# Best practices

Olav Vahtras

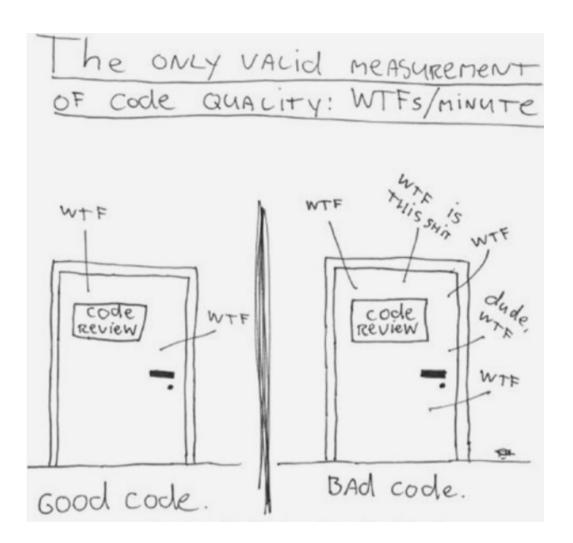
Leiden 2015-04-14

• Good programming practices come from experience

- Good programming practices come from experience
- Experience comes from bad programming practices

- Good programming practices come from experience
- Experience comes from bad programming practices
- Being able to recognize clean code does not mean we can write it

- Good programming practices come from experience
- Experience comes from bad programming practices
- Being able to recognize clean code does not mean we can write it
- Learning to write clean code is hard work!



• Well organized

- Well organized
- Code clearly expresses its intention

- Well organized
- Code clearly expresses its intention
- Code can be read like a newspaper article, well-written prose

- Well organized
- Code clearly expresses its intention
- Code can be read like a newspaper article, well-written prose
- Pleasing to read
  - code is read much more than written

- Well organized
- Code clearly expresses its intention
- Code can be read like a newspaper article, well-written prose
- Pleasing to read
  - code is read much more than written
- No code repetition
  - Code duplication is the root of all evil...

- Well organized
- Code clearly expresses its intention
- Code can be read like a newspaper article, well-written prose
- Pleasing to read
  - code is read much more than written
- No code repetition
  - Code duplication is the root of all evil...
- Short functions

- Well organized
- Code clearly expresses its intention
- Code can be read like a newspaper article, well-written prose
- Pleasing to read
  - code is read much more than written
- No code repetition
  - Code duplication is the root of all evil...
- Short functions
- Functions do one thing and one thing well

- Well organized
- Code clearly expresses its intention
- Code can be read like a newspaper article, well-written prose
- Pleasing to read
  - code is read much more than written
- No code repetition
  - Code duplication is the root of all evil...
- Short functions
- Functions do one thing and one thing well
- Clean code is well tested

- Well organized
- Code clearly expresses its intention
- Code can be read like a newspaper article, well-written prose
- Pleasing to read
  - code is read much more than written
- No code repetition
  - Code duplication is the root of all evil...
- Short functions
- Functions do one thing and one thing well
- · Clean code is well tested
- Clean code is easy to change

- Well organized
- Code clearly expresses its intention
- Code can be read like a newspaper article, well-written prose
- Pleasing to read
  - code is read much more than written
- No code repetition
  - Code duplication is the root of all evil...
- Short functions
- Functions do one thing and one thing well
- · Clean code is well tested
- Clean code is easy to change
- Dependencies between different parts kept to a minimum

• Forget about the engineering principle "If it ain't broke don't fix is"

- Forget about the engineering principle "If it ain't broke don't fix is"
- The Boy Scout rule: always leave the code in a better shape than you found it.

