Constructors of Class

Review: Class and Object

We have made an object of the class with the following code.

```
class student
{
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
```

Review: Class and Object

We have made an object of the class with the following code.

```
class student
{
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
```

Review: Class and Object

This looks like a function Call.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
```

Constructor of the Class

Whenever we create an object with class name and parenthesis, a function is automatically called.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
```

Constructor of the Class

We have not made the function, but C# creates one by default that reserves the memory in heap and sets attributes to the default values.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
```

Constructor of the Class

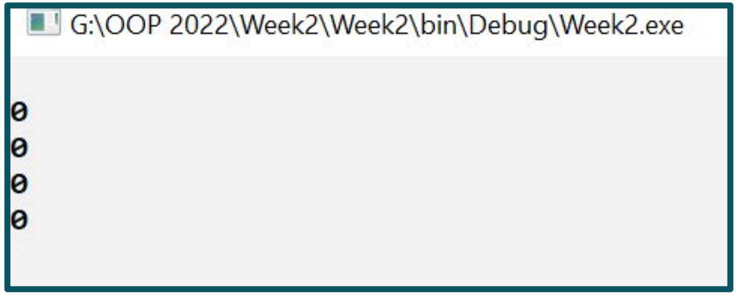
What will be the **Output** if the following lines are executed?

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
Console.WriteLine(s1.sname);
Console.WriteLine(s1.matricMarks);
Console.WriteLine(s1.fscMarks);
Console.WriteLine(s1.ecatMarks);
Console.WriteLine(s1.aggregate);
Console.Read();
```

Constructor of the Class

Output is:



G:\OOP 2022\Week2\Week2\bin\Debug\Week2.exe

```

0
0
0
0
```

```
class student
{
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
Console.WriteLine(s1.sname);
Console.WriteLine(s1.matricMarks);
Console.WriteLine(s1.fscMarks);
Console.WriteLine(s1.ecatMarks);
Console.WriteLine(s1.aggregate);
Console.Read();
```

Constructor of the Class

The Constructor that was called is known as Default Constructor because it is called by default.

```
class student
{
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
```

Constructor of the Class

We can also choose which default values we want to give to the attributes.

```
class student
{
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
```

Constructor of the Class

For that we have to specifically write the default constructor in the class.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
```

Constructor of the Class

To create a default constructor, we use the same name as the class, followed by parentheses ()

```
class student
{
   public student()
    {
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
```

Constructor of the Class

The constructor has the same name as the class, it is always public, and it does not have any return type.

```
class student
{
   public student()
    {
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
```

Constructor of the Class

Following code prints on the console “Default Constructor Called” because the constructor student() is automatically called.

```
class student
{
   public student()
    {
      Console.WriteLine("Default Constructor Called");
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

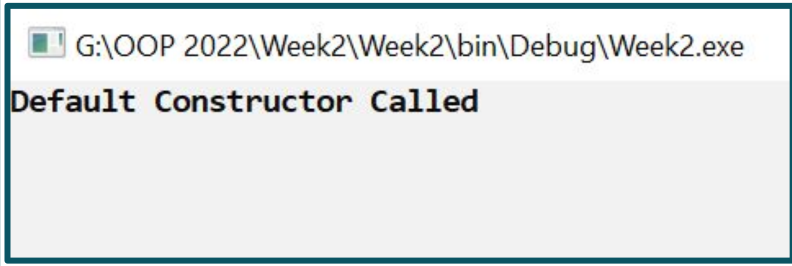
```
student s1 = new student();
Console.Read();
```

Constructor of the Class

Following code prints on the console "Default Constructor Called" because the constructor student() is automatically called.

```
class student
{
   public student()
    {
      Console.WriteLine("Default Constructor Called");
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
Console.Read();
```



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```
Default Constructor Called
```

Constructor of the Class

Now, We can use the constructor function to initialize any attributes of the class for the instance that is being created.

```
class student
{
   public student()
    {
      Console.WriteLine("Default Constructor Called");
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
Console.Read();
```

Constructor of the Class

It means whenever the object is created its sname will be set to "Jill".

```
class student
{
   public student()
    {
      sname = "Jill";
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
Console.Read();
```

Constructor of the Class

We can check it by printing the value on the screen. The Console.Write() statement will print Jill on the screen.

