

**Jaypee University of Engineering
and Technology, Guna**

**Department of Computer Science
and Engineering**

Object Oriented Programming Lab
(18B17CI271)

Lab Exercise-5

Constructors and Destructors

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QUESTION 1 :

Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imaginary parts to equal values and third which takes two argument is used to initialize real and imaginary to two different values. Include sum member function that takes two objects and performs the addition of these two objects. Write display function to display the object in complex form i.e. $2+i6$. Write main function to test your program.

```
#include <iostream>
using namespace std;
class complex
{
public:
    int x, y;
    complex()
    {
        x = 0;
        y = 0;
    }
    complex(int t)
    {
        x = t;
        y = t;
    }

    cout << "The sum of your complex number is : " << x << "+" << y << "i"
<< endl;
}
    complex(int r, int i)
    {
        x = r;
        y = i;
        cout << x << " " << y << endl;
    }

    void sum(complex &ob1, complex &ob2)
    {
        x = ob1.x + ob2.x;
        y = ob1.y + ob2.y;
    }
    void display()
    {
        cout << "The sum of your complex number is : " << x << "+" << y << "i"
<< endl;
    }
}
```

```
};
int main()
{
    int real, img, value;
    complex fi;
    cout << "Enter a value to make real and img part equal :\n";
    cin >> value;
    complex sec(value);
    cout << "NUMBER 1 : \n";
    cout << "Enter your number real and img part :\n";
    cin >> real >> img;
    complex thi_1(real, img);
    cout << "NUMBER 2 : \n";
    cout << "Enter your number real and img part :\n";
    cin >> real >> img;
    complex thi_2(real, img);
    thi_1.sum(thi_1, thi_2);
    thi_1.display();

    return 0;
}
```

OUTPUT :

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/powershell

PS C:\Users\hp\Desktop\labs> cd "C:\Users\hp\Desktop\labs\" ; if ($?) { g++ question1.cpp -o question1 } ; if ($?) { .\question1 }
Enter a value to make real and img part equal :
5
The sum of your complex number is : 5+5i
NUMBER 1 :
Enter your number real and img part :
4
9
4 9
NUMBER 2 :
Enter your number real and img part :
3
7
3 7
The sum of your complex number is : 7+16i
PS C:\Users\hp\Desktop\labs>
```

QUESTION 2 :

A point in a two-dimensional plane having coordinate as (x,y), can be represented by a class whose private data members are x and y. Write the constructor and destructor functions of the class. The constructor should initialise (x,y) by passing parameters values. Now, a rectangle can be represented by the top-left and bottom-right vertices. Define a class say 'Rectangle' whose private data members are top-left and bottom-right vertices. Write the parameterised constructor function of the class 'Rectangle'. Also, write the destructor function. Finally, write a program to show the order in which different constructors and destructors are called.

```
#include <iostream>
using namespace std;
class plane
{
    int x, y;

