Vinh Tran
CMPE 202

CMPE 202 Individual Project

Problems to Solve:

- Parsing different input file formats (JSON, XML, CSV) containing currency transactions.
- Validating currency codes in the transactions.
- Converting the amount from the original currency to the target currency based on given exchange rates.
- Handling errors if a transaction fails validation.
- Writing the results into an output file of the same format as the input.

Design Pattern to Use: Strategy Pattern and Slight use of Factory Pattern.

The Strategy Pattern is a behavioral design pattern that turns a set of behaviors into objects and makes them interchangeable inside the original context object. Additionally the Factory Pattern can be used as a supplementary pattern to create the appropriate strategy object based on the input file format.

Justification for Using the Strategy Pattern:
The Strategy Pattern is appropriate for this scenario because it provides a way to define a family of algorithms, encapsulate each one as an object, and make them interchangeable. This makes the application more flexible and easier to extend when new formats are required. For example, to support a new file format, we can simply add new FileParser and FileWriter strategies without modifying the existing code.

Consequences of Using the Strategy Pattern:
Pros:
- The application becomes more flexible and easier to extend.
- Each strategy can be tested independently which improves testability.
- The code becomes more modular and easier to understand as each action is separated by the format they are handling.

Cons:
- The number of classes increases as you add more strategies, which can make the codebase harder to manage.
- The client code must be aware of the differences between strategies to choose the appropriate one.
- The application might have a higher runtime complexity due to the communication between the context and the strategy objects.

Class Diagram:

In our case, the Context would be the CurrencyConverter application, and the Strategy would be the FileParser, CurrencyValidator, CurrencyConverter, ErrorHandler, and FileWriter interfaces. The ConcreteStrategy would be the specific implementations of these interfaces for handling JSON, XML, and CSV files.