```
class student
{
   public student()
    {
      sname = "Jill";
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

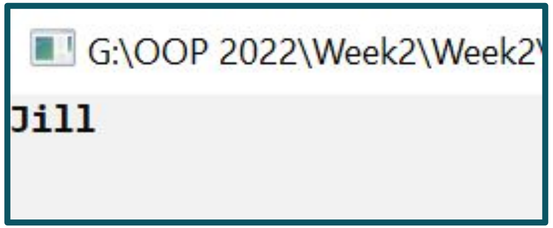
```
student s1 = new student();
Console.Write(s1.sname);
Console.Read();
```

Constructor of the Class

We can check it by printing the value on the screen. The Console.Write() statement will print Jill on the screen.

```
class student
{
   public student()
    {
      sname = "Jill";
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
Console.Write(s1.sname);
Console.Read();
```



```
Jill
```

Constructor of the Class

This will initialize sname as Jill for all objects that we will create.

```
class student
{
   public student()
    {
      sname = "Jill";
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
Console.WriteLine(s1.sname);
student s2 = new student();
Console.WriteLine(s2.sname);
Console.Read();
```

Constructor of the Class

What if we want to initialize different name using the same constructor?

```
class student
{
   public student()
    {
      sname = "Jill";
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
Console.WriteLine(s1.sname);
student s2 = new student();
Console.WriteLine(s2.sname);
Console.Read();
```

Constructor with Parameters

We can create constructors that can have different parameters.

```
class student
{
   public student()
    {
      sname = "Jill";
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
Console.WriteLine(s1.sname);
student s2 = new student();
Console.WriteLine(s2.sname);
Console.Read();
```

Constructor with Parameters

We can create constructors that can have different parameters. For example, the following constructor takes name as parameter.

```
class student
{
   public student(string n)
    {
      sname = n;
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

Constructor with Parameters

We can create constructors that can have different parameters. For example, the following constructor takes name as parameter.

```
class student
{
   public student(string n)
    {
      sname = n;
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

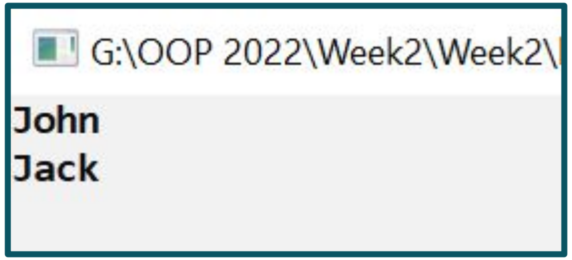
```
student s1 = new student(“John”);
Console.WriteLine(s1.sname);
student s2 = new student(“Jack”);
Console.WriteLine(s2.sname);
Console.Read();
```

Constructor with Parameters

We can create constructors that can have different parameters. For example, the following constructor takes name as parameter.

```
class student
{
   public student(string n)
    {
      sname = n;
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student("John");
Console.WriteLine(s1.sname);
student s2 = new student("Jack");
Console.WriteLine(s2.sname);
Console.Read();
```



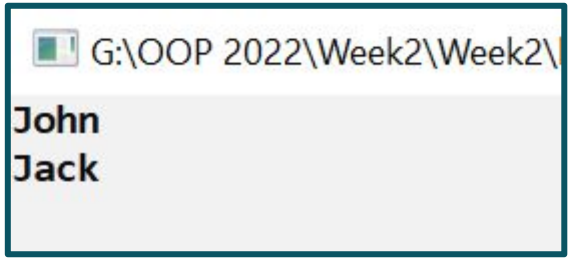
```
G:\OOP 2022\Week2\Week2\
John
Jack
```

Constructor with Parameters

Now, we need to pass name as argument, otherwise we will not be able to create the object of the class.

```
class student
{
   public student(string n)
    {
      sname = n;
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student("John");
Console.WriteLine(s1.sname);
student s2 = new student("Jack");
Console.WriteLine(s2.sname);
Console.Read();
```



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```
John
Jack
```

Constructor with Parameters

Following code contains an error because we are trying to create an object with default constructor that does not exist any more.

