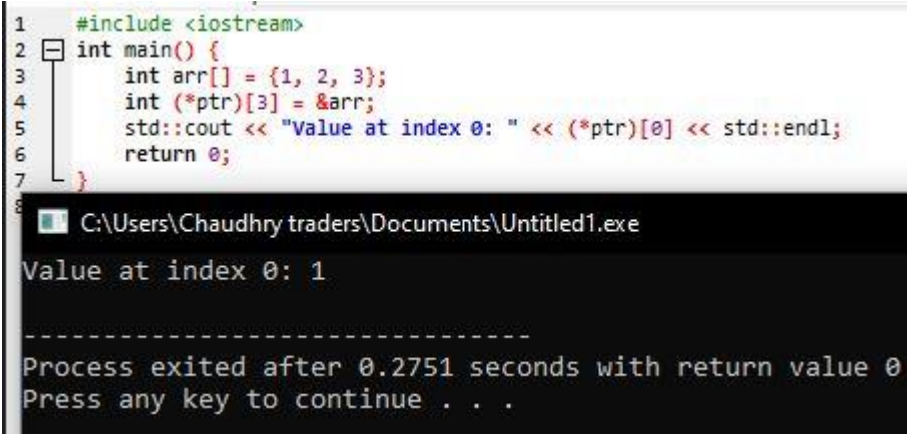
```
    int arr[] = {1, 2, 3};
```

```
    int (*ptr)[3] = &arr;
```

```
    std::cout << "Value at index 0: " << (*ptr)[0] <<  
std::endl;
```

```
    return 0;
```

```
}
```



```
1  #include <iostream>
2  int main() {
3      int arr[] = {1, 2, 3};
4      int (*ptr)[3] = &arr;
5      std::cout << "Value at index 0: " << (*ptr)[0] << std::endl;
6      return 0;
7  }
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Value at index 0: 1

-----

Process exited after 0.2751 seconds with return value 0

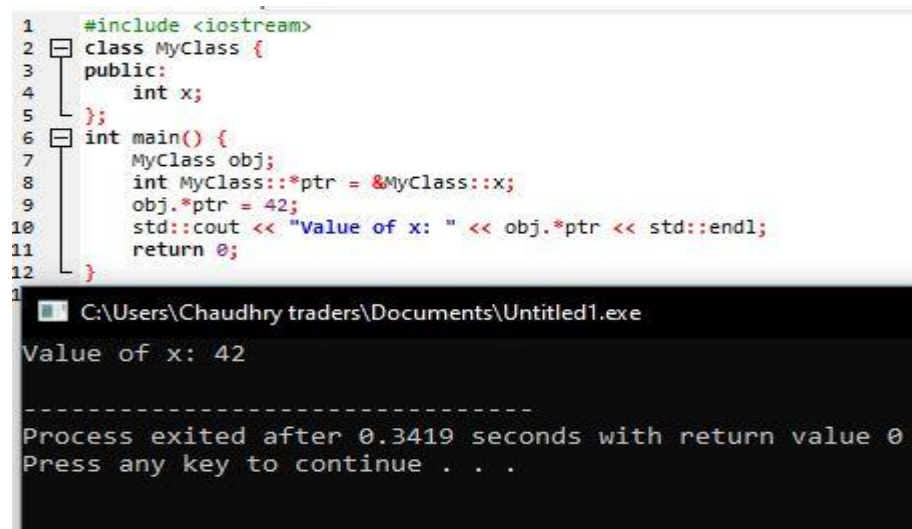
Press any key to continue . . .

## Program 12:

```
#include <iostream>

class MyClass {
public:
    int x;
};

int main() {
    MyClass obj;
    int MyClass::*ptr = &MyClass::x;
    obj.*ptr = 42;
    std::cout << "Value of x: " << obj.*ptr << std::endl;
    return 0; }
```



The image shows a code editor window with a C++ program and a terminal window below it. The code defines a class `MyClass` with a public member `x`. In the `main` function, an object `obj` of `MyClass` is created. A pointer `ptr` of type `int MyClass::*` is declared and assigned the address of `MyClass::x`. Then, `obj.*ptr` is assigned the value 42. Finally, the value is printed using `std::cout`. The terminal window shows the output "Value of x: 42" and a message indicating the process exited after 0.3419 seconds with a return value of 0.