- Forget about the engineering principle "If it ain't broke don't fix is"
- The Boy Scout rule: always leave the code in a better shape than you found it.
- Variable and function names are well chosen.
  - pronounceable
  - searchable in code (avoid 0, 0, l 1)
  - length of a variable name proportional to scope

- Forget about the engineering principle "If it ain't broke don't fix is"
- The Boy Scout rule: always leave the code in a better shape than you found it.
- Variable and function names are well chosen.
  - pronounceable
  - searchable in code (avoid 0, 0, l 1)
  - length of a variable name proportional to scope
- Frequently reflect and be willing to change

- Forget about the engineering principle "If it ain't broke don't fix is"
- The Boy Scout rule: always leave the code in a better shape than you found it.
- Variable and function names are well chosen.
  - pronounceable
  - searchable in code (avoid 0, 0, l 1)
  - length of a variable name proportional to scope
- Frequently reflect and be willing to change
- Coding is a two-phase product, extending code and refactoring

- Forget about the engineering principle "If it ain't broke don't fix is"
- The Boy Scout rule: always leave the code in a better shape than you found it.
- Variable and function names are well chosen.
  - pronounceable
  - searchable in code (avoid 0, 0, l 1)
  - length of a variable name proportional to scope
- Frequently reflect and be willing to change
- Coding is a two-phase product, extending code and refactoring
- Refactor code mercilessly
  - the act of modifying code without changing functionality
  - ∘ "clean-up"

- Forget about the engineering principle "If it ain't broke don't fix is"
- The Boy Scout rule: always leave the code in a better shape than you found it.
- Variable and function names are well chosen.
  - pronounceable
  - searchable in code (avoid 0, 0, l 1)
  - length of a variable name proportional to scope
- Frequently reflect and be willing to change
- Coding is a two-phase product, extending code and refactoring
- Refactor code mercilessly
  - the act of modifying code without changing functionality
  - o "clean-up"
- Code design is a process not and endpoint

- Forget about the engineering principle "If it ain't broke don't fix is"
- The Boy Scout rule: always leave the code in a better shape than you found it.
- Variable and function names are well chosen.
  - pronounceable
  - searchable in code (avoid 0, 0, l 1)
  - length of a variable name proportional to scope
- Frequently reflect and be willing to change
- Coding is a two-phase product, extending code and refactoring
- Refactor code mercilessly
  - the act of modifying code without changing functionality
  - o "clean-up"
- Code design is a process not and endpoint
- Make the code readable is as important as making it executable

• If you need comments to explain a code you should rewrite the code

- If you need comments to explain a code you should rewrite the code
- Obsolete or bad comments (be better off without)

- If you need comments to explain a code you should rewrite the code
- Obsolete or bad comments (be better off without)
- If you are afraid that changes may break the code you have too few tests.

- If you need comments to explain a code you should rewrite the code
- Obsolete or bad comments (be better off without)
- If you are afraid that changes may break the code you have too few tests.
- If your functions are long they probably do too much

- If you need comments to explain a code you should rewrite the code
- Obsolete or bad comments (be better off without)
- If you are afraid that changes may break the code you have too few tests.
- If your functions are long they probably do too much
- Are there variable names with similar spelling?

# Testing and version control

• This are not optional!

# Testing and version control

- This are not optional!
- Change code in small steps

# Testing and version control

- This are not optional!
- Change code in small steps
- Never commit code that have broken tests

• The first rule of functions is that they should be small

- The first rule of functions is that they should be small
- The second rule of functions is that *they should be smaller than that.* (Robert C Martin)

- The first rule of functions is that they should be small
- The second rule of functions is that *they should be smaller than that.* (Robert C Martin)
- Functions should hardly ever be 20 lines long.

- The first rule of functions is that they should be small
- The second rule of functions is that *they should be smaller than that.* (Robert C Martin)
- Functions should hardly ever be 20 lines long.
- Indent level should not be greater than two

- The first rule of functions is that they should be small
- The second rule of functions is that *they should be smaller than that.* (Robert C Martin)
- Functions should hardly ever be 20 lines long.
- Indent level should not be greater than two
- Do one thing and do it well
  - but it can be difficult know what that "one thing" is
  - try to keep the statements of a function at the same level of abstraction -e.g. do something or change something, but not both