```
class student
{
   public student(string n)
    {
      sname = n;
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
Console.WriteLine(s1.sname);
student s2 = new student();
Console.WriteLine(s2.sname);
Console.Read();
```

Constructor with Parameters

Now we can only create an object of the class by passing a name to the constructor.

```
class student
{
   public student(string n)
    {
      sname = n;
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student("John");
Console.WriteLine(s1.sname);
student s2 = new student("Jack");
Console.WriteLine(s2.sname);
Console.Read();
```

Constructor with Parameters

But if we want to call the default constructor as well then we have to give the definition of it as well.

```
class student
{
   public student(string n)
    {
      sname = n;
    }
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

Constructor with Parameters

But if we want to call the default constructor as well then we have to give the definition of it as well.

```
class student
{
   public student()
   {
      sname = "Jill";
   }
  public student(string n)
   {
      sname = n;
   }
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

Constructor with Parameters

But if we want to call the default constructor as well then we have to give the definition of it as well.

```
class student
{
   public student()
   {
      sname = “Jill”;
   }
  public student(string n)
   {
      sname = n;
   }
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

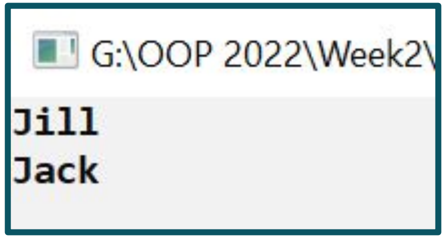
```
student s1 = new student();
Console.WriteLine(s1.sname);
student s2 = new student(“Jack”);
Console.WriteLine(s2.sname);
Console.Read();
```

Constructor with Parameters

But if we want to call the default constructor as well then we have to give the definition of it as well.

```
class student
{
    public student()
    {
      sname = "Jill";
    }
   public student(string n)
    {
      sname = n;
    }
    public string sname;
    public float matricMarks;
    public float fscMarks;
    public float ecatMarks;
    public float aggregate;
}
```

```
student s1 = new student();
Console.WriteLine(s1.sname);
student s2 = new student("Jack");
Console.WriteLine(s2.sname);
Console.Read();
```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```
Jill
Jack
```

Constructor with any No. of Parameters

We can extend the constructor so it can take any number of parameters.

```
class student
{
   public student()
   {
      sname = "Jill";
   }
  public student(string n, float m)
   {
      sname = n;
      matricMarks = m;
   }
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

Constructor with any No. of Parameters

This constructor is expecting two arguments to be passed when object is created otherwise it will give an error message.

```
class student
{
   public student()
   {
      sname = "Jill";
   }
   public student(string n, float m)
   {
      sname = n;
      matricMarks = m;
   }
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

Constructor with any No. of Parameters

This constructor is expecting two arguments to be passed when object is created otherwise it will give an error message.

```
class student
{
   public student()
   {
      sname = “Jill”;
   }
   public student(string n, float m)
   {
      sname = n;
      matricMarks = m;
   }
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student("Jack", 3F);
Console.WriteLine(s1.sname);
Console.WriteLine(s1.matricMarks);
Console.Read();
```

Copy Constructor

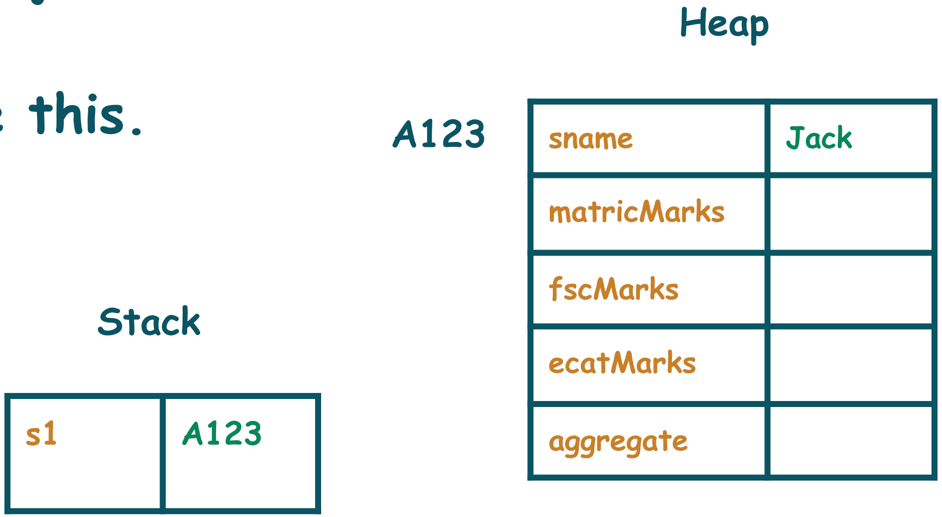
Right now, we are initializing the attributes of an object using the Constructor (Default or Parameterized). There is another Constructor called Copy Constructor that creates a new object (separate memory on heap) by copying variables from another object.

Why we need Copy Constructor

Suppose, we copy s1 into s2 like this.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
s1.sname = "Jack";
Console.Read();
```