```
1  #include <iostream>
2  class MyClass {
3  public:
4      int x;
5  };
6  int main() {
7      MyClass obj;
8      int MyClass::*ptr = &MyClass::x;
9      obj.*ptr = 42;
10     std::cout << "Value of x: " << obj.*ptr << std::endl;
11     return 0;
12 }
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Value of x: 42

-----

Process exited after 0.3419 seconds with return value 0  
Press any key to continue . . .

## Program 13:

```
#include <iostream>
```

```
class MyClass {
```

```
public:
```

```
    int add(int a, int b) {
```

```
        return a + b; }
```

```
};
```

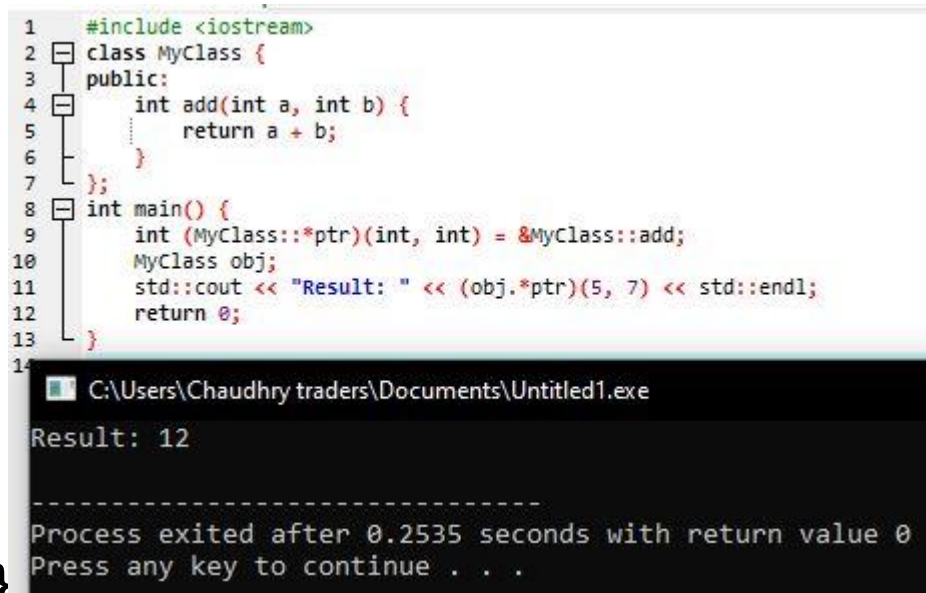
```
int main() {
```

```
    int (MyClass::*ptr)(int, int) = &MyClass::add;
```

```
    MyClass obj;
```

```
    std::cout << "Result: " << (obj.*ptr)(5, 7) << std::endl;
```

```
    return 0; }
```



The screenshot shows a C++ program being compiled and executed. The code defines a class `MyClass` with a public static member function `add` that takes two integers and returns their sum. In the `main` function, a pointer `ptr` of type `int (MyClass::*)(int, int)` is initialized to point to `&MyClass::add`. An object `obj` of type `MyClass` is created, and the program prints the result of `(obj.*ptr)(5, 7)`, which is 12. The output window shows the command prompt with the file path `C:\Users\Chaudhry traders\Documents\Untitled1.exe`, the output `Result: 12`, and a message indicating the process exited after 0.2535 seconds with a return value of 0.

```
1  #include <iostream>
2  class MyClass {
3  public:
4      int add(int a, int b) {
5          return a + b;
6      }
7  };
8  int main() {
9      int (MyClass::*ptr)(int, int) = &MyClass::add;
10     MyClass obj;
11     std::cout << "Result: " << (obj.*ptr)(5, 7) << std::endl;
12     return 0;
13 }
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Result: 12

-----

Process exited after 0.2535 seconds with return value 0

Press any key to continue . . .

## Program 14:

