Design Patterns Tutorial

Design Patterns - Flyweight Pattern

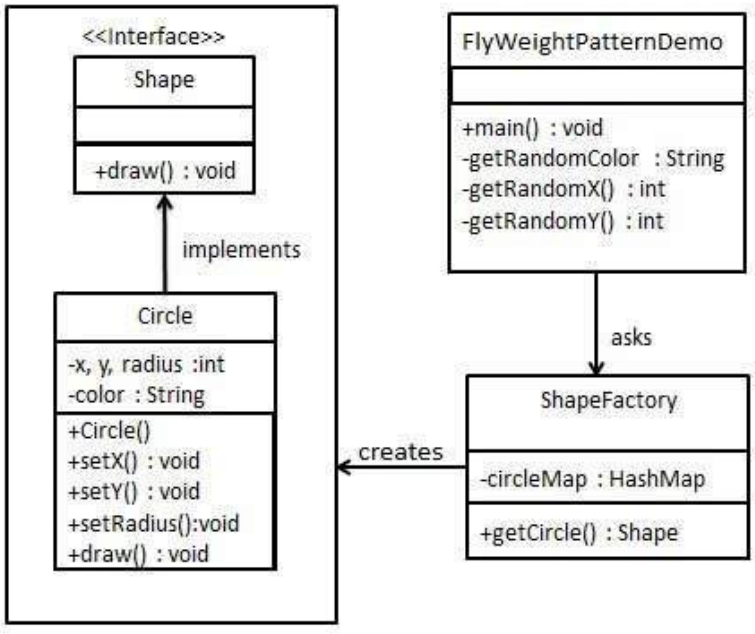
Flyweight pattern tries to reuse already existing similar kind objects by storing them and create new object when no matching object is found. We will demonstrate this pattern by drawing 2 circles of different locations but we will create only 5 objects. Only 5 colors are available so colo property is used to check already existing *Circle* objects.

Implementation

We are going to create a *Shape* interface and concrete class *Circle* implementing the *Shap* interface. A factory class *ShapeFactory* is defined as a next step.

ShapeFactory has a *HashMap* of *Circle* having key as color of the *Circle* object. Whenever a reque comes to create a circle of particular color to *ShapeFactory*, it checks the circle object in i *HashMap*, if object of *Circle* found, that object is returned otherwise a new object is created, store in hashmap for future use, and returned to client.

FlyWeightPatternDemo, our demo class, will use *ShapeFactory* to get a *Shape* object. It will pas information (*red / green / blue/ black / white*) to *ShapeFactory* to get the circle of desired color needs.



Step 1

Create an interface.

Shape.java

```
public interface Shape {
   void draw();
```

Create concrete class implementing the same interface.

Circle.java

```
public class Circle implements Shape {
   private String color;
   private int x;
   private int y;
   private int radius;

   public Circle(String color){
      this.color = color;
   }

   public void setX(int x) {
      this.x = x;
   }

   public void setY(int y) {
      this.y = y;
   }

   public void setRadius(int radius) {
      this.radius = radius;
   }

   @Override
   public void draw() {
      System.out.println("Circle: Draw() [Color : " + color + ", x : " + x + ", y :" + y + ", radius :" + radius)
   }
}
```

Step 3

Create a factory to generate object of concrete class based on given information.

ShapeFactory.java

```
import java.util.HashMap;

public class ShapeFactory {
   private static final HashMap<String, Shape> circleMap = new HashMap();

   public static Shape getCircle(String color) {
      Circle circle = (Circle)circleMap.get(color);

      if(circle == null) {
         circle = new Circle(color);
         circleMap.put(color, circle);
         System.out.println("Creating circle of color : " + color);
      }
      return circle;
   }
}
```

Step 4

```
public class FlyweightPatternDemo {
   private static final String colors[] = { "Red", "Green", "Blue", "White", "Black" };
   public static void main(String[] args) {

      for(int i=0; i < 20; ++i) {
         Circle circle = (Circle)ShapeFactory.getCircle(getRandomColor());
         circle.setX(getRandomX());
         circle.setY(getRandomY());
         circle.setRadius(100);
         circle.draw();
      }
   }
   private static String getRandomColor() {
      return colors[(int)(Math.random()*colors.length)];
   }
   private static int getRandomX() {
      return (int)(Math.random()*100 );
   }
   private static int getRandomY() {
      return (int)(Math.random()*100);
   }
}
```

Step 5

Verify the output.

```
Creating circle of color : Black
Circle: Draw() [Color : Black, x : 36, y :71, radius :100
Creating circle of color : Green
Circle: Draw() [Color : Green, x : 27, y :27, radius :100
Creating circle of color : White
Circle: Draw() [Color : White, x : 64, y :10, radius :100
Creating circle of color : Red
Circle: Draw() [Color : Red, x : 15, y :44, radius :100
Circle: Draw() [Color : Green, x : 19, y :10, radius :100
Circle: Draw() [Color : Green, x : 94, y :32, radius :100
Circle: Draw() [Color : White, x : 69, y :98, radius :100
Creating circle of color : Blue
Circle: Draw() [Color : Blue, x : 13, y :4, radius :100
Circle: Draw() [Color : Green, x : 21, y :21, radius :100
Circle: Draw() [Color : Blue, x : 55, y :86, radius :100
Circle: Draw() [Color : White, x : 90, y :70, radius :100
Circle: Draw() [Color : Green, x : 78, y :3, radius :100
Circle: Draw() [Color : Green, x : 64, y :89, radius :100
Circle: Draw() [Color : Blue, x : 3, y :91, radius :100
Circle: Draw() [Color : Blue, x : 62, y :82, radius :100
Circle: Draw() [Color : Green, x : 97, y :61, radius :100
Circle: Draw() [Color : Green, x : 86, y :12, radius :100
Circle: Draw() [Color : Green, x : 38, y :93, radius :100
```

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