

Clean Code

There's no problem so simple that a bad developer can't make it complicated. Steve Bohlen

Programming is the art of telling another human what one wants the computer to do. Donald Knuth

What Clean Code stands for?

Clean code is a reader-focused development style that produces software that's easy to write, read and maintain.

Why it matters?

Broken windows theory

One *broken window* is all it takes to start the decline.

It's too easy to slip into the mindset of "All the rest of this code is crap, I'll just follow suit."

It's the software entropy.

So called: "software rot".

The four characteristics of Rotting software

From the book *Design Principles and Design Patterns* de *Robert C. Martins*

1 - Rigidity

It's hard to solve simple problems.

No one knows how long will take to solve them.

Estimating is hard.

2 - Fragility

The software breaks too often.

A change in one unrelated part breaks others.

Changes must be echoed in many places.

3 - Immobility

It's the inability of reusing software from other places.

4 - Viscosity

Its easier to go to the *hacking mode* than to the *design preservation* mode.

Implications

Software rot implies in frustrated developers.

Frustrated developers implies in more rotting.

Too much rooting implies in system rewrite.

Who's fault?

The clinical analogy

Solution?

Anyone can write code a computer can understand, but professional developers write code humans can understand.

Good practices, software craftsmanship, clean code.

Literature

1. Clean code: A hand book of Agile Software craftsmanship; Robert C. Martin.
2. The pragmatcal programmer; Andrew Hunt.
3. Code Complete ... Lot's more

*Those who do not remember the past are condemned to repeat it. Jorge
Agustin Nicolas Ruiz de Santayana y Borrás*

Some Principles

Dear truth always deceiving simplicity. - John Green

Follow what suites you most.

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Obviously this is not an exhaustive list.

Principle - SOLID

Or the “first five principles” by Michael Feathers.

Single responsibility principle

If you can think of more than one motive for changing a class, then that class has more than one responsibility.

Open Close Principle

The interface is closed to modification - and new implementation must, at least, implement that interface.

Liskov substitution principle

It's possible to change subclasses without breaking the program.

Interface segregation principle

It's better more interfaces than less.

Dependency inversion

One should depend only on abstractions.

Principle - Dry

Don't Repeat Yourself

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Two or more things are *orthogonal* if changes in one do not affect any of the others

Benefits of Orthogonal Systems

- ▶ Eliminate effects between unrelated things.
- ▶ Changes are localized.
- ▶ Promotes reuse.
- ▶ Disease sections of code are isolated.
- ▶ The result system is less fragile.
- ▶ Better tested.
- ▶ Not tightly to a particular vendor.

Principle - Law of Demeter

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If you need to change an object's state, get the object to do it for you.

Any method of an object should call only methods belonging to:

- ▶ itself;
- ▶ any parameters received;
- ▶ any objects it creates and any directly held component objects.

Principle - Composite Reuse

One should be build only upon interfaces.

Benefits

- ▶ Easier to maintain (no unexpected behaviours);
- ▶ Performance gain;

Works flawlessly with traits.

```
//service user
class User
    implements AuthenticatedUserAwareInterface,
    ClientAwareInterface,
    ServiceLocatorAwareInterface,
    EntityManagerAwareInterface,
    PluginManagerAwareInterface
{
    use ClientAwareTrait;
    use AuthenticatedUserAwareTrait;
    use ServiceLocatorAwareTrait;
    use EntityManagerAwareTrait;
    use PluginManagerAwareTrait;
```

Principle - Design by contract

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If your contract indicates that you'll accept anything and promise the world in return, then you've got a lot of code to write.

Principle - The scout rule

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Clean code is not about perfection.. It's about honesty.

We made our best to leave the camp cleaner than we find it?

Practise

Tips for applying the previous principles.

Functions Arguments

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Flag arguments are ugly.

They state a SRP violation.

Function Returns

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If functions must change a thing it must change itself.

(Demeter Law)

Comments - Usage scenarios

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Comments serves as well to discuss the purpose and trade-offs of implementations.

