Abstract Factory Pattern

관련 부품을 조합해서 인스턴스 생성

- 부품의 구체적인 구현에는 주목하지 않고, **인터페이스(API)에 주목**.
- **추상적인 공장**(Abstract Factory)에서 **추상적인 부품**을 조립하고 **추상적인 제품**을 완성한다.

Architecture, Modeling, DesignPattern, Creational

Factory

Abstract Factory

```
package factory;

public abstract class Factory {
    public static Factory getFactory(String className) {
        Factory factory = null;
        try {
            factory = (Factory) Class.forName(className).newInstance();
        } catch (InstantiationException | IllegalAccessException |
ClassNotFoundException e) {
            e.printStackTrace();
        }
        return factory;
    }
    public abstract LinkItem createLink(String caption, String url);
    public abstract TrayItem createTray(String caption);
    public abstract Page createPage(String caption, String author);
}
```

Abstract Products

```
public abstract class Item {
    protected String caption;

    public Item(String caption) {
        super();
        this.caption = caption;
    }
    public abstract String makeHTML();
}
```

```
package factory;

public abstract class LinkItem extends Item {

    protected String url;
    public LinkItem(String caption, String url) {
        super(caption);
        this.url = url;
    }
}
```

```
package factory;

import java.util.ArrayList;

public abstract class TrayItem extends Item {

    protected final ArrayList<Item> tray = new ArrayList<>();
    public TrayItem(String caption) {
        super(caption);
    }
    public void add(Item item) {
        tray.add(item);
    }
}
```

```
package factory;

import java.io.BufferedWriter;
import java.io.FileOutputStream;
import java.io.OutputStreamWriter;
import java.nio.charset.StandardCharsets;
import java.util.ArrayList;

public abstract class Page {
    protected String title;
    protected String author;
    protected ArrayList<Item> content = new ArrayList<>();
    public Page(String title, String author) {
        this.title = title;
        this.author = author;
    }
    public void add(Item item) {
        content.add(item);
```

```
    }
    public void output() {
        System.out.println(this.makeHTML());
        try (BufferedWriter bw = new BufferedWriter(new
OutputStreamWriter(new FileOutputStream(title + ".html"),
StandardCharsets.UTF_8))) {
            bw.write(this.makeHTML());
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
    public abstract String makeHTML();
}
```

Concrete Factories

Concrete Factory1 - ListFactory

Concrete Factory

```
package listfactory;

import factory.Factory;
import factory.LinkItem;
import factory.Page;
import factory.TrayItem;

public class ListFactory extends Factory {

    @Override
    public LinkItem createLink(String caption, String url) {
        return new ListLink(caption, url);
    }

    @Override
    public TrayItem createTray(String caption) {
        return new ListTray(caption);
    }

    @Override
    public Page createPage(String caption, String author) {
        return new ListPage(caption, author);
    }

}
```

Concrete Products

```
package listfactory;

import factory.LinkItem;

public class ListLink extends LinkItem {
    public ListLink(String caption, String url) {
        super(caption, url);
    }

    @Override
    public String makeHTML() {
        StringBuilder sb = new StringBuilder();
        sb.append("<li>");
        sb.append("<a href=\"");
        sb.append(url);
        sb.append("\">");
        sb.append(caption);
        sb.append("</a>");
        sb.append("</li>\n");
        return sb.toString();
    }

}
```

```
package listfactory;

import factory.TrayItem;

public class ListTray extends TrayItem {

    public ListTray(String caption) {
        super(caption);
    }

    @Override
    public String makeHTML() {
        StringBuilder sb = new StringBuilder();
        sb.append("<li>\n");
        sb.append(caption);
        sb.append("\n<ul>\n");
        tray.forEach(item -> sb.append(item.makeHTML()));
        sb.append("</ul>\n");
```

```
        sb.append("</li>");
        return sb.toString();
    }
}
```

```
package listfactory;

import factory.Page;

public class ListPage extends Page {

    public ListPage(String title, String author) {
        super(title, author);
    }

    @Override
    public String makeHTML() {
        StringBuilder sb = new StringBuilder();
        sb.append("<html>\n");
        sb.append("<head><title>");
        sb.append(title);
        sb.append("</title></head>\n");
        sb.append("<body>\n");

        sb.append("<h1>");
        sb.append(title);
        sb.append("</h1>");
        sb.append("<ul>\n");
        content.forEach(item -> sb.append(item.makeHTML()));
        sb.append("</ul>\n");
        sb.append("<hr>");
        sb.append("<footer>");
        sb.append(author);
        sb.append("</footer>");
        sb.append("</body>\n</html>");
        return sb.toString();
    }

}
```

Concrete Factory2 - DivFactory

Concrete Factory

```

```

```
package divfactory;

import factory.Factory;
import factory.LinkItem;
import factory.Page;
import factory.TrayItem;

public class DivFactory extends Factory {

    @Override
    public LinkItem createLink(String caption, String url) {
        return new DivLink(caption, url);
    }

    @Override
    public TrayItem createTray(String caption) {
        return new DivTray(caption);
    }

    @Override
    public Page createPage(String caption, String author) {
        return new DivPage(caption, author);
    }

}
```

Concrete Products

```
package divfactory;

import factory.LinkItem;

public class DivLink extends LinkItem {

    public DivLink(String caption, String url) {
        super(caption, url);
    }

    @Override
    public String makeHTML() {
        StringBuilder sb = new StringBuilder();
        sb.append("\n<span>");
        sb.append("<a href=\"");
        sb.append(url);
        sb.append("\">");
        sb.append(caption);
```

```
        sb.append("</a>");
        sb.append("</span>\n");
        return sb.toString();
    }
}
```

```
package divfactory;

import factory.TrayItem;

public class DivTray extends TrayItem {

    public DivTray(String caption) {
        super(caption);
    }

    @Override
    public String makeHTML() {
        StringBuilder sb = new StringBuilder();
        sb.append("\n<div style=\"border: 1px solid black; ; margin: 5px;
padding: 5px\">");
        sb.append("\n<div>");
        sb.append(caption);
        sb.append("</div>\n");
        sb.append("\n<div>");
        tray.forEach(item -> sb.append(item.makeHTML()));
        sb.append("</div>\n");
        sb.append("</div>\n");
        sb.append("<br>\n");
        return sb.toString();
    }

}
```

```
package divfactory;

import factory.Page;

public class DivPage extends Page {

    public DivPage(String title, String author) {
        super(title, author);
    }

    @Override
    public String makeHTML() {
```

```
        StringBuilder sb = new StringBuilder();
        sb.append("<html>\n");
        sb.append("<head><title>");
        sb.append(title);
        sb.append("</title></head>\n");
        sb.append("<body>\n");

        sb.append("<h1>");
        sb.append(title);
        sb.append("</h1>");
        sb.append("\n<div>");
        content.forEach(item -> sb.append(item.makeHTML()));
        sb.append("</div>\n");
        sb.append("<hr>");
        sb.append("<footer>");
        sb.append(author);
        sb.append("</footer>");
        sb.append("</body>\n</html>");
        return sb.toString();
    }

}
```

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