1. Local variables are stored in an area called Stack.

2.
```
#include <iostream>
using namespace std;
class Base {};
class Derived : public Base {};

int main()
{
Base *bp = new Derived;
Derived *dp = new Base;
}
```

Compile Error in line
`Derived *dp = new Base;`

3. When the inheritance is private, the private methods in base class are inaccessible in the derived class (in C++).

4. Which of the Following is true?
The number of times destructor is called depends on Number of objects created.

5. Type conversion is automatic whereas type casting is explicit.

__/__/____

→ New and Delete Keywords

The new operator denotes a request For memory allocation on the Free Store. If Sufficient memory is available, new operator initializes the memory.

Syntax

pointer-variable = new data-type;

Delete operator memory that is dynamically allocated using the new operator can be Freed using the delete operator.

Syntax

delete pointer-variable;

→ Constructor

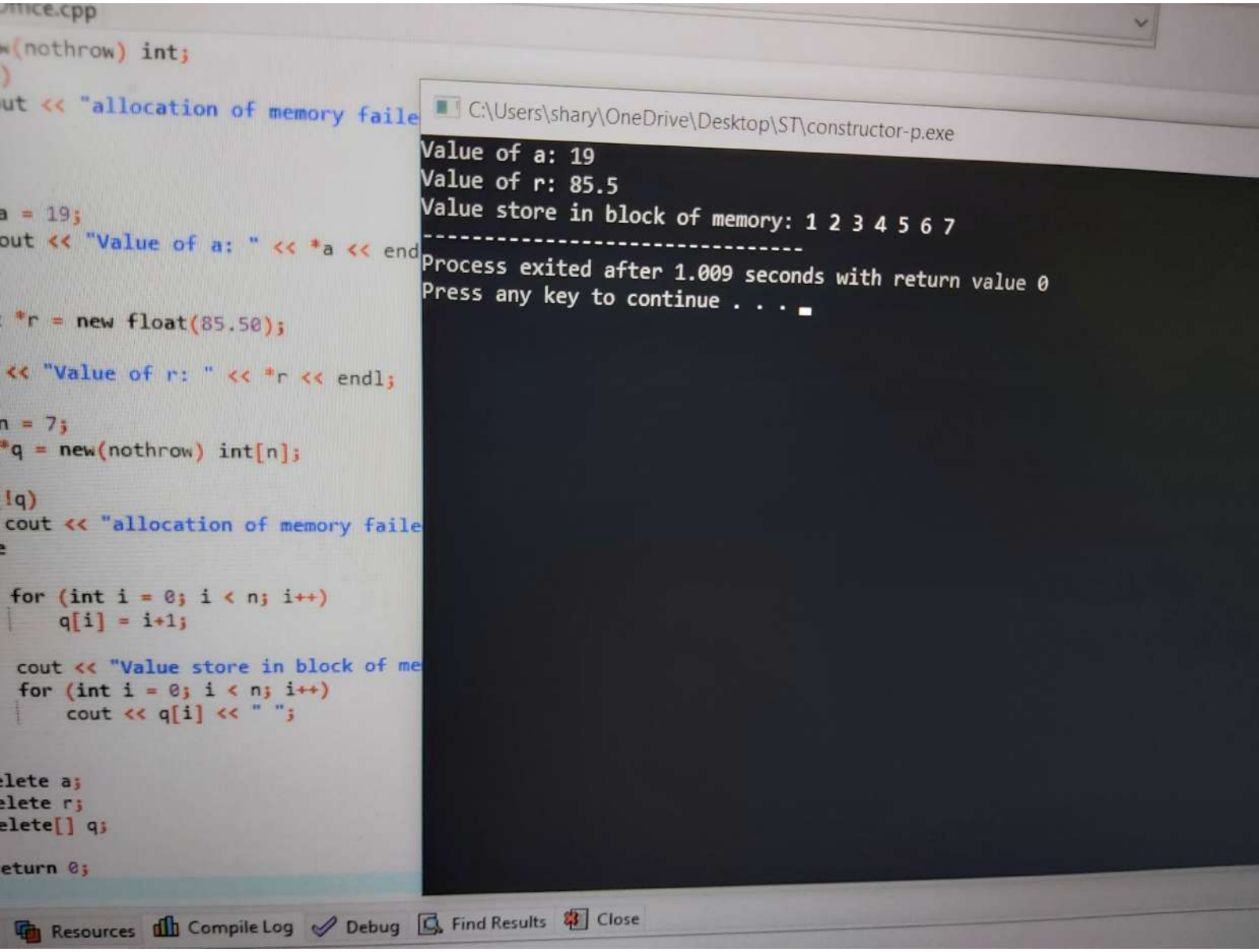
A constructor is a member Function of a class which initializes objects of a class. Constructor is automatically called when Object creates. They have same name as class itself. They don't have return type.