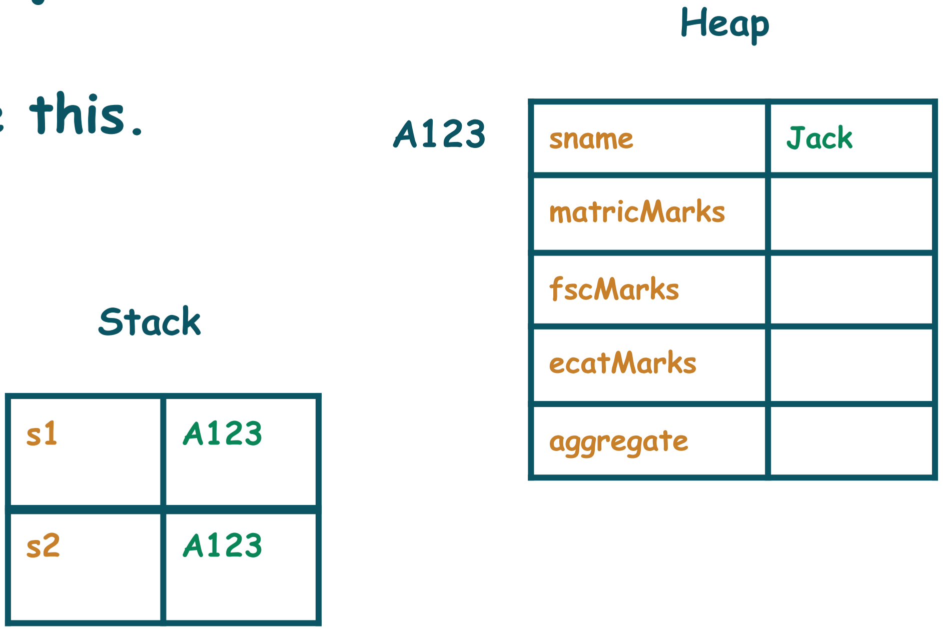


Why we need Copy Constructor

Suppose, we copy s1 into s2 like this.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
s1.sname = "Jack";
Student s2 = s1;
Console.WriteLine(s2.sname);
Console.Read();
```



s1	A123
s2	A123

sname	Jack
matricMarks	
fscMarks	
ecatMarks	
aggregate	

Why we need Copy Constructor

Suppose, we copy s1 into s2 like this.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
s1.sname = "Jack";
Student s2 = s1;
Console.WriteLine(s2.sname);
Console.Read();
```

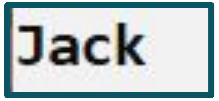
Stack

s1	A123
s2	A123

Heap

A123

sname	Jack
matricMarks	
fscMarks	
ecatMarks	
aggregate	



```
Jack
```

Why we need Copy Constructor

Heap

Suppose, we copy s1 into s2 like this.

