tsconfig.json

* define things like which files should be “compiled, which directory to compile them to, and which version of JavaScript to emit.

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## SOLID Principle

**Single Responsibility**

* a class or method should be focused on doing one thing and one thing only.

Common violation

* presentation logic
* file/database read/write
  + when your class or method becomes responsible for handling the persistence layers specifics.

Example

* before

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* after

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**Open/Close Principle**

* open to extension
* close to modification
* don’t add stuff to completed class
  + Solution (new functionality): add functionality by extending

**Liskov Substitution Principle**

* A subclass should be used whenever its base class can be used, without altering the functionality in a blocking way.
* Think twice when using inheritance

**The Interface Segregation Principle**

* A class should not depend on methods that it does not need to implement
* Splitting interface into smaller ones

How to recognize the issue

* Don’t know how to implement an interface method
* The interface method does not belong in the class

How to avoid

* Segregate interfaces (split up)
* Only implement methods it needs

**The dependency Inversion Principle**

* Classes and modules should depend on abstractions instead of concrete implementations
* In typescript, it boils down to one concept 🡪 interface
  + Abstractions == interfaces

Loose coupling

**Design Patterns**

* Don’t reinvent the wheel
* Every time you are struggling to come up with an architectural breakthrough, there is probably a design pattern

**Creational**

* All about instantiating objects
* How objects are instantiated
* How many of them we are allowed to create

Singleton pattern

* Have only a single instance of a specific class throughout the entire application
* Benefits
  + Shared state
    - More common in mobile apps or console apps; not common in web apps and APIs
  + Avoid long initializations
    - Ex. A class that has very complex logic in its constructor
  + Cross-class communication
  + Perfectly represents unique items
* Key
  + Use class.\_instance = this

Factory Pattern

* A combination of the single responsibility and open/close principles combined

Loose Coupling

* All about interfaces
* Software parts that communicate with each other have little to no knowledge of each other’s actual implementation
* What to use
  + Single responsibility principle
  + Separation of concerns
  + Factory pattern/object pool
  + Dependency Injection
* Benefits
  + Easy to work with large projects
  + Swap implementation
  + Testability
  + Components grow independently

The Object Pool

* A pool of pre-initialized objects whose initialization is heavyweight
* Every time we need such an object we take one from the pool
* Once we are done with it, we return it back to the pool
* Is it depreciated

**Structural**

* About the apps’ structure
* Situation for structural patterns
  + Have complex classes or objects that are composed from smaller objects
  + Structural patterns offer most efficient solutions to this type of situation

**Behavioural**

* Ways applications flow and how objects communicate with each other

**Dependency Injection**

* a technique in which an object receives other objects that it depends on, called dependencies.
* Instead of the client specifying which service it will use, the injector tells the client what service to use. The 'injection' refers to the passing of a dependency (a service) into the client that uses it.

Ts Specific

* New is not allowed
  + Be careful to not abuse New

Traditional vs dependency injection flow of control

* Traditional

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* Inverted flow of control

Text

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Dependency injection container

* an object that knows how to instantiate and configure objects.
* Every time you create a new component in your app, you register it with the container

**Decorator**

* An experimental TypeScript feature
* Widely used Angular

How to use

* Have to enable 2 fields in tsconfig.json file

Types

* Class, Method, Property, Accessors

Method Decorator

* Arguments:
  + The class constructor
  + The method’s name
  + The property descriptor
* Hook
  + A decorator that will allow us to call certain methods before the method that the decorator decorates
  + Allows use not to extend the class to include methods that are called before the actual method
  + The decorator factory that binds hook to the bar method only runs once

Constructor decorator

* Only accepts only one argument
  + Constructor function
* Best practice
  + Always use decorator factories