Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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Code Readability OSSS - Day 2

#### Teodora Băluță

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June 19, 2013

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## Overview

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Code Readability - just a fancy name? What is CR? Naming Aspect Modularity Commenting & Doc

Motivation

Tips to write readable code

Tools

Questions



# Code Readability

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#### A set of rules and best practices

#### • naming



# Code Readability

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- naming
- general aspect = aesthetic



# Code Readability

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- naming
- general aspect = aesthetic
- simplify code & modularity





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- naming
- general aspect = aesthetic
- simplify code & modularity
- commenting & documentation



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# Code Readability

- naming
- general aspect = aesthetic
- simplify code & modularity
- commenting & documentation
- refactoring



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Questions

## What's in a name?

```
class BinaryTree {
   int Size();
};
```

• Size() ??



## What's in a name?

```
class BinaryTree {
    int Size();
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- Size() ??
- could refer to the tree's height, number of nodes or the memory footprint on the disk

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• use specific, descriptive words

Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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Word	Alternatives
send	deliver, dispatch, announce, distribute, route
find	search, extract, locate, recover
start	launch, create, begin, open
make	creat, set up, build, generate, compose, add, new

Table : Useful alternatives

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Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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• avoid generic names



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- avoid generic names
  - for example, tmp și retval



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- avoid generic names
  - for example, tmp și retval
  - do we never use them?



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## Naming - cont

- avoid generic names
  - for example, tmp și retval
  - do we never use them?
- use a naming convention



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- avoid generic names
  - for example, tmp și retval
  - do we never use them?
- use a naming convention
  - lowercase + underscore: run\_simple\_cmd



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## Naming - cont

- avoid generic names
  - for example, tmp și retval
  - do we never use them?
- use a naming convention
  - lowercase + underscore: run\_simple\_cmd
  - CamelCase: runSimpleCmd, RunSimpleCmd()



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  - Hungarian notation: arru8NumberList (not recommended now)

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... be consistent!

```
Code Readability - just a fancy name? Motivation Tips to write readable code Tools
```

## Aspect

```
class StatsKeeper {
public:
  void Add(double d);
private: int count;
/* how many so far
*/ public:
  double Average();
private: double minimum;
list<double>
  past_items
    ;double maximum;
};
```

