Dependency Injection (DI)

with dependency-injector

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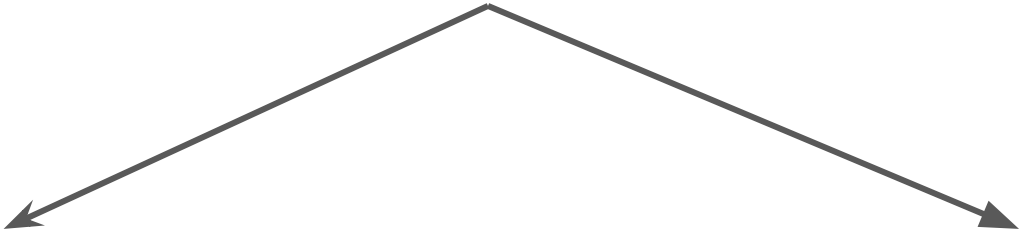
Build software that is easy to change!



Reduce mental load

Reduce fear of change

High cohesiveness

Low coupling

Single Responsibility (**S**OLID)

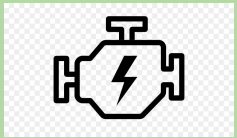
Create pressure in the fuel system

Store fuel

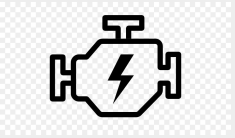
Interface Segregation (SOLID)

So you are an engine? There is a fuel pump for you!

Dependency Inversion (SOLI**D**)

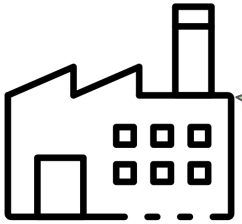
I need an 

I need a Toyota 2JZGTE!

I am an 

Inversion of Control (IoC)

I'll take Toyota 2JZGTE engine



Here is Toyota 2JZGTE engine

Inheritance vs Composition

class BaseCar

🚫

class BaseCarWithEngine < BaseCar

class Engine

✅

class Car

Coupling

```python
from abc import ABC, abstractmethod


class Engine(ABC):
    @abstractmethod
    def accelerate(self):
        ...

    @abstractmethod
    def start(self):
        ...

    @abstractmethod
    def stop(self):
        ...

    @property
    @abstractmethod
    def rpm(self):
        ...
```

```python
class FuelPump:
    """Single responsibility."""
    ...


class Engine2JZGTE(Engine):

    def __init__(self):
        """Interface segregation, composition."""
        self.fuel_pump = FuelPump()


class Car:
    def __init__(self):
        self.engine = Engine2JZGTE()


car = Car()
```

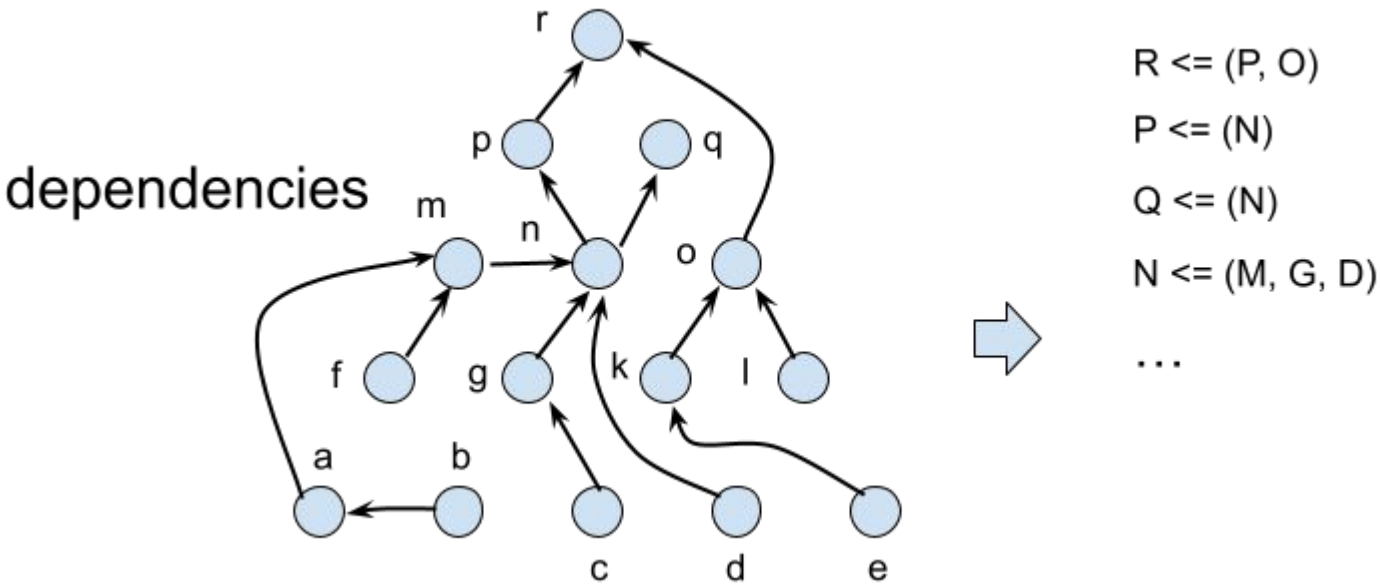
Decouple

```python
class Engine2JZGTE(Engine):
    def __init__(self, fuel_pump: FuelPump):
        """Inversion of control, dependency injection."""
        self.fuel_pump = fuel_pump


class Car:
    def __init__(self, engine: Engine):
        """Dependency inversion."""
        self.engine = engine


fuel_pump = FuelPump()
engine = Engine2JZGTE(fuel_pump=fuel_pump)
car = Car(engine=engine)
```

Benefits:

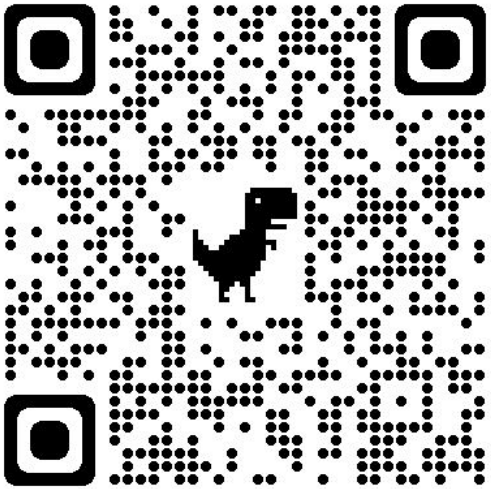
- Can clearly see all the dependencies
- Easier to change (each object and the entire app)
- Easies to test (can pass a fake object of mock as dependency, no need to patch)

Dependency Locator (Container)



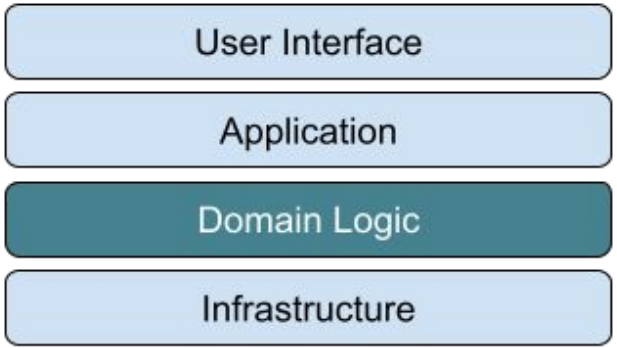
TODO List App example

The App on GitHub



dependency-injector

Using Container inside a framework



Using Container with Django example

Providers