A123

sname	Jill
matricMarks	
fscMarks	
ecatMarks	
aggregate	

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

Stack

s1	A123
s2	A123

```
student s1 = new student();
s1.sname = “Jack”;
Student s2 = s1;
Console.WriteLine(s2.sname);
s2.sname = "Jill";
Console.WriteLine(s1.sname);
Console.Read();
```

Why we need Copy Constructor

Suppose, we copy s1 into s2 like this.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
s1.sname = "Jack";
Student s2 = s1;
Console.WriteLine(s2.sname);
s2.sname = "Jill";
Console.WriteLine(s1.sname);
Console.Read();
```

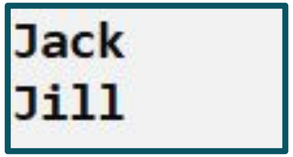
Stack

s1	A123
s2	A123

Heap

A123

sname	Jill
matricMarks	
fscMarks	
ecatMarks	
aggregate	



```
Jack
Jill
```

Why we need Copy Constructor

It means this is a Shallow Copy pointing to the same location.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
s1.sname = “Jack”;
Student s2 = s1;
Console.WriteLine(s2.sname);
s2.sname = "Jill";
Console.WriteLine(s1.sname);
Console.Read();
```

Stack

s1	A123
s2	A123

Heap

A123

sname	Jill
matricMarks	
fscMarks	
ecatMarks	
aggregate	

```
Jack
Jill
```

Working Example

Let's solve a working Example First.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
student s2 = new student();
s1.sname = “A”;
s2.sname = “B”;
s2 = s1;
s2.sname = "C";
Console.WriteLine(s1.sname);
Console.Read();
```

Working Example

Let's solve a working Example First.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
student s2 = new student();
s1.sname = "A";
s2.sname = "B";
s2 = s1;
s2.sname = "C";
Console.WriteLine(s1.sname);
Console.Read();
```

Stack

s1	A123
s2	A140

Heap

A123

sname	
matricMarks	
fscMarks	
ecatMarks	
aggregate	

A140

sname	
matricMarks	
fscMarks	
ecatMarks	
aggregate	

Working Example

Let's solve a working Example First.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
student s2 = new student();
s1.sname = "A";
s2.sname = "B";
s2 = s1;
s2.sname = "C";
Console.WriteLine(s1.sname);
Console.Read();
```

Stack

s1	A123
s2	A140

Heap

A123

sname	A
matricMarks	
fscMarks	
ecatMarks	
aggregate	

A140

sname	B
matricMarks	
fscMarks	
ecatMarks	
aggregate	

Working Example

Let's solve a working Example First.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
student s2 = new student();
s1.sname = "A";
s2.sname = "B";
s2 = s1;
s2.sname = "C";
Console.WriteLine(s1.sname);
Console.Read();
```

Stack

s1	A123
s2	A123

Heap

A123

sname	A
matricMarks	
fscMarks	
ecatMarks	
aggregate	

A140

sname	B
matricMarks	
fscMarks	
ecatMarks	
aggregate	

Working Example

Let's solve a working Example First.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
student s2 = new student();
s1.sname = "A";
s2.sname = "B";
s2 = s1;
s2.sname = "C";
Console.WriteLine(s1.sname);
Console.Read();
```

Stack

s1	A123
s2	A123

Heap

A123

sname	C
matricMarks	
fscMarks	
ecatMarks	
aggregate	

A140

sname	B
matricMarks	
fscMarks	
ecatMarks	
aggregate	

Working Example

Let's solve a working Example First.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
student s2 = new student();
s1.sname = "A";
s2.sname = "B";
s2 = s1;
s2.sname = "C";
Console.WriteLine(s1.sname);
Console.Read();
```

Stack

s1	A123
s2	A123

Heap

A123

sname	C
matricMarks	
fscMarks	
ecatMarks	
aggregate	

A140

sname	B
matricMarks	
fscMarks	
ecatMarks	
aggregate	

This will print C on Console

Working Example

Let's solve a working Example First.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
student s2 = new student();
s1.sname = "A";
s2.sname = "B";
s2 = s1;
s2.sname = "C";
Console.WriteLine(s1.sname);
Console.Read();
```

Stack

s1	A123
s2	A123

Now, the reference to A140 memory is lost

Heap

A123

sname	C
matricMarks	
fscMarks	
ecatMarks	
aggregate	

A140

sname	B
matricMarks	
fscMarks	
ecatMarks	
aggregate	

Working Example

Let's solve a working Example First.

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
student s2 = new student();
s1.sname = "A";
s2.sname = "B";
s2 = s1;
s2.sname = "C";
Console.WriteLine(s1.sname);
Console.Read();
```

Stack

s1	A123
s2	A123

Heap

A123

sname	C
matricMarks	
fscMarks	
ecatMarks	
aggregate	

A140

sname	B
matricMarks	
fscMarks	
ecatMarks	
aggregate	

Garbage Collector is a program that automatically runs and free the memory of the object that cannot be referenced.

