Software Engineering Fundamentals (SEF): MS.NET

Design Patterns

Origin and history

a) Book about architectural patterns by Christopher Alexander (1977)
b) Kent Beck's and Ward Cunningham's presentation at OOPSLA (1987)
c) Book about software design patterns by gang of four (1994)

What they are?

Reusable templates for solving recurring software design problems.

Why they matter?

a) No need to discover (productivity)
b) Solution verified over time (reliability)
c) Common language for developers

Use and misuse

Apply design patterns only when needed and only those which give benefit in your context.

Classification

a) Creational (Builder, Singleton, Factory, …)
b) Structural (Facade, Decorator, Composite, …)
c) Behavioral (Strategy, Chain of responsibility, …)
d) …

Simple factory

Class which defines a method for creating instances of other classes.

Not actually a pattern.

Advantages?

a) Construction logic is separated
b) Dependent object can be easier switched (unit testing, …)

Facade

Provide a unified interface to a set of interfaces in a subsystem. Facade defines a higher-level interface that makes the subsystem easier to use.

Advantages?

a) Client code is decoupled from subsystem
b) Interaction with subsystem in single place
c) Simplified interface to set of classes

Repository

Mediates between the domain and data mapping layers using a collection-like interface for accessing domain objects.

Advantages?

a) Centralized data access
b) Business logic is decoupled from data access

Decorator

Attach additional responsibilities to an object dynamically. Decorators provide a flexible alternative to subclassing for extending functionality.

Advantages?

a) Helps avoid class explosion
b) Behavior can be added\changed dynamically

Template method

Define the skeleton of an algorithm in an operation, deferring some steps to subclasses. Template Method lets subclasses redefine certain steps of an algorithm without changing the algorithm's structure.

Advantages?

a) Facilitates code reuse
b) Algorithm structure in single place

Summary

Avoid POTY (Pattern Of The Year) syndrome

References

a) GoF design patterns (dofactory)

b) Pattern classification (gofpatterns)

c) Head First Design Patterns book

Video Tutorials

- Factory - https://www.youtube.com/watch?v=ub0DXaeV6hA
- Facade - https://www.youtube.com/watch?v=B1Y8fcYrz5o
- repository - https://www.youtube.com/watch?v=rtXpYpZdOzM
- decorator - https://www.youtube.com/watch?v=j40kRwSm4VE
- template - https://www.youtube.com/watch?v=aR1B8MlwbRI
- Full PlayList with aditional patterns :
  - https://www.youtube.com/watch?v=vNHpsC5ng_E&list=PLF206E906175C7E07

Code examples

a) https://github.com/maksims-ahadovs/Design-Patterns

Questions?

Wish you already understood everything =’(