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Inaccurate comments are way worse than no comments at all.

Comments - A bad case

```
/**  
 *  
 * @param $title The title of the CD  
 * @param $author The author of the CD  
 * @param $tracks The number of tracks of the CD  
 *  
 */  
public addCd($title, $author, int $tracks);
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Clearly a DRY violation

Documentation

Code and documentation are different views of the same underlying model.

Two places to edit models? DRY violation.

Classes - Journal Metaphor (SRP)

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A journal is made of many little articles.

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Objects hide data and expose operations over it.

Data structures expose data and have no meaningful operation.

Naming

Long names are generally better and simple names.

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If there's an `And` in a function name it's violating SRP.

Conventions

Follow a coding standard, no matter which, but all the code must follow the chosen one.

Examples for php

PSR2, Zend, Symfony, etc.

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Or only a compartment and all inside?

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We want our systems to have many little classes - not few big ones.

Relates to ISP.

Abuse of Namespaces

`Inventory\Model\TradeStatusType.php`

Imagine if we extend this for a long period?

Hell!

Bonus.php

BonusRepository.php

BonusType.php

Client.php

ClientRepository.php

ClientSellerLevel.php

Payment.php

PaymentFrequency.php

PaymentMode.php

PaymentStatus.php

Privilege.php

PrivilegeRepository.php

PrivilegeType.php

And so on..

Much better:

`Inventory\Model\Trade\Status\Type.php`

Remove is better than adding

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The assumption is that the impact will be less than the cost of not making the change.

Object Calisthenics

Seven code qualities premisses:

- ▶ Cohesion;
- ▶ Loose coupling;
- ▶ No redundancy;
- ▶ Encapsulation;
- ▶ Testability;
- ▶ Readability;
- ▶ Focus;

phpcs rules

1 - One level of indentation per method;

Benefits

Finding bugs is much easier.

If you have more than one indentation level you have more than one abstraction level.

2 - Don't use ELSE keyword;

Else's encourages the inclusion of more, intermediate, ifs.

Use polymorphism instead.

3 - Wrap all primitives and Strings;

Small objects make programs more maintainable.

They serves as a container for logic that otherwise would be sparse.

4 - First class collections

Any class with a collection shouldn't contain other member variables.

5 - One dot per line;

Never:

```
this  
    ->myMemberObjectMemberObject  
    ->myMemberObjectMemberObject  
    ->doFoo();
```

Much better:

```
this  
    ->myMemberObjectMemberObject  
    ->functionThatDoFooToo();
```

(Law of Demeter)

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Too long names?

Maybe a SRP problem.

7 - Keep all entities small;

No classes over 50 lines and no packages over 10 files.

8 - No classes with more than two instance variables.

A class *Name* with first, middle and last name might be decomposed to:

A class *Name* with a *Surname* class and a *GivenNames* class.

9 - No getters/setters/properties

When you have the enough quantity of encapsulation provided from the previous rules you will never need to do any operation on the getters/setters.

Testing clean code

Testing code use different patterns than production code.

They have different constraints.

There are things you will never do in production code that in testing code is allowed.

Like memory and performance things.

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There things you will never do in production code that in testing code is allowed.

Like memory and performance things.

But never clarity things.

Meta programming

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How?

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How?

Program for the general case, and put the specifics somewhere else - outside the code base.

Metrics

Nice things to measure:

- ▶ Cyclomatic complexity;
- ▶ Inheritance fan-in (number of base classes);
- ▶ Inheritance fan-out (number of derived modules using this one as parent);
- ▶ Class coupling ratios

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Do this by actually writing something simple that does the basics that you need.

Make sure the magic all goes away.

Conclusion

Quality is a team issue. Andy hunt.

Teams as a hole should not tolerate broken windows.

Obviously no one will ever do the hundred percent of what was here exposed.

But if we aim for the 80% where code needs the most.

We are cool.

Parts not critical to performance must be clean - not optimized.

Remember...

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So there's always room for improvement.

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3. Code Complete; Steve McConnell

Thanks for all!