Coming Back: Why we need Copy Constructor?

We want to create two separate objects; but in this way, new object is not created. So what to Do ?

```
class student
{
   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
s1.sname = “Jack”;
Student s2 = s1;
Console.WriteLine(s1.sname);
s2.sname = "Jill";
Console.WriteLine(s1.sname);
Console.Read();
```

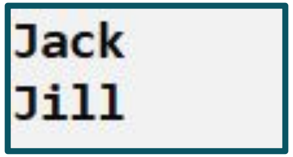
Stack

s1	A123
s2	A123

Heap

A123

sname	Jill
matricMarks	
fscMarks	
ecatMarks	
aggregate	



```
Jack
Jill
```

Copy Constructor

In the Copy Constructor we have to pass a complete object.

```
class student
{
   public student()
   {
      Console.WriteLine("Default Constructor");
   }
   public student(student s)              //Copy Constructor
   {
      sname = s.sname;
      matricMarks = s.matricMarks;
      fscMarks = s.fscMarks;
      ecatMarks = s.ecatMarks;
      aggregate = s.aggregate;
   }

   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

Copy Constructor

In the Copy Constructor we have to pass a complete object.

```
class student
{
   public student()
   {
      Console.WriteLine("Default Constructor");
   }
   public student(student s)              //Copy Constructor
   {
      sname = s.sname;
      matricMarks = s.matricMarks;
      fscMarks = s.fscMarks;
      ecatMarks = s.ecatMarks;
      aggregate = s.aggregate;
   }

   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

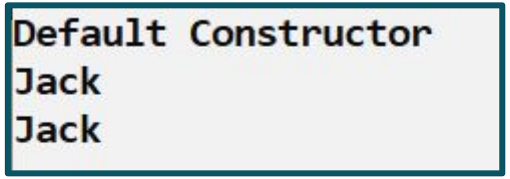
```
student s1 = new student();
s1.sname = "Jack";
student s2 = new student(s1);
Console.WriteLine(s1.sname);
Console.WriteLine(s2.sname);
```

Copy Constructor

In the Copy Constructor we have to pass a complete object.

```
class student
{
   public student()
   {
      Console.WriteLine("Default Constructor");
   }
   public student(student s)              //Copy Constructor
   {
      sname = s.sname;
      matricMarks = s.matricMarks;
      fscMarks = s.fscMarks;
      ecatMarks = s.ecatMarks;
      aggregate = s.aggregate;
   }

   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
s1.sname = "Jack";
student s2 = new student(s1);
Console.WriteLine(s1.sname);
Console.WriteLine(s2.sname);
```



```
Default Constructor
Jack
Jack
```

Copy Constructor

In the **Copy Constructor** we have to pass a complete object.

```
class student
{
   public student()
   {
      Console.WriteLine("Default Constructor");
   }
   public student(student s)               //Copy Constructor
   {
      sname = s.sname;
      matricMarks = s.matricMarks;
      fscMarks = s.fscMarks;
      ecatMarks = s.ecatMarks;
      aggregate = s.aggregate;
   }

   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
s1.sname = "Jack";
student s2 = new student(s1);
Console.WriteLine(s1.sname);
Console.WriteLine(s2.sname);
s1 = "Jill";
Console.WriteLine(s1.sname);
Console.WriteLine(s2.sname);
```

Copy Constructor

In the **Copy Constructor** we have to pass a complete object.