```
class StatsKeeper {
  public:
    void Add(double d);
    double Average();
  private:
    list<double> past_items;
    // how many so far
    int count;
    double minimum;
    double maximum;
};
```

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Indentation

• outline the flow of the code



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Indentation

- outline the flow of the code
- make code easier to read



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Indentation

- outline the flow of the code
- make code easier to read
- could be a part of the language (Python, Haskell)



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Indent Styles

• K&R (see *The C Programming Language* de Kernighan & Ritchie)

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• Allman - brackets under each instruction



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- Allman brackets under each instruction
- BSD KNF (Unix-like)



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- Allman brackets under each instruction
- BSD KNF (Unix-like)
- ... and combinations of these!

Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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Spacing

• readable code



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- declaring variabiles
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Spacing

- readable code
- declaring variabiles
  - a = 3, not a=3
- declaring pointers

int\* a vs int \*a

Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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Spacing

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Spaces vs tabs

• tabs depend on editor, spaces same everywhere Trailing whitespaces

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Trailing whitespaces

commit noise

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Spaces vs tabs

• tabs depend on editor, spaces same everywhere

Trailing whitespaces

- commit noise
- positioning the cursor at the end of the line

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Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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Lines < 80 characteres

• historical reasons


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Lines < 80 characteres

- historical reasons
- easier to read (short attention span?)



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Lines < 80 characteres

- historical reasons
- easier to read (short attention span?)

Column/Vertical Alignment

\$search = array('a', 'b', 'c', 'd', 'e'); \$replacement = array('foo', 'bar', 'baz', 'quux');

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Key Word: Consistency!



Tools

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Questions

# Functions, simplify your code

Naming functions: concrete and descriptive!



#### Motivatio

Tools Q

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Questions

## Functions, simplify your code

Naming functions: concrete and descriptive! Short, specific, easy to follow

• one functionality per function



#### Motivatio

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Questions

# Functions, simplify your code

Naming functions: concrete and descriptive! Short, specific, easy to follow

- one functionality per function
- short (aprox < 40 lines)



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#### Questions

# Functions, simplify your code

Naming functions: concrete and descriptive! Short, specific, easy to follow

- one functionality per function
- short (aprox < 40 lines)
- should be generic/reusable



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#### Motivatio

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Modularity



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Simplify the code's logic

• ternary operator: time\_str += (hour >= 12) ? "pm" : "am";



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- ternary operator: time\_str += (hour >= 12) ? "pm" : "am";
- while (cond) ... ; vs do ... while (cond);



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Modularity

Simplify the code's logic

- ternary operator: time\_str += (hour >= 12) ? "pm" : "am";
- while (cond) ... ; vs do ... while (cond);
  - Bjarne Stroustrup: In my experience, the do-statement is a source of errors and confusion. ... I prefer the condition "up front where I can see it." Consequently, I tend to avoid do-statements.



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## Commenting & Documenting

• One language only



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#### Questions

- One language only
- Describe what's not obvious

Code Readability - just a fancy name?  $^{\circ}_{\circ\circ\circ\circ}$ 

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Code Readability - just a fancy name?

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Code Readability - just a fancy name?

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Code Readability - just a fancy name?  $\circ$ 

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- Clear and corect

Code Readability - just a fancy name?  $_{\odot}$ 

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## Commenting & Documenting

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- Describe what's not obvious
  - algorithms, tricks
  - hacks
  - everything you think you won't understand in 3 months time
- Clear and corect
- Don't exaggerate!

// add the two numbers
suma = a + b;

Code Readability - just a fancy name? 0 000 0000 0 0	Motivation	Tips to write readable code	Tools	Questions			
Why?							

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• We read more code than we write

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Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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- We read more code than we write
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- We want others to understand our code

Code Readability - just a fancy name? 0 000	Motivation	Tips to write readable code	Tools	Questions
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Why?

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Code Readability - just a fancy name? 0 000 0000 0 0	Motivation	Tips to write readable code	Tools	Questions
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• Efficient code (but not optimized)

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  - make the code easier to understand
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  - inside do ... while(0)
    - use ";" after macro

Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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  - may insert bugs (they are not type safe)
  - inside do ... while(0)
    - use ";" after macro
- Include guards
- No typecast malloc in C

C: char \*str = malloc(256 \* sizeof(char));

C++: char \*str = (char\*) malloc(256 \* sizeof(char)

Code Readability - just a fancy name? 0 000 0000 0 0	Motivation	Tips to write readable code	Tools	Questions
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• Initialize variabiles cu 0, 0.0 sau NULL

Code Readability - just a fancy name? 0 000 0000 0 0	Motivation	Tips to write readable code	Tools	Questions
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- Initialize variabiles cu 0, 0.0 sau NULL
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Be better!

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- Initialize variabiles cu 0, 0.0 sau NULL
- Test possible return values
  - smaller chances to have bugs
- Get reviews!

Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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## Vim

- Auto-indent:
  - :set cindent
- Trailing whitespaces:
  - :set list

Gprof

- profiliing = analyze execution time per blocks
- -pg flags at compilation:

gcc example1.c -pg -o example1 -O2 -lc

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• C, C++, Pascal

Lint (splint)

spot some bugs!

Code Readability - just a fancy name?	Motivation	Tips to write readable code	Tools	Questions
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- Google C++ Style Guides
- Linux Kernel Coding Style
- How To Write Unmaintainable Code
- *The Art of Readable Code* by Dustin Boswell, Trevor Foucher, O'Reily Media, 2011

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