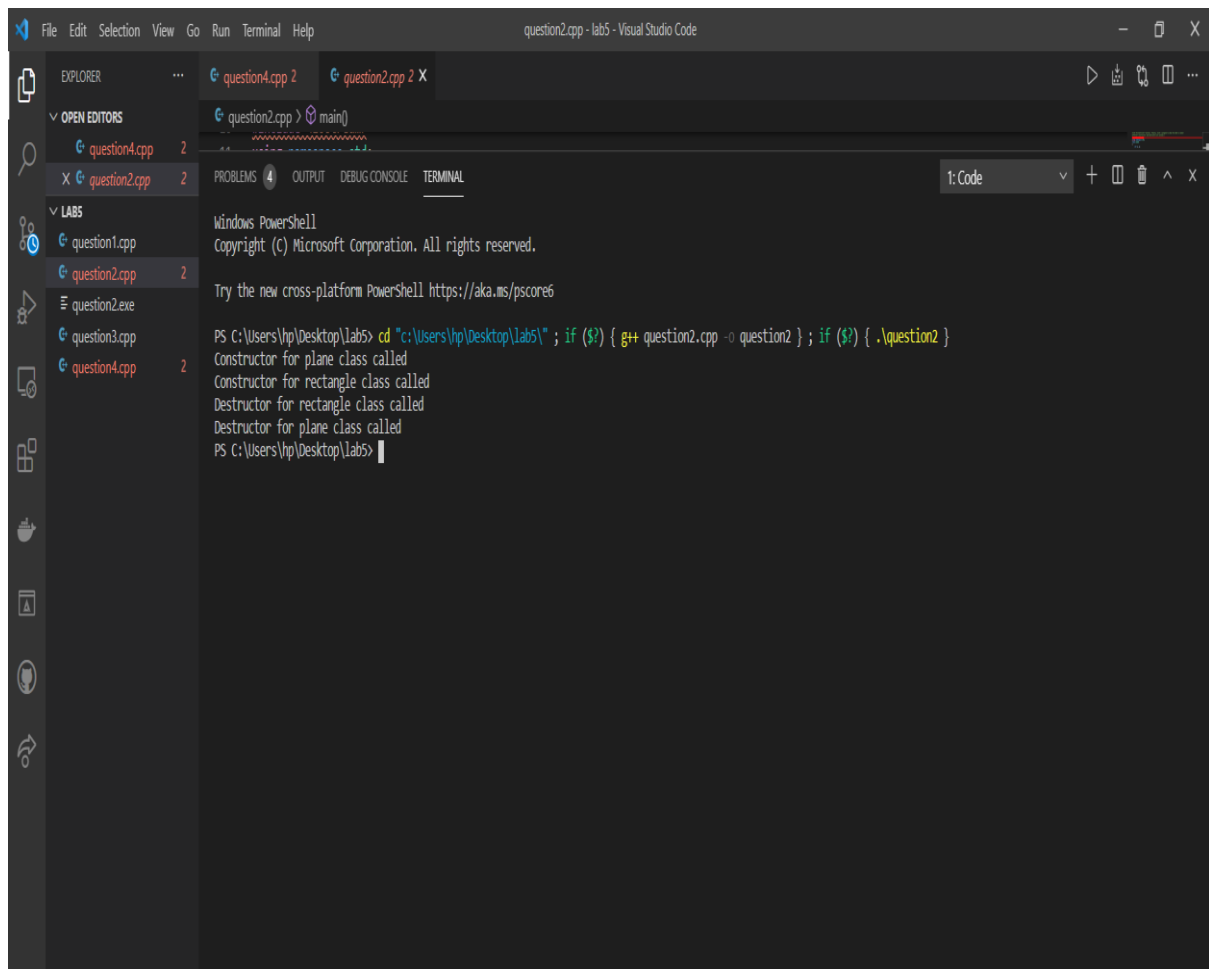
public:
    plane(int x, int y)
    {
        cout << "Constructor for plane class called \n";
    }
    ~plane()
    {
        cout << "Destructor for plane class called \n";
    }
};

class rectangle
{
    int top_l, bottom_r;

public:
    rectangle(int a, int b)
    {
        cout << "Constructor for rectangle class called \n";
    }
    ~rectangle()
    {
        cout << "Destructor for rectangle class called \n";
    }
};

int main()
{
    class plane p1(2, 3);
    class rectangle rc(5,9);
}
```

OUTPUT :



The screenshot shows the Visual Studio Code interface with the following components:

- Explorer:** Lists files in the 'LABS' folder: question1.cpp, question2.cpp (selected), question2.exe, question3.cpp, and question4.cpp.
- Editor:** Displays the source code of question2.cpp, showing a `main()` function.
- Terminal:** Shows the output of the program execution in a Windows PowerShell window.

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\hp\Desktop\labs> cd "C:\Users\hp\Desktop\labs\" ; if ($?) { g++ question2.cpp -o question2 } ; if ($?) { .\question2 }
Constructor for plane class called
Constructor for rectangle class called
Destructor for rectangle class called
Destructor for plane class called
PS C:\Users\hp\Desktop\labs>
```

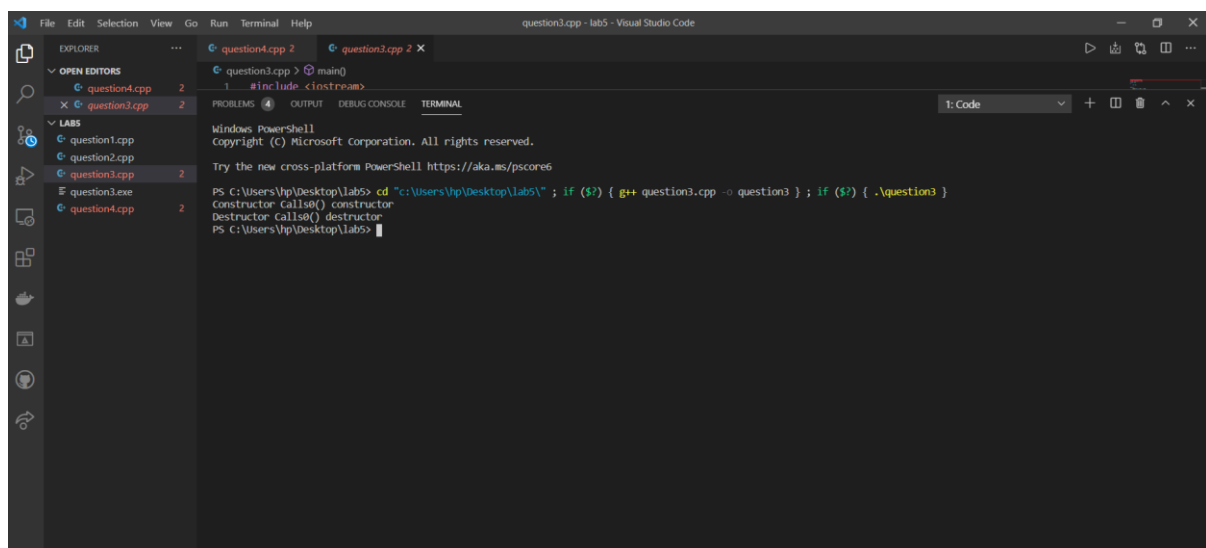
QUESTION 3 :

