Visitor Pattern

객체 구조를 돌아다니면서 동일한 조작을 반복해서 적용하기. 이 때, '객체 구조'와 '처리(Algorithm)'을 분리하는 것이 핵심. 개방-폐쇄 원칙(OCP, Open-Closed Principle)[(기존 클래스를 수정하지 않고 확장할 수 있도록 하는 것. https://ko.wikipedia.org/wiki/%EA%B0%9C%EB%B0%A9-%ED%8F%90%EC%87%84_%EC%9B%90%EC%B9%99)]을 적용한 방법중 하나.

- 언제 사용하는가?
  - 데이터 구조 안에 많은 요소가 저장되어 있고, 그 각 요소에 대해서 다른 종류의 처리(Algorithm)가 필요한 경우
  - 이로써 얻는 이점으로 객체 구조와 처리 역할을 독립적으로 확장 가능!

Architecture, Modeling, DesignPattern, Behavioral

시나리오

- composite pattern의 예제인 "파일 시스템"을 객체 구조(Element, ObjectStructure)로 이용. 여기서 처리 알고리즘을 분리시킨다.

Visitor

Method Overloading을 이용하여 각각의 처리할 Logic 수행하는 역할.

```
package visitor;

import element.objectstructure.concrete.Directory;
import element.objectstructure.concrete.File;

public abstract class Visitor {
    public abstract void visit(File file);
    public abstract void visit(Directory directory);
}
```

```
package visitor.concrete;

import java.util.Iterator;

import element.objectstructure.Entry;
import element.objectstructure.concrete.Directory;
import element.objectstructure.concrete.File;
import visitor.Visitor;

public class ListVisitor extends Visitor {
```

```
    private String currentDirectoryName = "";
    @Override
    public void visit(File file) {
        System.out.println(currentDirectoryName + " / " + file);
    }

    @Override
    public void visit(Directory directory) {
        System.out.println(currentDirectoryName + " / " + directory);
        String tempDirectoryName = currentDirectoryName;
        currentDirectoryName = new
StringBuilder(currentDirectoryName).append("/").append(directory.getName()).
toString();
        Iterator<Entry> it = directory.iterator();
        while(it.hasNext()) {
            it.next().accept(this);
        }
        currentDirectoryName = tempDirectoryName;
    }
}
```

Element

방문할 객체를 지정하는 역할. accept()로 요청하여 객체 각각의 처리 Logic 수행.

```
package element;

import visitor.Visitor;

public interface Element {
    void accept(Visitor visitor);
}
```

```
package element.objectstructure;

import java.util.Iterator;

import element.Element;
import element.objectstructure.exception.FileTreatmentException;

public abstract class Entry implements Element {
    public abstract String getName();
    public abstract int getSize();
    /* Directory에서만 유효 */
    public Entry add(Entry entry) throws FileTreatmentException {
```

```
        throw new FileTreatmentException();
    }
  /* 객체 구조의 각 요소에 특정한 처리를 실행하는 데 필요 */
    /* Directory에서만 유효 */
    public Iterator<Entry> iterator() throws FileTreatmentException {
        throw new FileTreatmentException();
    }
    @Override
    public String toString() {
        StringBuilder sb = new StringBuilder();
        sb.append(getName());
        sb.append(" (");
        sb.append(getSize());
        sb.append(") ");
        return sb.toString();
    }
}
```

```
package element.objectstructure.concrete;

import element.objectstructure.Entry;
import visitor.Visitor;

public class File extends Entry {

    private String name;
    private int size;
    public File(String name, int size) {
        this.name = name;
        this.size = size;
    }
    @Override
    public void accept(Visitor visitor) {
        visitor.visit(this);
    }

    @Override
    public String getName() {
        return name;
    }

    @Override
    public int getSize() {
        return size;
    }

}
```

```
package element.objectstructure.concrete;

import java.util.ArrayList;
import java.util.Iterator;

import element.objectstructure.Entry;
import element.objectstructure.exception.FileTreatmentException;
import visitor.Visitor;

public class Directory extends Entry {

    private String name;
    private ArrayList<Entry> directories = new ArrayList<>();
    public Directory(String name) {
        this.name = name;
    }

    @Override
    public void accept(Visitor visitor) {
        visitor.visit(this);
    }

    @Override
    public String getName() {
        return name;
    }

    @Override
    public int getSize() {
        return directories.size();
    }
    @Override
    public Entry add(Entry entry) throws FileTreatmentException {
        directories.add(entry);
        return this;
    }
    @Override
    public Iterator<Entry> iterator() throws FileTreatmentException {
        return directories.iterator();
    }
}
```

```
package element.objectstructure.exception;

public class FileTreatmentException extends RuntimeException {
    public FileTreatmentException() {
    }
    public FileTreatmentException(String message) {
        super(message);
```

```
    }
}
```

Client

```
import element.objectstructure.concrete.Directory;
import element.objectstructure.concrete.File;
import visitor.concrete.ListVisitor;

public class Client {
    public static void main(String[] args) {
        Directory rootdir = new Directory("root");
        Directory bindir = new Directory("bin");
        Directory tmpdir = new Directory("tmp");
        Directory usrdir = new Directory("usr");
        rootdir.add(bindir);
        rootdir.add(tmpdir);
        rootdir.add(usrdir);
        bindir.add(new File("sub1", 10000));
        bindir.add(new File("sub2", 20000));
        rootdir.accept(new ListVisitor());
    }
}

/*
 / root (3)
/root / bin (2)
/root/bin / vi (10000)
/root/bin / latex (20000)
/root / tmp (0)
/root / usr (0)
*/
```

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