Doctor

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Introduction

- **About**
- **Users**
- **Design**

An automated documentation assistant built in Python and TEX for procedural, data-driven reporting.

Doctor provides services to simplify the reporting of data-oriented, beautiful, lightweight documents.

Transparent and opinionated, without the WYSIWYG faff.

- ▶ Personal side project

- ▶ Business-critical application

- ▶ Internal collaborative platform

C_1	C_2	C_3	C_4
a	b	c	d
e	f	g	h
i	j	k	l

C_1	C_2	C_3	C_4
a	b	c	d
e	f	g	h
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Introduction
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Better Python

Software development & design
introductory handbook

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PATTERNS

Factories   5

Design patterns were conceived in the 90s when object-oriented programming was extremely popular. So naturally, design patterns rely on classes and inheritance quite a lot. However, programming languages have evolved. Python not only has classes, but also tuples, dictionaries, Protocols and data classes.

4.1 Analysing the Factory pattern

The factory allows you to inject objects of a certain subtype into a part of an application that then uses those objects without knowing what they are exactly.

Doing this helps reduce coupling by enabling you to introduce and inject new kinds of objects into that same application without having to change the code. A related principle is the 'single responsibility principle' enforcing the idea of not both creating and using something in the same place – those are two separate responsibilities.

The Open Closed principle also plays an important role in the factory pattern: we want to be able to extend the application without having to extensively change the code. The code should be open for extension but closed for modification. The factory pattern achieves this by letting you, the developer, introduce new importer factories without modifying the original code interface.

Figure 4.1: Factory pattern Unified Modeling Language (UML) diagram, demonstrating separation of creation from use

4.2 Factories

In this section, we take a look at the factory design pattern and strip it down completely until we arrive at the design principles that are behind the pattern. The most important design principle behind the factory pattern is to separate creation from use.

4.2.1 A more Pythonic Factory pattern

In this example, we have `VideoExporter` Protocol and `AudioExporter` Abstract Base Classes (ABC) that cover various output formats, and an `ExporterFactory` – which is also an ABC – that has abstract methods for creating the video and audio exporters.

```
class VideoExporter(Protocol):
    """Basic representation of video exporting codec."""

    def prepare_export(self, video_data: str) -> None:
        """Prepares video data for exporting."""
        raise NotImplementedError

    def do_export(self, folder: Path) -> None:
        """Exports the video data to a folder."""
        raise NotImplementedError
```
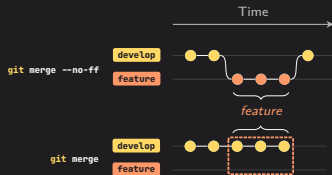
This user can choose to use the fast, high or master quality exporter to render their video and audio files, of which there are subclasses of the exporter factory. To facilitate these different factories, we create an object a dictionary `FACTORIES` and define a method `read_factory()` to read the user's desired output quality as input, get the corresponding factory to use the appropriate video and audio exporters, and then prepares and does the export.

```
FACTORIES = {
    "low": FastExporter(),
    "high": HighQualityExporter(),
    "master": MasterQualityExporter(),
}

def read_factory() -> ExporterFactory:
    """Constructs an exporter factory based on the user's preference."""

    while True:
        export_quality = input(
            f"Enter desired output quality ({', '.join(FACTORIES)}): "
        )
        try:
            return FACTORIES[export_quality]
        except KeyError:
            print(f"Unknown output quality option: {export_quality}.")
```

Contribution

– **GitHub**

Interested in contributing? **Doctor** is developed open source! Get it touch via email or create a pull request

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● TeX ● Python

You're welcome to retain a copy and share this material with anyone who may benefit.

Please ⭐ this repository if you have found this material useful and to follow its development!

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