Write a program to show that, the constructor and destructor functions of a globally declared object are the first and last functions, respectively to be called in a program.

```
#include <iostream>
using namespace std;
class oop
{
    int x;

public:
    oop(int y = 0) : x(y)
    {
        cout << "Constructor Calls" << x << "() constructor " << endl;
    }
    ~oop()
    {
        cout << "Destructor Calls" << x << "() destructor " << endl;
    }
};
int main()
{
    oop m;
}
```

OUTPUT :



```
question3.cpp - lab5 - Visual Studio Code
EXPLORER
  question4.cpp 2
  question3.cpp 2
  LABS
    question1.cpp
    question2.cpp
    question3.cpp 2
    question3.exe
    question4.cpp 2
  question3.cpp > main()
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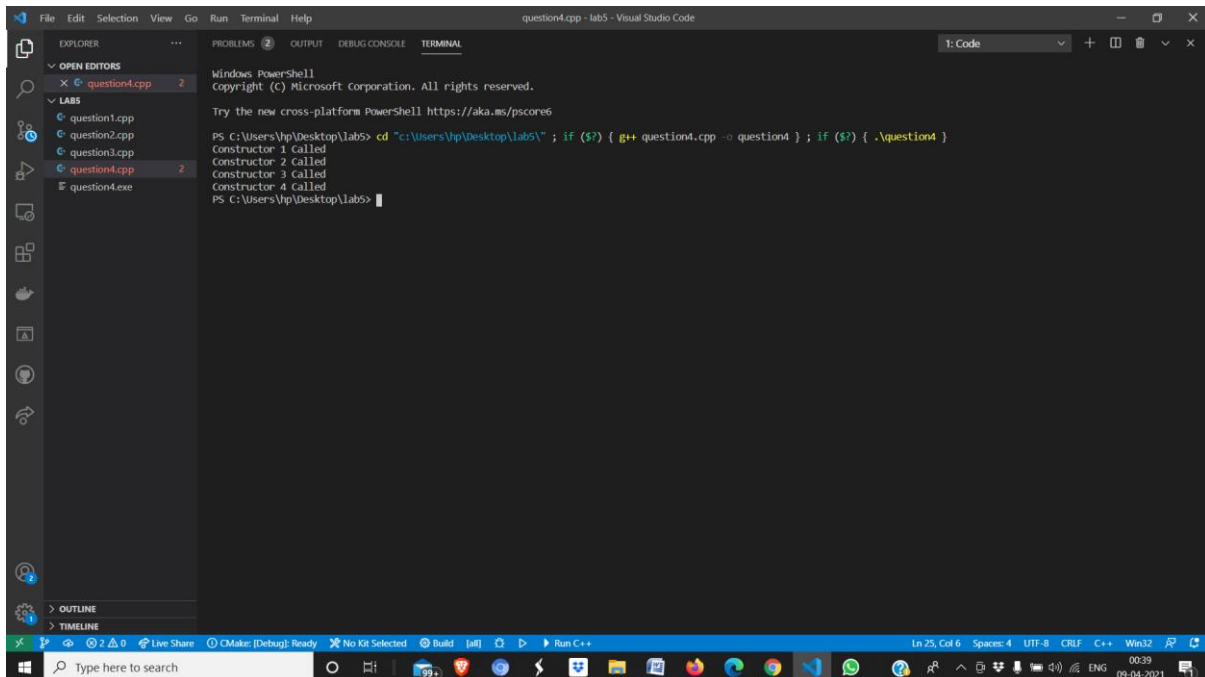
QUESTION 4 :

Write a program to show that constructors follow the property of function overloading as well as default parameter. Also, show that in case of constructor also, default parameter may create problem in implementing function overloading.