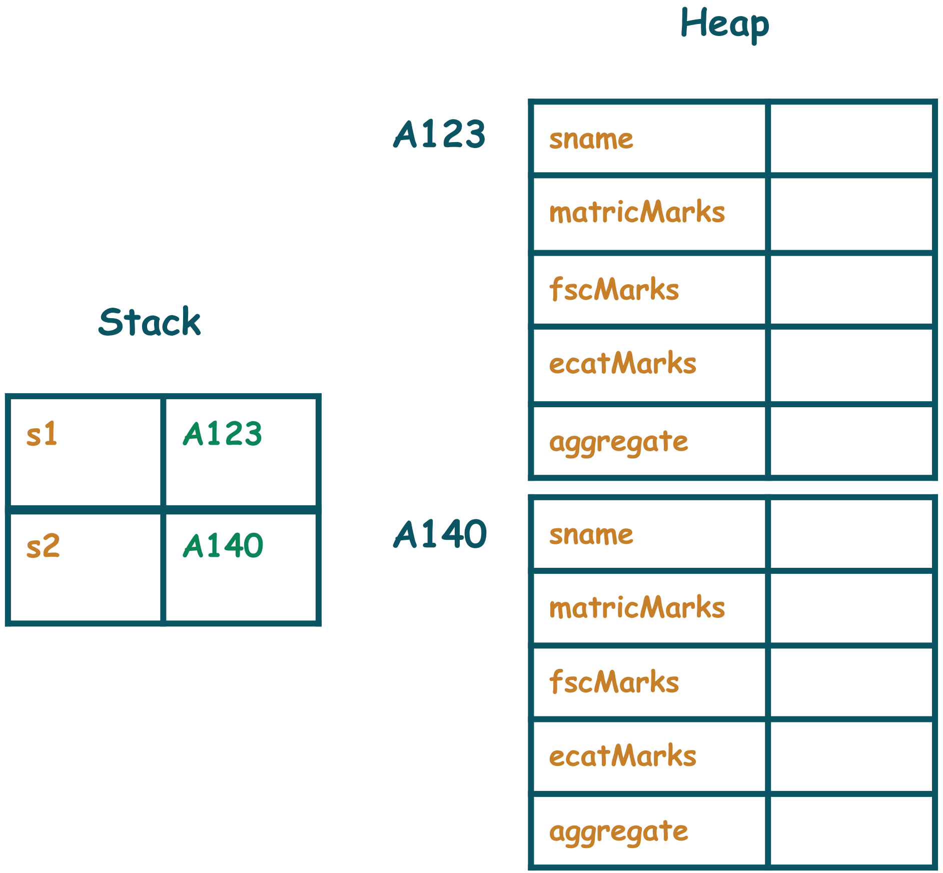
```
class student
{
   public student()
   {
      Console.WriteLine(“Default Constructor”);
   }
   public student(student s)            //Copy Constructor
   {
      sname = s.sname;
      matricMarks = s.matricMarks;
      fscMarks = s.fscMarks;
      ecatMarks = s.ecatMarks;
      aggregate = s.aggregate;
   }

   public string sname;
   public float matricMarks;
   public float fscMarks;
   public float ecatMarks;
   public float aggregate;
}
```

```
student s1 = new student();
s1.sname = “Jack”;
student s2 = new student(s1);
Console.WriteLine(s1.sname);
Console.WriteLine(s2.sname);
s1 = “Jill”;
Console.WriteLine(s1.sname);
Console.WriteLine(s2.sname);
```

```
Default Constructor
Jack
Jack
Jill
Jack
```

Copy Constructor

Important thing to note is that copy constructor makes a new object in the memory, therefore separate memory is allocated to the new object.
This is what we call a Deep Copy.
Do not make the copies of the object unless it is highly needed.



Conclusion

- Whenever we create an object of a class a constructor function is called automatically.
- Constructor function without any parameters is called default constructor.
- To create a default constructor, we use the same name as the class, followed by parentheses ()
- The constructor has the same name as the class, it is always public, and it does not have any return type.
- We can also pass multiple parameters to a constructor when an object is being created.
- Copy Constructor copies the data of one object into another object

Learning Objective

Explain Role of the Constructors and Memory Representation of the objects.

Self Assessment: Class and Objects

1. Make following Class in C# for Circle.

- Two data members:

1. radius (of the type double)
2. color (of the type String).

- Make Three constructors:

1. One with default constructor with default value of 1.0 and "red", respectively.
2. One Constructor that takes only the radius as parameter
3. And Another constructor which takes radius and color.

- Make a Copy Constructor to make a deep copy