Types of constructors

1. Default constructors
2. Parameter constructors
3. Copy constructors

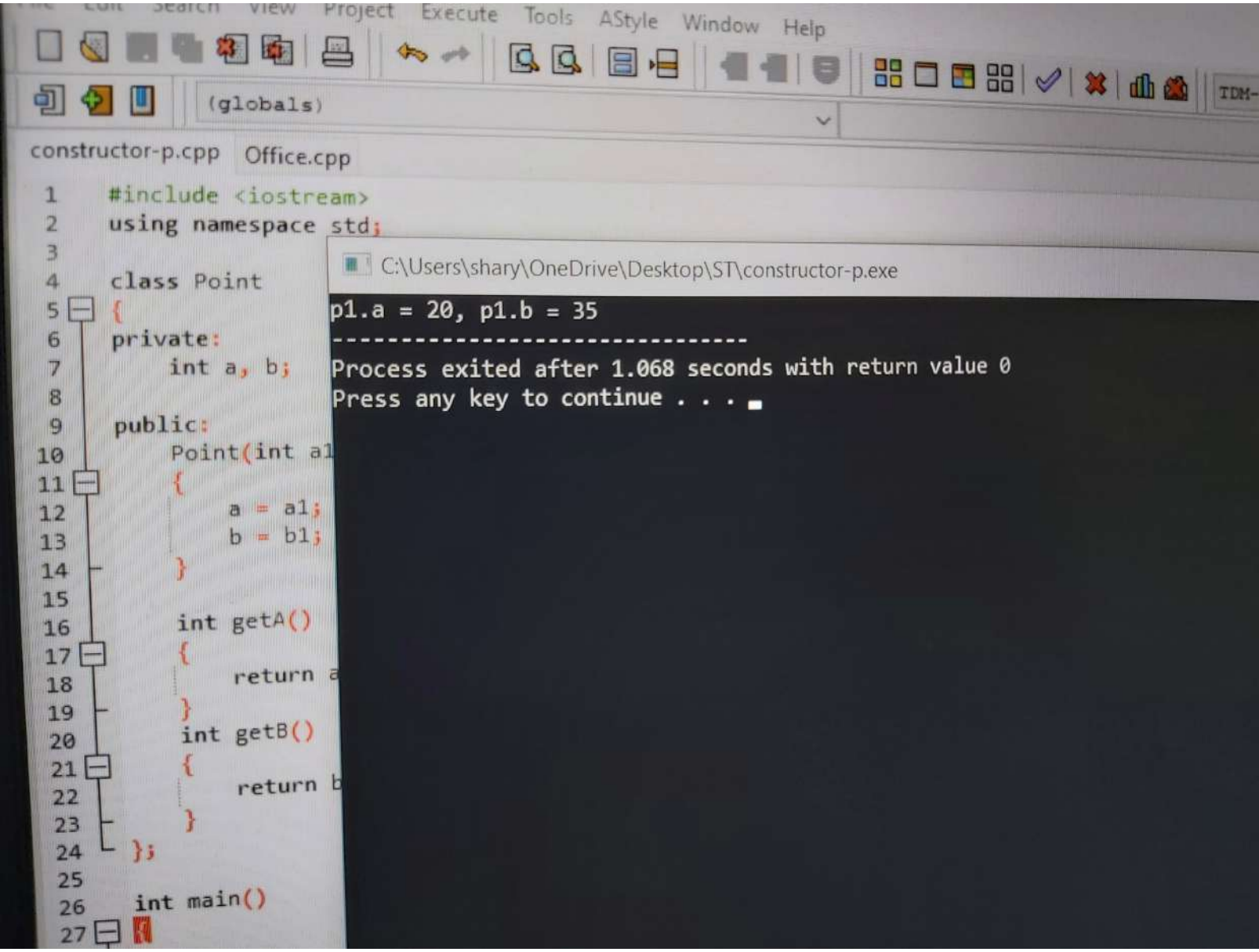
New / Delete


```
#include <iostream>
using namespace std;
int main ()
{   int * a = NULL;
    a = new (nothrow) int;
    if (!a)
    cout << "allocation Failed \n";
    else
    {
      *a = 19;
    cout<< "Value of a : << *a << endl;
}
Float *x = new Float (85.50);
cout << "value of x: " << *x << endl;
int n = 7;
int *q = new (nothrow) int [n];
if (!q)
cout << "allocation Failed \n";
else
{   For (int i=0; i<n; i++)
      q [i] = i+1;
cout << value Store in memory block:
For (int i=0;  i<n;  i++)
   cout << q [i] << "  ";
}
delete a;
delete x;
delete [] q;
return 0;
}
```


