GeeksforGeeks

A computer science portal for geeks

Custom Search

Practice GATE CS Placements Videos Contribute

Login/Register

Can a constructor be private in C++ ?

Prerequisite : Constructors

3.3

A **constructor** is a special member function of a class which initializes objects of a class. In C++, constructor is automatically called when object of a class is created.

By default, constructors are defined in public section of class. So, question is can a constructor be defined in private section of class ?

Answer : Yes, Constructor can be defined in private section of class

How to use Constructors in private section?

1. **Using Friend Class :** If we want that class should not be instantiated by anyone else but only by a friend class.

```
// CPP program to demonstrate usage of
// private constructor
#include <iostream>
using namespace std;

// class A
class A{
private:
    A(){
       cout << "constructor of A\n";
    }
    friend class B;
};

// class B, friend of class A
class B{
public:
    B(){
        A a1;
        cout << "constructor of B\n";
    }
};

// Driver program
```

```
int main(){
    B b1;
    return 0;
}
```

Run on IDE

Output:

```
constructor of A
constructor of B
```

If you comment the line **friend class B**, you will encounter below error:

```
test1.cpp: In constructor ‘B::B()’:
test1.cpp:9:5: error: ‘A::A()’ is private
     A(){
     ^
test1.cpp:19:11: error: within this context
         A a1;
```

2. **Using Singleton design pattern:** When we want to design a singleton class. This means instead of creating several objects of class, the system is driven by a single object or a very limited number of objects.
3. **Named Constructor Idiom :** Since constructor has same name as of class, different constructors are differentiated by their parameter list, but if numbers of constructors is more, then implementation can become error prone.
   With the Named Constructor Idiom, you declare all the class’s constructors in the private or protected sections, and then for accessing objects of class, you create public static functions.

   For example, consider below CPP program

```
// CPP program to demonstrate
// ambiguous nature of constructor
// with same no of parameters of same type
#include <iostream>
using namespace std;
class Point
{
    public:

    // Rectangular coordinates
    Point(float x, float y);

    // Polar coordinates (radius and angle)
    Point(float r, float a);

    // error: ‘Point::Point(float, float)’ cannot
    // be overloaded
};
int main()
{
    // Ambiguous: Which constructor to be called ?
    Point p = Point(5.7, 1.2);
    return 0;
}
```

Run on IDE

This problem can be resolved by Named Constructor Idiom. The above CPP program can be improved as following :

```
// CPP program to demonstrate
// named constructor idiom
#include <iostream>
#include <cmath>
using namespace std;
class Point
{
    private:
    float x1, y1;
    Point(float x, float y)
    {
        x1 = x;
        y1 = y;
    };
public:
    // polar(radius, angle)
    static Point Polar(float, float);

    // rectangular(x, y)
    static Point Rectangular(float, float);
    void display();
};

// utility function for displaying of coordinates
void Point :: display()
{
    cout << "x :: " << this->x1 <<endl;
    cout << "y :: " << this->y1 <<endl;
}

// return polar coordinates
Point Point :: Polar(float x, float y)
{
    return Point(x*cos(y), x*sin(y));
}

// return rectangular coordinates
Point Point :: Rectangular(float x, float y)
{
    return Point(x,y);
}
int main()
{
    // Polar coordinates
    Point pp = Point::Polar(5.7, 1.2);
    cout << "polar coordinates \n";
    pp.display();

    // rectangular coordinates
    Point pr = Point::Rectangular(5.7,1.2);
    cout << "rectangular coordinates \n";
    pr.display();
    return 0;
}
```

Run on IDE

Output :

```
polar coordinates
x :: 2.06544
y :: 5.31262
rectangular coordinates
x :: 5.7
y :: 1.2
```

References :

1) Named Constructor Idiom

2) can a constructor be private in cpp

This article is contributed by **Mandeep Singh**. If you like GeeksforGeeks and would like to contribute, you can also write an article using contribute.geeksforgeeks.org or mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above.

GATE CS Corner **Company Wise Coding Practice**

C++ cpp-constructor

Login to Improve this Article

Please write to us at contribute@geeksforgeeks.org to report any issue with the above content.

Recommended Posts:

std::search_n with example in C++
Friend class and function in C++
Constructors in C++
Private Destructor
When is copy constructor called?
Draw a line in C++ graphics
forward_list::begin() and forward_list::end() in C++ STL
list::emplace_front() and list::emplace_back() in C++ STL
list::begin() and list::end() in C++ STL
map::size() in C++ STL

(Login to Rate)

3.3 Average Difficulty : **3.3/5.0**
Based on **3** vote(s)

Basic Easy Medium Hard Expert

□ Add to TODO List

□ Mark as DONE

Writing code in comment? Please use ide.geeksforgeeks.org, generate link and share the link here.

Load Comments

Share this post!