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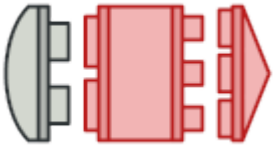

Adapter in Java

Adapter is a structural design pattern, which allows incompatible objects to collaborate.

The Adapter acts as a wrapper between two objects. It catches calls for one object and transforms them to format and interface recognizable by the second object.

Learn more about Adapter →

Navigation

Complexity: ★☆☆

Popularity: ★★★

systems based on some legacy code. In such cases, Adapters make legacy code work with modern classes.

There are some standard Adapters in Java core libraries:

- `java.util.Arrays#asList()`
- `java.util.Collections#list()`
- `java.util.Collections#enumeration()`
- `java.io.InputStreamReader(InputStream)` (returns a `Reader` object)
- `java.io.OutputStreamWriter(OutputStream)` (returns a `Writer` object)
- `javax.xml.bind.annotation.adapters.XmlAdapter#marshal()` and `#unmarshal()`

Identification: Adapter is recognizable by a constructor which takes an instance of a different abstract/interface type. When the adapter receives a call to any of its methods, it translates parameters to the appropriate format and then directs the call to one or several methods of the wrapped object.

Fitting square pegs into round holes

This simple example shows how an Adapter can make incompatible objects work together.

round

round/RoundHole.java: Round holes

```
package refactoring_guru.adapter.example.round;

/**
 * RoundHoles are compatible with RoundPegs.
 */
public class RoundHole {
    private double radius;

    public RoundHole(double radius) {
        this.radius = radius;
    }

    public double getRadius() {
        return radius;
    }
```

SPRING SALE

```
        boolean result;
        result = (this.getRadius() >= peg.getRadius());
        return result;
    }
}
```

round/RoundPeg.java: Round pegs

```
package refactoring_guru.adapter.example.round;

/**
 * RoundPegs are compatible with RoundHoles.
 */
public class RoundPeg {
    private double radius;

    public RoundPeg() {}

    public RoundPeg(double radius) {
        this.radius = radius;
    }

    public double getRadius() {
        return radius;
    }
}
```

square

square/SquarePeg.java: Square pegs

```
package refactoring_guru.adapter.example.square;

/**
 * SquarePegs are not compatible with RoundHoles (they were implemented by
 * previous development team). But we have to integrate them into our program.
 */
public class SquarePeg {
    private double width;

    public SquarePeg(double width) {
        this.width = width;
    }
```

SPRING SALE

```
        return width;
    }

    public double getSquare() {
        double result;
        result = Math.pow(this.width, 2);
        return result;
    }
}
```

adapters

adapters/SquarePegAdapter.java: Adapter of square pegs to round holes

```
package refactoring_guru.adapter.example.adapters;

import refactoring_guru.adapter.example.round.RoundPeg;
import refactoring_guru.adapter.example.square.SquarePeg;

/**
 * Adapter allows fitting square pegs into round holes.
 */
public class SquarePegAdapter extends RoundPeg {
    private SquarePeg peg;

    public SquarePegAdapter(SquarePeg peg) {
        this.peg = peg;
    }

    @Override
    public double getRadius() {
        double result;
        // Calculate a minimum circle radius, which can fit this peg.
        result = (Math.sqrt(Math.pow((peg.getWidth() / 2), 2) * 2));
        return result;
    }
}
```

Demo.java: Client code

```
package refactoring_guru.adapter.example;

import refactoring_guru.adapter.example.adapters.SquarePegAdapter;
```

SPRING SALE

```
import refactoring_guru.adapter.example.square.SquarePeg;

/**
 * Somewhere in client code...
 */
public class Demo {
    public static void main(String[] args) {
        // Round fits round, no surprise.
        RoundHole hole = new RoundHole(5);
        RoundPeg rpeg = new RoundPeg(5);
        if (hole.fits(rpeg)) {
            System.out.println("Round peg r5 fits round hole r5.");
        }

        SquarePeg smallSqPeg = new SquarePeg(2);
        SquarePeg largeSqPeg = new SquarePeg(20);
        // hole.fits(smallSqPeg); // Won't compile.

        // Adapter solves the problem.
        SquarePegAdapter smallSqPegAdapter = new SquarePegAdapter(smallSqPeg);
        SquarePegAdapter largeSqPegAdapter = new SquarePegAdapter(largeSqPeg);
        if (hole.fits(smallSqPegAdapter)) {
            System.out.println("Square peg w2 fits round hole r5.");
        }
        if (!hole.fits(largeSqPegAdapter)) {
            System.out.println("Square peg w20 does not fit into round hole r5.");
        }
    }
}
```

OutputDemo.txt: Execution result

```
Round peg r5 fits round hole r5.
Square peg w2 fits round hole r5.
Square peg w20 does not fit into round hole r5.
```

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Home

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