(nothrow) int;
ut << "allocation of memory faile
a = 19;
out << "Value of a: " << *a << end
*r = new float(85.50);
<< "Value of r: " << *r << endl;
n = 7;
*q = new(nothrow) int[n];
!q)
cout << "allocation of memory faile
for (int i = 0; i < n; i++)
q[i] = i+1;
cout << "Value store in block of me
for (int i = 0; i < n; i++)
cout << q[i] << " ";
elete a;
elete r;
elete[] q;
eturn 0;
C:\Users\shary\OneDrive\Desktop\ST\constructor-p.exe
Value of a: 19
Value of r: 85.5
Value store in block of memory: 1 2 3 4 5 6 7
Process exited after 1.009 seconds with return value 0
Press any key to continue . . .
Resources
Compile Log
Debug
Find Results
Close

Constructor

```
#include <iostream>
using namespace std;
class Point
{
private:
 int a; b;
public:
 Point (int a1, int b1)
{
    a = a1;
    b = b1;
}
 int getA()
{
  return a;
}
 int getB()
{
  return b;
}
};

int main()
{
 Point p1(20,35);
 cout << "p1.a = " << p1.getA()
      << ", p1.b = " << p1.getB();

 return 0;
}
```


Project Execute Tools AStyle Window Help
(globals)
constructor-p.cpp
Office.cpp
#include <iostream>
using namespace std;
class Point
{
private:
int a, b;
public:
Point(int a1
{
a = a1;
b = b1;
}
int getA()
{
return a
}
int getB()
{
return b
}
};
int main()
C:\Users\shary\OneDrive\Desktop\ST\constructor-p.exe
p1.a = 20, p1.b = 35
Process exited after 1.068 seconds with return value 0
Press any key to continue . . .

→ Object oriented programming and procedural programming

Object oriented programming can be defind as a programming model which is based upon the concepts of objects. Objects contain data in the Form of attributes and code in the Form of methods.

Broedural programming can be defined as a programming model which is derived From Structured programming, based upon the concept of calling procedure.

