# Solid and clean

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*“Bad programmers worry about the code. Good programmers worry about data structures and their relationships.”*

Linus Torvalds

# What will we see?

- ~~How to implement patterns within a given language~~
- ~~How to choose variables' names~~
- ~~CamelCase vs snake_case~~
- ~~Best coding practices~~

How to code properly

- "Properly?"
- In such a way that your code becomes scalable, maintainable, robust..
- Do engineer's job!

# SOLID programming

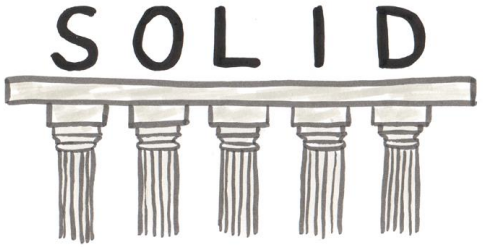
Aka: **Object Oriented Design**

Five principles that ~~save your life~~ make the difference between a programmer/coder and a software architect

› (Or between an happy person and a sad person)

Applicable to object-oriented programming (but not only)

1. Single Responsibility
2. Open/Close principle
3. Liskov substitution
4. Interface segregation
5. Dependency inversion



# Single responsibility principle

*A software entity should have only one reason to change*

- Aka: every class should have a single responsibility or single job or single purpose

- **Answers to**: "What should I put into a class?"
- **Pros**: you always know where/what/how to change your code, and don't mess up things
- (**Cons**: increase number of classes and effort…)

# Open/Close principle

*Entities should be open for extension, but closed for modification*

- Aka: you should never change anything, always adding new behavior using polymorphism

- **Answers to**: "How should I extend my code?"
- **Pros**: reduce the number of bugs and headaches
- (**Cons**: N/A)

# Liskov substitution principle

*You should be able to substitute any parent class with any of their children without any behavior modification*

- Aka: remember "Rectangles vs Squares"

- **Answers to**: "When and what should I inherit?"
- **Pros**: code is scalable, and minimize changes upon modifications
- (**Cons**: you have to think before you code)
  - not actually a con…

# Interface segregation principle

*Many client specific interfaces are better than a big one*

- Aka: Interfaces should be the minimal set of behaviors you need

- **Answers to**: "When should I create an interface?"
  - Spolier: "as much as you can"
- **Pros**: you minimize dependencies in your code (thus, programming effort)
- (**Cons**: trust me…NONE)

Always remember: an interface is a contract. You can build (automatic) tests over contracts!

# Dependency inversion principle

*Your project shouldn't depend of anything, make those things depend of interfaces*

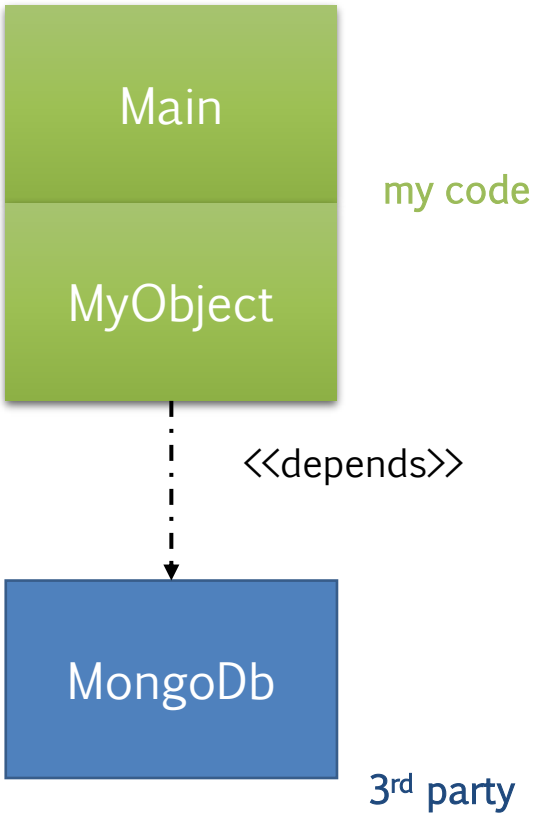
- Design wrappers around your dependencies
  - (This is **NOT** "dependency injection"…but its good friend)

- **Answers to**: "How can I avoid getting crazy with dependencies?"
- **Pros**: isolation between code components; your code reflects the analysis/model of business
- (**Cons**: additional programming effort)

# Dependency inversion principle

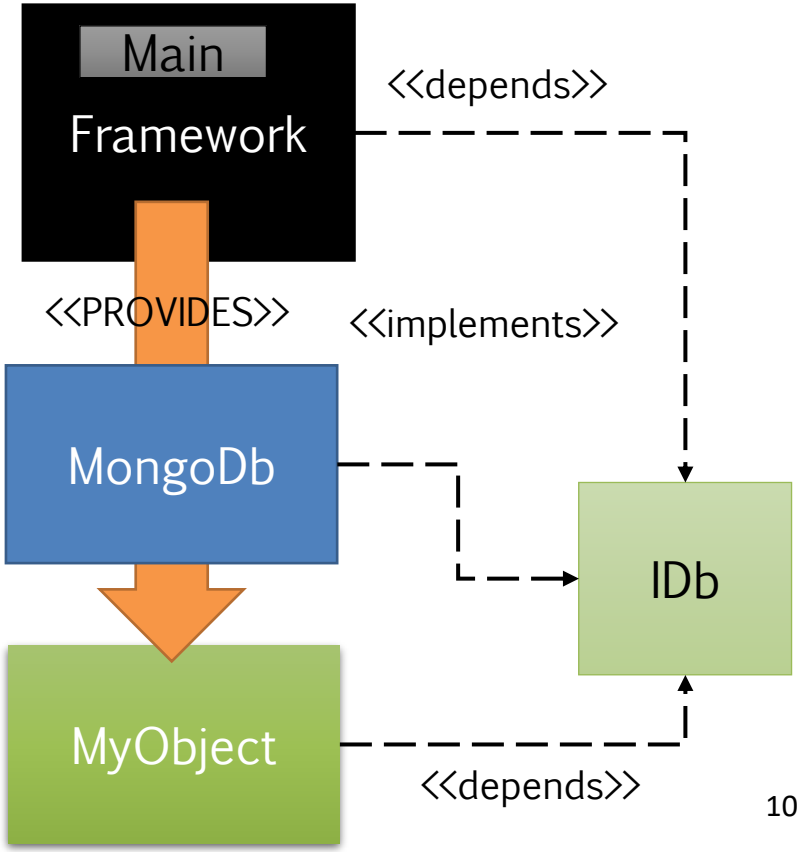
## Library

- Tied to 3rd party code




## Framework

- Inversion of control
- Dependency injection



# CLEAN architecture

- Applies to big projects
- Specifies how to model your problem(s)..and how to manage implementation
- Enables scalable, maintainable, and easy-to-test codebase

- (OF course) builds upon SOLID programming style

# References

## Course website

- http://hipert.unimore.it/people/paolob/pub/Industrial_Informatics/index.html

## My contacts

- paolo.burgio@unimore.it
- http://hipert.mat.unimore.it/people/paolob/

## Resources

- https://springframework.guru/solid-principles-object-oriented-programming/
- A "small blog"
  - http://www.google.com