Constructors and Destructors

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Constructors and Destructors

Constructors and destructors are fundamental to the concept of classes in C++.

Both constructor and destructor are more or less like normal functions (but with some differences) that are provided to enhance the capabilities of a class.

Constructors

- Constructors are special class functions which performs initialization of every object.
- Constructor is automatically called when object (instance of class) is create.
- Constructors initialize values to object members after storage is allocated to the object.

Rules for creating constructor

- While defining a constructor you must remember that the name of constructor will be same as the name of the class,

- Constructor never have return type.

- *It must be a public member.*

- Constructors can be defined either inside the class definition or outside class definition using class name and scope resolution **“::”** operator.

Constructor syntax

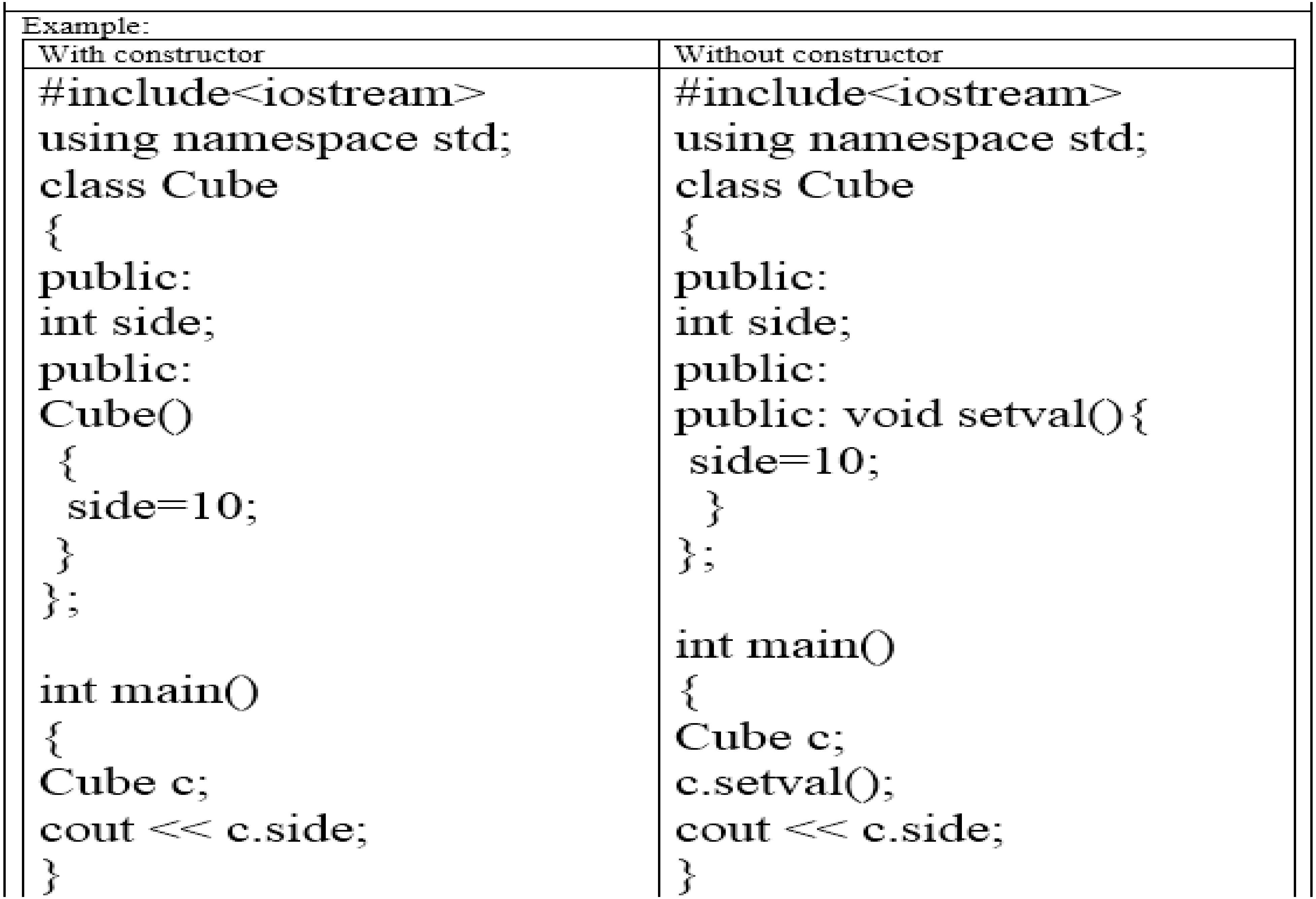
```
class A
{
 int i;
 public:
 A(); //Constructor declared
};

 ***************************************
A::A()   // Constructor definition
{
 i=1;
}
```

Use of constructor:

- main use of constructor is: initializes an object automatically when it is created.

- Suppose you are working on 100's of Person objects and the default value of a data member age is 0. Initializing all objects manually will be a very tedious task.

- Instead, you can define a constructor that initializes age to 0. Then, all you have to do is create a Person object and the constructor will automatically initialize the age.



Example:

With constructor	Without constructor

#include<iostream>
using namespace std;
class Cube
{
public:
int side;
public:
Cube()
 {
  side=10;
 }
};
 	
int main()
{
Cube c;
cout << c.side;
}
	#include<iostream>
	using namespace std;
	class Cube
	{
	public:
	int side;
	public:
	public: void setval(){
	 side=10;
	  }
	};
	
	int main()
	{
	Cube c;
	c.setval();
	cout << c.side;
	}

Types of constructor:

Constructors are of three types :

1. Default Constructor

2. Parameterized Constructor

3. Copy Constructor

Default Constructor

Default constructor is the constructor which doesn't take any argument. It has no parameter.

```
class Cube
{
public:
int side;
public:
Cube()
{
side=10;
}
};
```

```
int main()
{
Cube c;
cout << c.side;
}
```

Parameterized Constructor

- These are the constructors with parameter. Using this Constructor you can provide different values to data members of different objects

```
class Cube
{
 int side;
 public:
 Cube(int x)
  {
   side=x;
  }
};
```

```
int main()
{
 Cube c1(10);
 Cube c2(20);
 Cube c3(30);
 cout << c1.side;
 cout << c2.side;
 cout << c3.side;
}
```

Copy Constructor

These are special type of Constructors which takes an object as argument, and is used to copy values of data members of one object into other object.

```
class Example       {
        int a,b;
    public:
Example(int x,int y)  {
    a=x;
    b=y;
    cout<<"\nIm Constructor";
    }
     void Display()    {
    cout<<"\nValues :"<<a<<"\t"<<b;
    }
};
```

```
int main()               {
        Example Object(10,20);

        //Copy Constructor
        Example Object2=Object;
        Object.Display();
        Object2.Display();
        return 0;
}
```

Destructors

Destructor is a special class function which destroys the object as soon as the scope of object ends.

The destructor is called automatically by the compiler when the object goes out of scope

The **syntax** for destructor is same as that for the constructor, the class name is used for the name of destructor,

with a tilde ~ sign as prefix to it.

Destructor syntax:

```
~ classname();
```

Example

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

class A
{
public:

A()
 {
  cout << "Constructor called \n";
 }

~A()
 {
  cout << "Destructor called\n";
 }
};
```

```
int main()
{
 A obj1;   // Constructor Called

} //  Destructor called for obj1
```

Assignment-2

Write a c++ program to calculate area of rectangle and square using constructor (default) and destructor

Write a c++ program to calculate area of circle using constructor (parameterized) and destructor

Write a c++ program to calculate area of triangle using constructor (copy) and destructor