→ Polymorphism

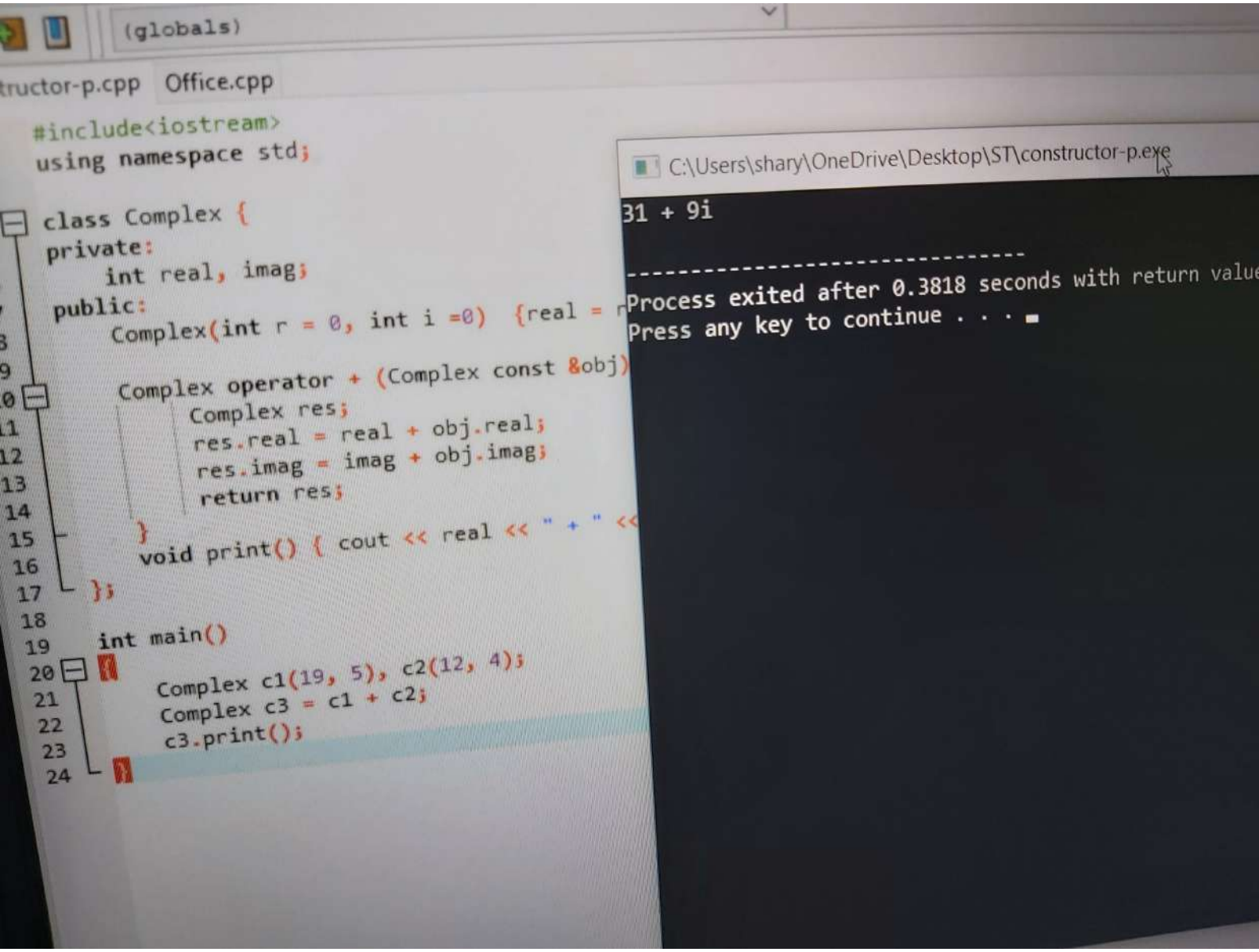
It can be define as the ability of a message to be displayed in more than one Form. It is considered as one of the important Features of object oriented programming.

2 types

1. Compile time polymorphism achieved by Funtion overloading or operator overloading
2. Runtime polymorphism by Funtion overriding