```
#include <iostream>
```

```
int main () {
```

```
    int arr[] = {1, 2, 3, 4, 5};
```

```
    int* ptr = arr;
```

```
    for (int i = 0; i < 5; i++) {
```

```
        std::cout << "Value at index " << i << ": " << *(ptr +  
i) << std::endl;
```

```
    }
```

```
    return 0;
```

```
}
```

```
1  #include <iostream>  
2  int main() {  
3      int arr[] = {1, 2, 3, 4, 5};  
4      int* ptr = arr;  
5      for (int i = 0; i < 5; i++) {  
6          std::cout << "Value at index " << i << ": " << *(ptr + i) << std::endl;  
7      }  
8      return 0;  
9  }
```

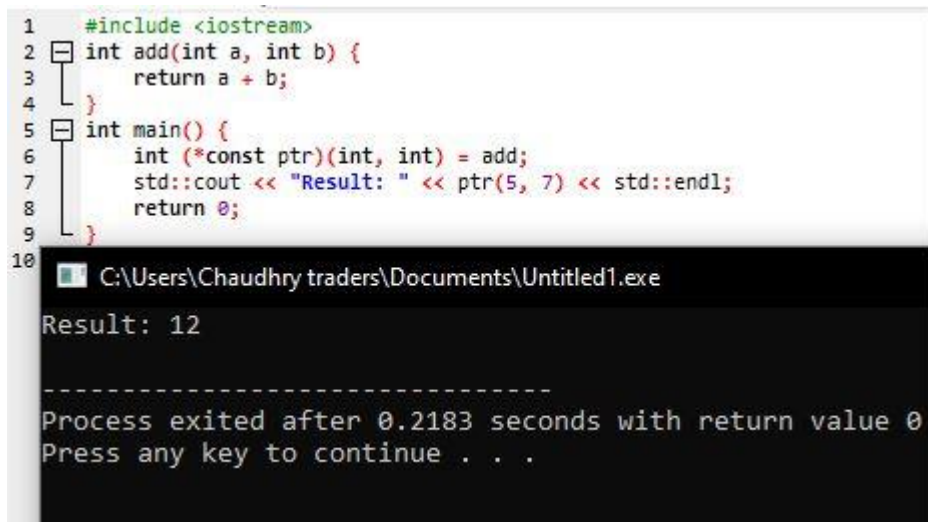
```
10 C:\Users\Chaudhry traders\Documents\Untitled1.exe  
  
Result: 12  
  
-----  
Process exited after 0.03454 seconds with return value 0  
Press any key to continue . . .
```

## Program 15:

```
#include <iostream>

int add (int a, int b) {
    return a + b;
}

int main() {
    int (*const ptr)(int, int) = add;
    std::cout << "Result: " << ptr(5, 7) << std::endl;
    return 0;
}
```



The screenshot shows a C++ program in a code editor and its execution in a terminal window. The code defines a function `add` that takes two integers and returns their sum. In the `main` function, a constant pointer `ptr` of type `int (*)(int, int)` is assigned the address of the `add` function. The program then prints the result of `ptr(5, 7)`, which is 12. The terminal output shows the program's path, the result, and a message indicating the process exited after 0.2183 seconds.

```
1  #include <iostream>
2  int add(int a, int b) {
3      return a + b;
4  }
5  int main() {
6      int (*const ptr)(int, int) = add;
7      std::cout << "Result: " << ptr(5, 7) << std::endl;
8      return 0;
9  }
10
```

C:\Users\Chaudhry traders\Documents\Untitled1.exe

Result: 12

-----

Process exited after 0.2183 seconds with return value 0  
Press any key to continue . . .