

### SOLID

#### Single Responsibility Principle

A class changes for only one reason

#### Open/Closed Principle

A class should be open for extension, closed for editing

#### Liskov's Substitution Principle

Derived types should cleanly and easily replace base types

#### Interface Segregation Principle

Favor multiple single-purpose interfaces over composite

#### Dependency Inversion Principle

Concrete classes depend on abstractions, not vice-versa

### Other Principles

#### Don't Repeat Yourself (DRY)

Duplication should be abstracted

#### Law of Demeter

Only talk to related classes

#### Hollywood Principle

"Don't call us, we'll call you"

#### You Ain't Gonna Need It

Only code what you need now

#### Keep It Simple, Stupid

Favor clarity over cleverness

#### Convention Over Configuration

Defaults cover 90% of uses

#### Encapsulation

What happens in Vegas...

### Other Principles (cont)

#### Design By Contract

And then write tests

#### Avoid Fragile Base Class

Treat Base like a public API

#### Common Closure Principle

Classes that change together, stay together

### Common Refactorings

#### Encapsulate Field

#### Generalize Type

Type-Checking  $\Rightarrow$  State/Strategy

Conditional  $\Rightarrow$  Polymorphism

#### Extract Method

#### Extract Class

#### Move/Rename Method or Field

#### Move to Superclass/Subclass

<http://martinfowler.com/refactoring/catalog>

### Class Associations: Association



Two objects have some sort of relationship to each other.

**Example:** *Car uses Highway*

### Class Associations: Aggregation



An association where one object *has-a* (owns a) different object.

**Example:** *Car has a Driver*

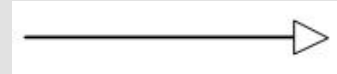
### Class Associations: Composition



An aggregation with dependency - objects are mutually destroyed/created.

**Example:** *Car has an Engine*

### Class Associations: Generalization



"Is-A" relationship (inheritance).

**Example:** *Porsche is a Car*

### Class Associations: Realization



One class implements behavior that is abstractly defined in another class.

**Example:** *An Animal may Move(), but a Duck would move by waddling*

### Class Associations: Dependency



One class weakly depends on another.

**Example:** *Car uses Highway*

### Access Modifiers

Private	Only inside the same class instance
Protected	Inside same or derived class instances
Public	All other classes linking/referencing the class
Internal	Only other classes in the same assembly
Protected Internal	All classes in same assembly, or derived classes in other assembly
Static	Accessible on the class itself (can combine with other accessors)



Design Patterns (GoF)	
Abstract Factory	Creational
Builder	Creational
Factory Method	Creational
Prototype	Creational
Singleton	Creational
Adapter	Structural
Bridge	Structural
Composite	Structural
Decorator	Structural
Facade	Structural
Flyweight	Structural
Proxy	Structural
Chain of Responsibility	Behavioral
Command	Behavioral
Interpreter	Behavioral
Iterator	Behavioral
Mediator	Behavioral
Memento	Behavioral
Observer	Behavioral
State	Behavioral
Strategy	Behavioral
Template Method	Behavioral
Visitor	Behavioral



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