Polymorphism
Operator overloading 11

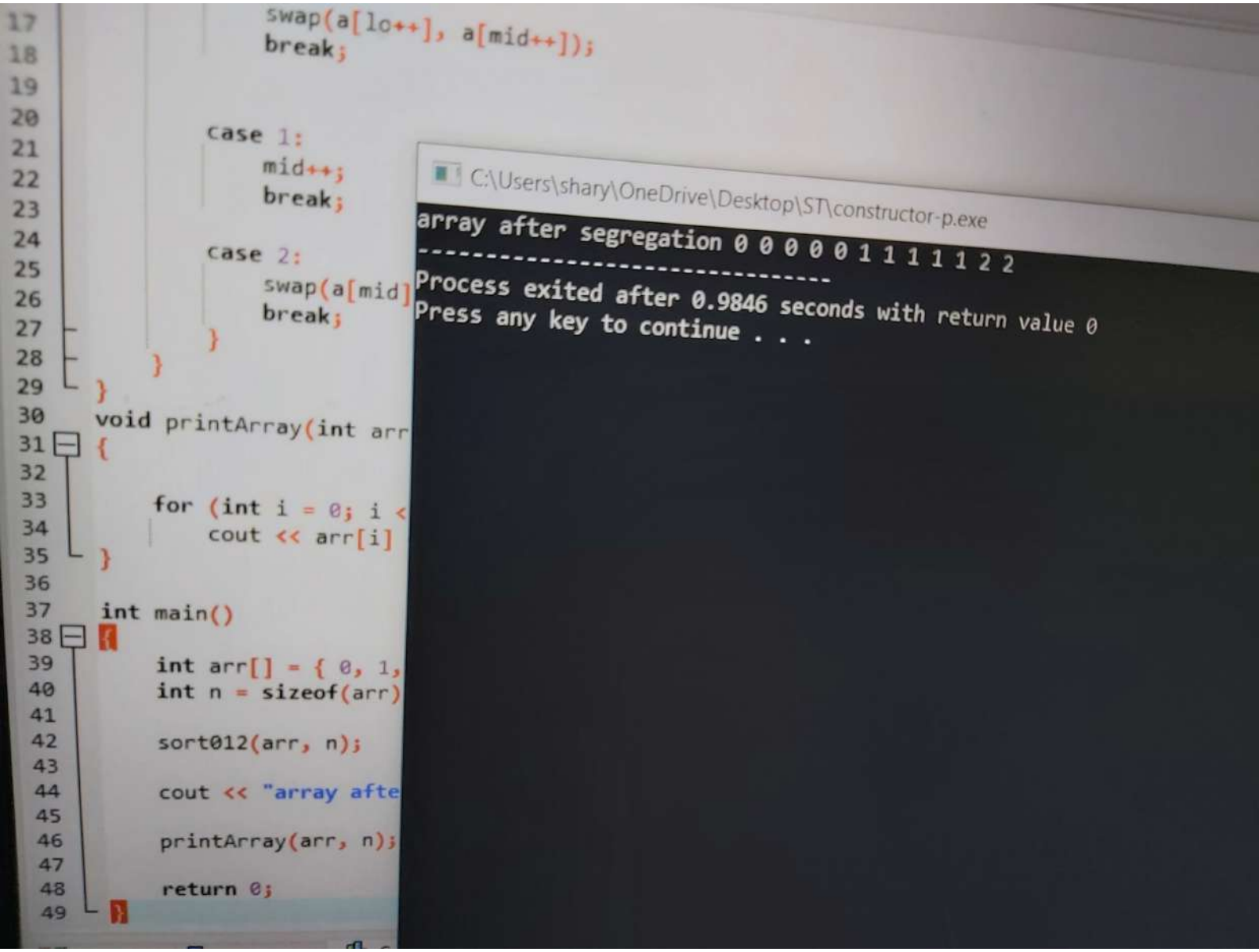
```
#include <iostream>
using namespace std;

class Complex {
 private:
   int real, imag;
 public:
   Complex (int r=0, int i = 0)
      { real = r;
        imag = i;
      }
 Complex operator + (complex const & obj) {
  Complex res;
 res.real = real + obj.real;
 res.imag = imag + obj.imag;
  return res;
 }
 void print () {
   cout << real << " + " << imag << " ; "
                                 << endl;
 }
};
int main ()
{
  Complex c1 (19,5), c2 (12,4);
  Complex c3 = c1 + c2;
  c3.print ();
}
```


(globals)
tructor-p.cpp
Office.cpp
#include<iostream>
using namespace std;
class Complex {
private:
int real, imag;
public:
Complex(int r = 0, int i =0) {real = r
Complex operator + (Complex const &obj)
Complex res;
res.real = real + obj.real;
res.imag = imag + obj.imag;
return res;
}
void print() { cout << real << " + " <<
};
int main()
{
Complex c1(19, 5), c2(12, 4);
Complex c3 = c1 + c2;
c3.print();
}
C:\Users\shary\OneDrive\Desktop\ST\constructor-p.exe
31 + 9i
Process exited after 0.3818 seconds with return value
Press any key to continue . . .

Sorting 0, 1, 2

```
#include <bits/stdc++.h>
using namespace std;

void sortnum(int a[], int arr_size)
{ int l = 0;
  int h = arr_size - 1;
  int m = 0;

  while (m <= h){
   switch (a[m]){

    case 0;
      swap(a[l++], a[m++]);
      break;
    case 1;
      m++;
      break;
    case 2;
      swap(a[m], a[h--]);
      break;
  }
}

void printArr(int arr[], int
                    arr_size)
{
  for(int i=0; i<arr_size, i++)
     cout << arr[i] << " ";
}
```

```
int main()
{
int arr[] = {1,1,2,2,0,0,2,1,2};
int n = sizeof(arr)/sizeof(arr[0]);

Sortnum(arr, n);

cout << "array after sorting" ;
printArr(arr,n);

return 0;
}
```


swap(a[lo++], a[mid++]);
break;
case 1:
mid++;
break;
case 2:
swap(a[mid]
break;
}
}
}
void printArray(int arr
{
for (int i = 0; i <
cout << arr[i]
}
int main()
{
int arr[] = { 0, 1,
int n = sizeof(arr)
sort012(arr, n);
cout << "array afte
printArray(arr, n);
return 0;
}
C:\Users\shary\OneDrive\Desktop\ST\constructor-p.exe
array after segregation 0 0 0 0 0 1 1 1 1 1 2 2
Process exited after 0.9846 seconds with return value 0
Press any key to continue . . .