- The first rule of functions is that they should be small
- The second rule of functions is that *they should be smaller than that.* (Robert C Martin)
- Functions should hardly ever be 20 lines long.
- Indent level should not be greater than two
- Do one thing and do it well
  - but it can be difficult know what that "one thing" is
  - try to keep the statements of a function at the same level of abstraction -e.g. do something or change something, but not both
- Try to make the code read like a top-down narrative

- The first rule of functions is that they should be small
- The second rule of functions is that *they should be smaller than that.* (Robert C Martin)
- Functions should hardly ever be 20 lines long.
- Indent level should not be greater than two
- Do one thing and do it well
  - but it can be difficult know what that "one thing" is
  - try to keep the statements of a function at the same level of abstraction -e.g. do something or change something, but not both
- Try to make the code read like a top-down narrative
- A long descriptive function name is better than a comment

- The first rule of functions is that they should be small
- The second rule of functions is that *they should be smaller than that.* (Robert C Martin)
- Functions should hardly ever be 20 lines long.
- Indent level should not be greater than two
- Do one thing and do it well
  - but it can be difficult know what that "one thing" is
  - try to keep the statements of a function at the same level of abstraction -e.g. do something or change something, but not both
- Try to make the code read like a top-down narrative
- A long descriptive function name is better than a comment
- The fewer arguments the better

- The first rule of functions is that they should be small
- The second rule of functions is that *they should be smaller than that.* (Robert C Martin)
- Functions should hardly ever be 20 lines long.
- Indent level should not be greater than two
- Do one thing and do it well
  - but it can be difficult know what that "one thing" is
  - try to keep the statements of a function at the same level of abstraction -e.g. do something or change something, but not both
- Try to make the code read like a top-down narrative
- A long descriptive function name is better than a comment
- The fewer arguments the better
- Avoid side effects

• Even very experienced programmers do not this from scratch

- Even very experienced programmers do not this from scratch
- First versions may be long and clumsy

- Even very experienced programmers do not this from scratch
- First versions may be long and clumsy
- The you need to refactor. (Improve variable named, extract functions, eliminate duplication)

- Even very experienced programmers do not this from scratch
- First versions may be long and clumsy
- The you need to refactor. (Improve variable named, extract functions, eliminate duplication)
- You need unit tests (again!)

- Even very experienced programmers do not this from scratch
- First versions may be long and clumsy
- The you need to refactor. (Improve variable named, extract functions, eliminate duplication)
- You need unit tests (again!)
- Write your programs like a story to be told

• Comments is to compensate for our failure to express ourselves in code

- Comments is to compensate for our failure to express ourselves in code
- Comments often do not follow changes in code ("lies")

- Comments is to compensate for our failure to express ourselves in code
- Comments often do not follow changes in code ("lies")
- Aim at write code that do not require comments at all

- Comments is to compensate for our failure to express ourselves in code
- Comments often do not follow changes in code ("lies")
- Aim at write code that do not require comments at all
- Inaccurate comments are worse than no comments

- Comments is to compensate for our failure to express ourselves in code
- Comments often do not follow changes in code ("lies")
- Aim at write code that do not require comments at all
- Inaccurate comments are worse than no comments
- Commented history in source files is unnecessary we have version control

- Comments is to compensate for our failure to express ourselves in code
- Comments often do not follow changes in code ("lies")
- Aim at write code that do not require comments at all
- Inaccurate comments are worse than no comments
- Commented history in source files is unnecessary we have version control
- Commented code remove.

# On code style

- It is a good idea to follow the Python PEP-8 style guide
  - https://www.python.org/dev/peps/pep-0008/

# On code style

- It is a good idea to follow the Python PEP-8 style guide
  - https://www.python.org/dev/peps/pep-0008/
- You can use the pylint program to check Python code against the standard

## On code style

- It is a good idea to follow the Python PEP-8 style guide
  - https://www.python.org/dev/peps/pep-0008/
- You can use the pylint program to check Python code against the standard
- Examples
  - 4 spaced indentation
  - o class name in CamelCase
  - constants in UPPER\_CASE with underscores
  - most other variable in lower\_case with underscores

## Literature

To read more, consider e.g.