```
/*Write a program to show that constructors follow the property of function overloading as well as default parameter. Also, show that in case of constructor also, default parameter may create problem in implementing function overloading.*/
#include <iostream>
using namespace std;
class cons
{
    int x;

public:
    cons()
    {
        cout << "Constructor 1 Called" << endl;
    }
    cons(int y)
    {
        cout << "Constructor 2 Called" << endl;
    }
    cons(char c)
    {
        cout << "Constructor 3 Called" << endl;
    }
    cons(double y)
    {
        cout << "Constructor 4 Called" << endl;
    }
    cons(int y=0)
    {
        cout << "Constructor 1 Called" << endl;
    }
};
int main()
{
    cons m;
    cons n(4);
    cons o('p');
    cons p(5.8);
    cons q(5);
}
```

OUTPUT :



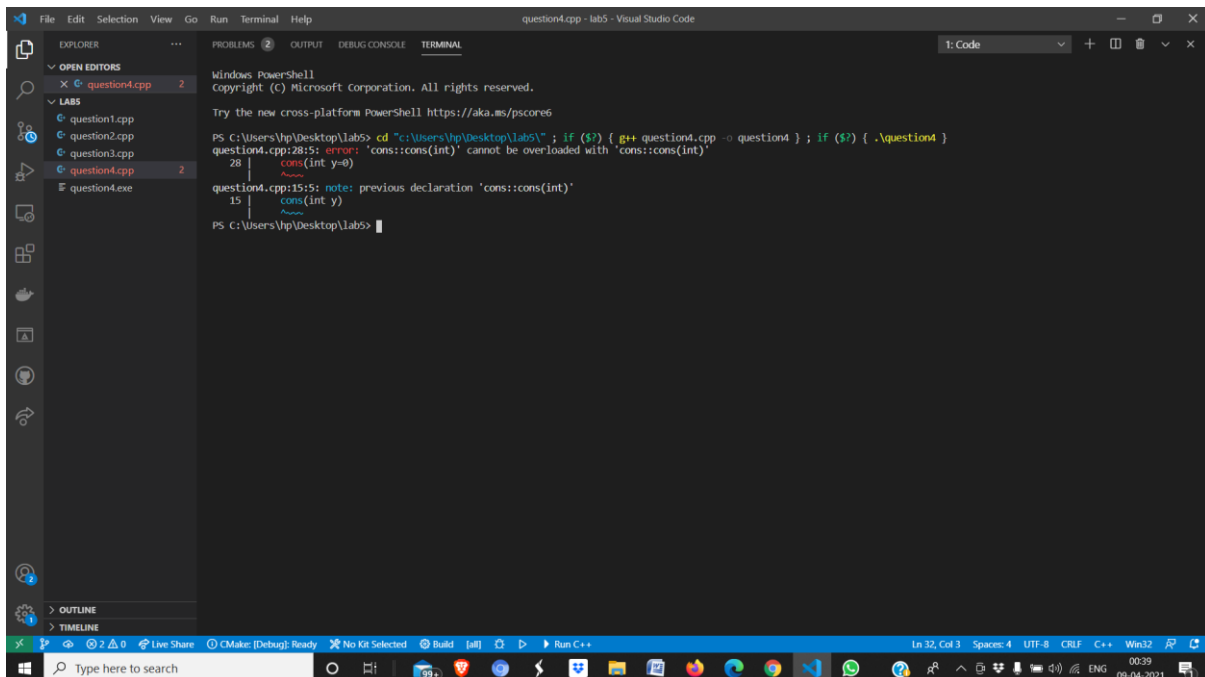
The screenshot shows the Visual Studio Code interface with a terminal window open. The terminal displays the output of a C++ program executed in a Windows PowerShell environment. The program's output is as follows:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\hp\Desktop\lab5> cd "C:\Users\hp\Desktop\lab5"; if ($?) { g++ question4.cpp -o question4 }; if ($?) { .\question4 }
Constructor 1 Called
Constructor 2 Called
Constructor 3 Called
Constructor 4 Called
PS C:\Users\hp\Desktop\lab5>
```

Problem with using default parameter in implementation of function overloading



The screenshot shows the Visual Studio Code interface with a terminal window open. The terminal displays the output of a C++ program that fails to compile due to a conflict between two overloaded functions. The error message is as follows:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\hp\Desktop\lab5> cd "C:\Users\hp\Desktop\lab5"; if ($?) { g++ question4.cpp -o question4 }; if ($?) { .\question4 }
question4.cpp:28:5: error: 'cons::cons(int)' cannot be overloaded with 'cons::cons(int)'
   28 |     cons(int y=0)
      |     ~~~~~
question4.cpp:15:5: note: previous declaration 'cons::cons(int)'
   15 |     cons(int y)
      |     ~~~~~
PS C:\Users\hp\Desktop\lab5>
```