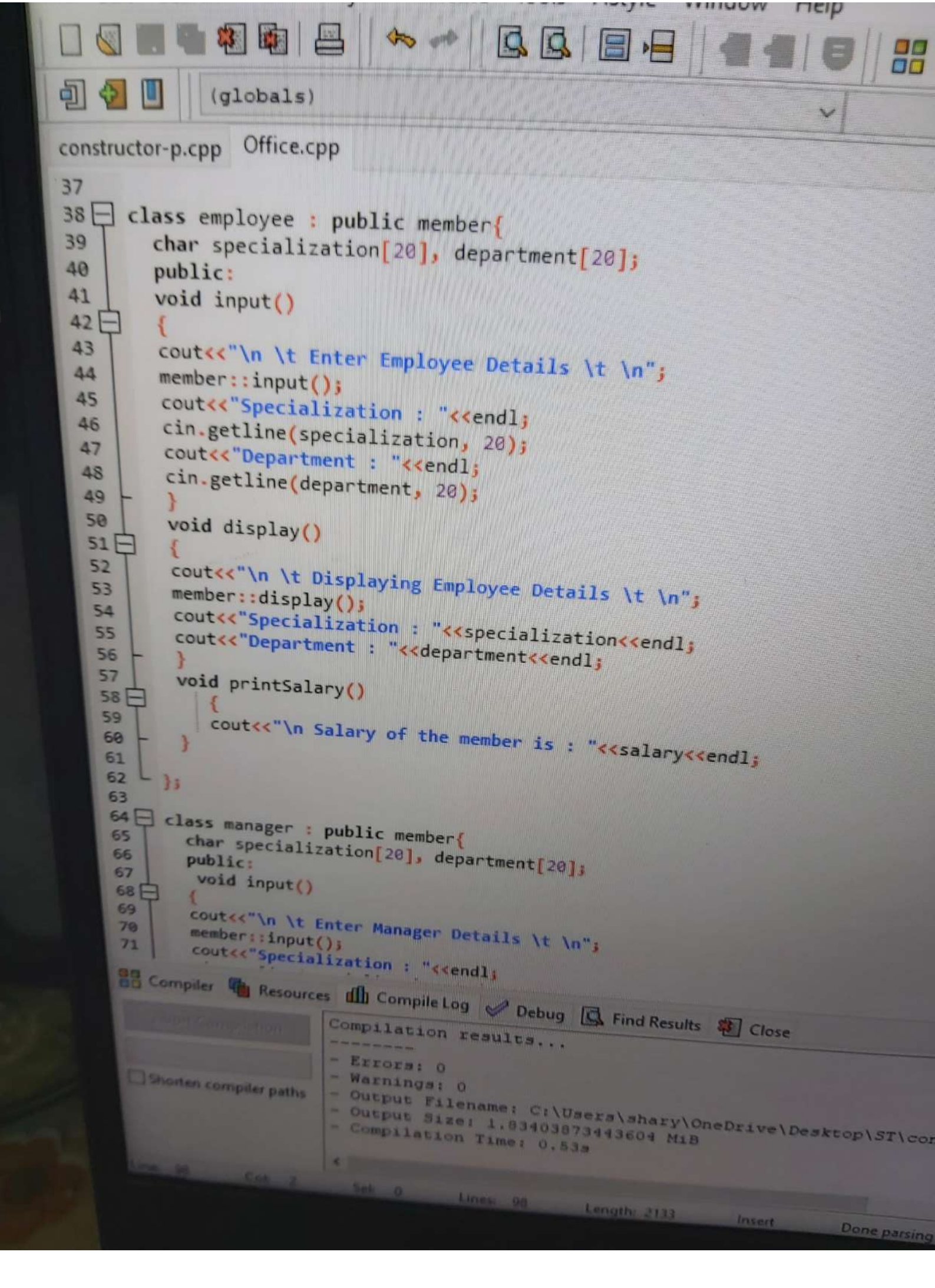
constructor-p.cpp | Office.cpp

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

class member{

   char name[20], address[40];
    double number;
    int age;

