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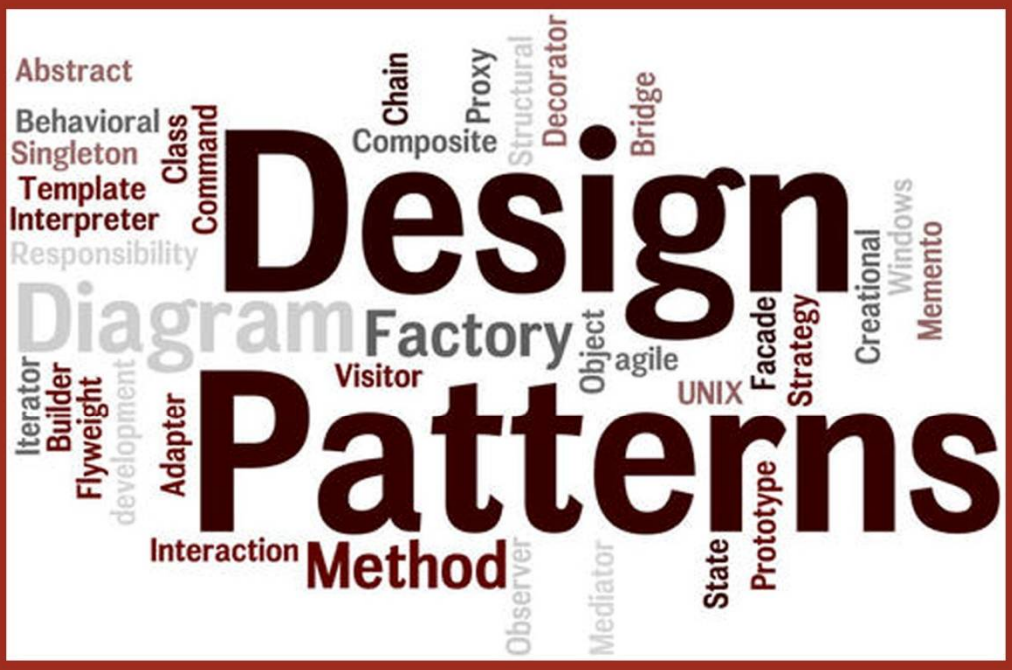
Design Patterns

Core Level Design Patterns

7. Prototype Design Pattern



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Prototype Design Pattern

The prototype means making a clone. This implies cloning of an object to avoid creation. If the cost of creating a new object is large and creation is resource intensive, we clone the object. We use the interface Cloneable and call its method clone() to clone the object.

Problem: If you create a new object in regular manner based on the existing objects & its data then it gives much burden to JVM because the new object has to fulfill all the formalities of object creation from scratch level including **constructor execution** also.

Solution: Use Prototype design pattern, Which says create a new object through cloning process which reduces burden on JVM by avoiding some formalities of object creation like constructor execution.

> **Note:** While creating java class object through cloning process the constructor will not be executed in order to avoid the initialization again by the programmer.

Usage:

When creating an object is time consuming and a costly affair and you already have a most similar object instance in hand, then you go for prototype pattern. Instead of going through a time consuming process to create a complex object, just copy the existing similar object and modify it according to your needs.

Rules to Follow To perform Cloning on Java Class Object: You can make a copy of any Java object using the clone method.

E.g. JObj j1 = (JObj)j0.clone();

The clone method always returns an object declared to have a return type of Object. Thus you must cast it to the actual type of the object that you are cloning. Three other significant Restrictions apply to this method:

- ✓ It is a protected method and can be called only from within the same class or a subclass.
- ✓ You can clone only objects that are declared to implement the Cloneable interface. All arrays are considered to implement the Cloneable interface.
- ✓ Any object whose class is Object does not implement Cloneable and throws the CloneNotSupported Exception.

Sample Code

```
// PrototypeTest.java
import java.lang.*;
class Test implements Cloneable
{
   int x;
   String s;
   public Test(int y,String r)
   {
   this.x=y;
   this.s=r;
   System.out.println("Test: 2- arg Constructor");
   }
```

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```
    public Object clone()
    {
        try
        {
            //ProtoType Pattern Logic
            return super.clone();
        }
        catch(Exception e)
        {
            e.printStackTrace();
            return null;
        }
    }
    //Normal method to display Values
    public String display()
    {
    return "Value of X ="+x+" & S ="+s;
    }
}
public class PrototypeTest
{
    public static void main(String[] args) throws Exception
```

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```
{
        Test t1=new Test(10,"Durga");// Object creation in Normal Way
        System.out.println("Hadscode of T1 Object is : "+t1.hashCode());
        System.out.println(t1.display());
        Test t2=(Test)t1.clone();// Object through Cloning Process
        System.out.println("Hadscode of T2 Object is : "+t2.hashCode());
        System.out.println(t2.display());

        //do some modifications
        System.out.println("After Performing Modifications:");
```

```
        t1.x=20;
        System.out.println(t1.display());
        System.out.println(t2.display());
    }
}
```

Output

```
C:\Design patterns\Programs\Prototype>javac PrototypeTest.java
C:\Design patterns\Programs\Prototype>java PrototypeTest
Test: 2- arg Constructor
Hadscode of T1 Object is : 1671711
Value of X =10 & S =Durga

Hadscode of T2 Object is : 11394033
Value of X =10 & S =Durga
After Performing Modifications:
Value of X =20 & S =Durga
Value of X =10 & S =Durga
```

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