    public:
     int salary;
     void input()
     {   cout<<endl;
      cout<<"Name : "<<endl;
      cin.getline(name, 20);
      cout<<"Age : "<<endl;
      cin>>age;
      cout<<"Phone Number : "<<endl;
      cin>>number;
      cout<<"Address : "<<endl;
      cin.getline(address, 40);
      cout<<"Salary : "<<endl;
      cin>>salary;

  }
  void display()
     {   cout<<endl;
      cout<<"Name : "<<name<<endl;
      cout<<"Age : "<<age<<endl;
      cout<<"Phone Number : "<<number<<endl;
      cout<<"Address : "<<address<<endl;
      cout<<"Salary : "<<salary<<endl;
  }
```

Compiler | Resources | Compile Log | Debug | Find Results

Compilation results...

- Errors: 0
- Warnings: 0
- Output Filename:



(globals)

constructor-p.cpp | Office.cpp

```
37
38  class employee : public member{
39      char specialization[20], department[20];
40      public:
41      void input()
42      {
43      cout<<"\n \t Enter Employee Details \t \n";
44      member::input();
45      cout<<"Specialization : "<<endl;
46      cin.getline(specialization, 20);
47      cout<<"Department : "<<endl;
48      cin.getline(department, 20);
49      }
50      void display()
51      {
52      cout<<"\n \t Displaying Employee Details \t \n";
53      member::display();
54      cout<<"Specialization : "<<specialization<<endl;
55      cout<<"Department : "<<department<<endl;
56      }
57      void printSalary()
58          {
59          cout<<"\n Salary of the member is : "<<salary<<endl;
60      }
61
62  };
63
64  class manager : public member{
65      char specialization[20], department[20];
66      public:
67       void input()
68      {
69      cout<<"\n \t Enter Manager Details \t \n";
70      member::input();
71      cout<<"Specialization : "<<endl;
```

Compiler | Resources | Compile Log | Debug | Find Results | Close

Shorten compiler paths

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\shary\OneDrive\Desktop\ST\cor
- Output Size: 1.8340873443604 MiB
- Compilation Time: 0.53s
```

Line: 98 Col: 2 Sel: 0 Lines: 98 Length: 2133 Insert Done parsing

File Edit Search View Project Execute Tools AStyle Window Help

(globals)

constructor-p.cpp | Office.cpp

```
64  class manager : public member{
65      char specialization[20], department[20];
66      public:
67       void input()
68      {
69      cout<<"\n \t Enter Manager Details \t \n";
70      member::input();
71      cout<<"Specialization : "<<endl;
72      cin.getline(specialization, 20);
73      cout<<"Department : "<<endl;
74      cin.getline(department, 20);
75      }
76      void display()
77      {
78      cout<<"\n \t Displaying Manager Details \t \n";
79      member::display();
80      cout<<"Specialization : "<<specialization<<endl;
81      cout<<"Department : "<<department<<endl;
82      }
83      void printSalary()
84          {
85          cout<<"\n Salary of the member is : "<<salary<<endl;
86      }
87  };
88  int main()
89  {
90      employee e;
91      manager m;
92      e.input();
93      m.input();
94      e.display();
95      e.printSalary();
96      m.display();
97      m.printSalary();
98  }
```

Compiler | Resources | Compile Log | Debug | Find Results | Close

Shorten compiler paths

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\shary\OneDrive\Desktop\ST\
- Output Size: 1.834038734436O4 MiB
- Compilation Time: 0.53s
```

C:\Users\shary\OneDrive\Desktop\ST\Office.exe

```
Department :
manager

        Displaying Employee Details

Name : divyam
Age : 19
Phone Number : 8.96966e+009
Address :
Salary : 10000
Specialization :
Department : student

 Salary of the member is : 10000

        Displaying Manager Details

Name : sharyan
Age : 30
Phone Number : 8.23942e+009
Address :
Salary : 200000
Specialization :
Department : manager

 Salary of the member is : 200000

--------------------------------
Process exited after 56.21 seconds with return value 0
Press any key to continue . . .
```