2nd hardest thing in computer science

@pawel_lewtak

Definition?

There are only two hard things in Computer Science: cache invalidation and naming things.

Phil Karlton

Source: https://martinfowler.com/bliki/TwoHardThings.html

There are 2 hard problems in computer science: cache invalidation, naming things, and off-by-1 errors

Leon Bambrick

Source: https://twitter.com/secretgeek/status/7269997868

There are only two hard problems in distributed systems:

2. Exactly-once delivery

1. Guaranteed order of messages

2. Exactly-once delivery

Mathias Verraes

Source: https://twitter.com/mathiasverraes/status/632260618599403520

#2 Naming things*

*things

- variables
- methods
- classes
- modules
- comments
- inline docs
- commit messages

You don't code for CPU

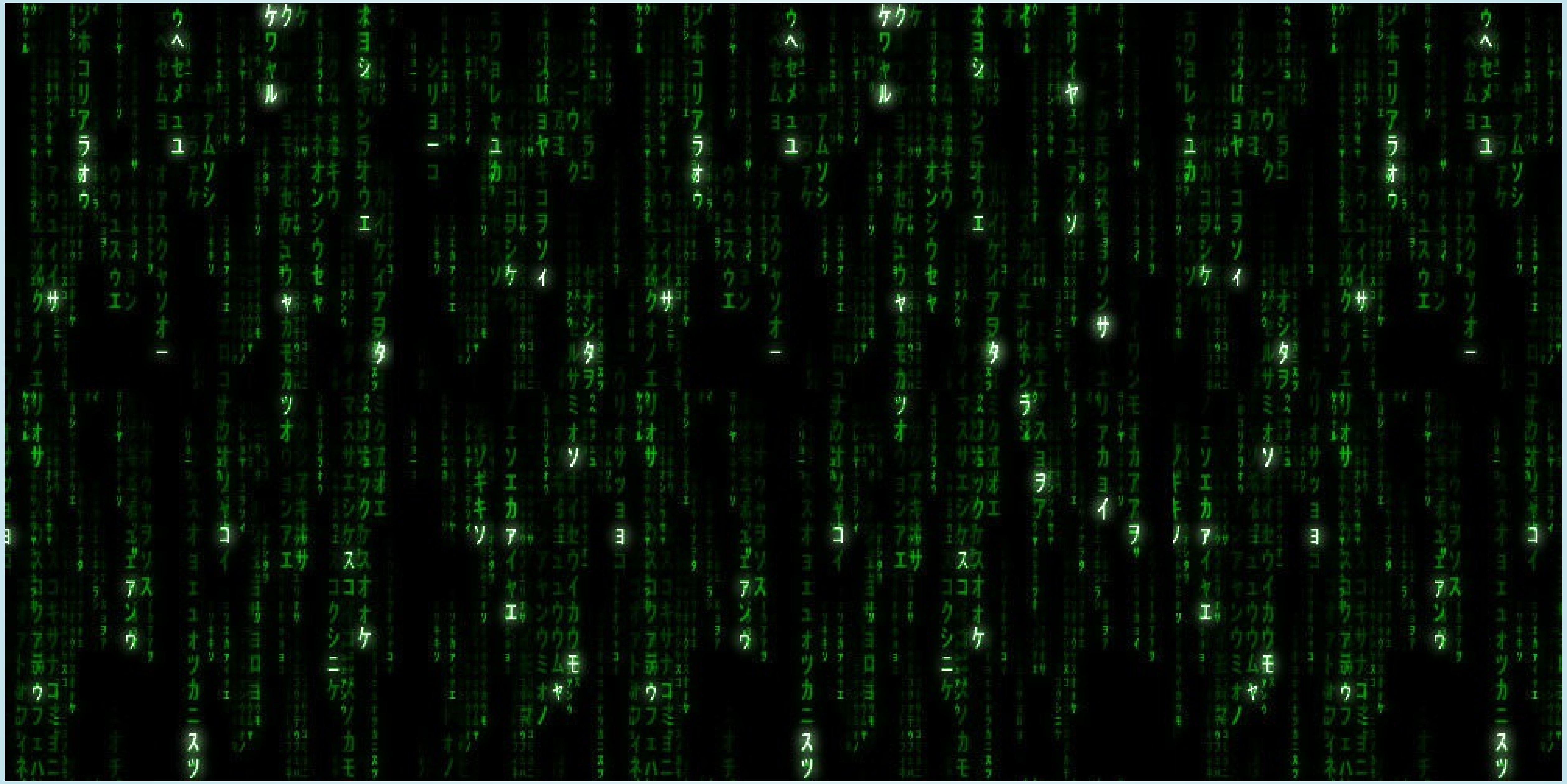
You don't code for interpreter

You don't code for compiler

SKYNET

NEURAL NET-BASED ARTIFICIAL INTELLIGENCE

CYBERYNE SYSTEMS CORPORATION



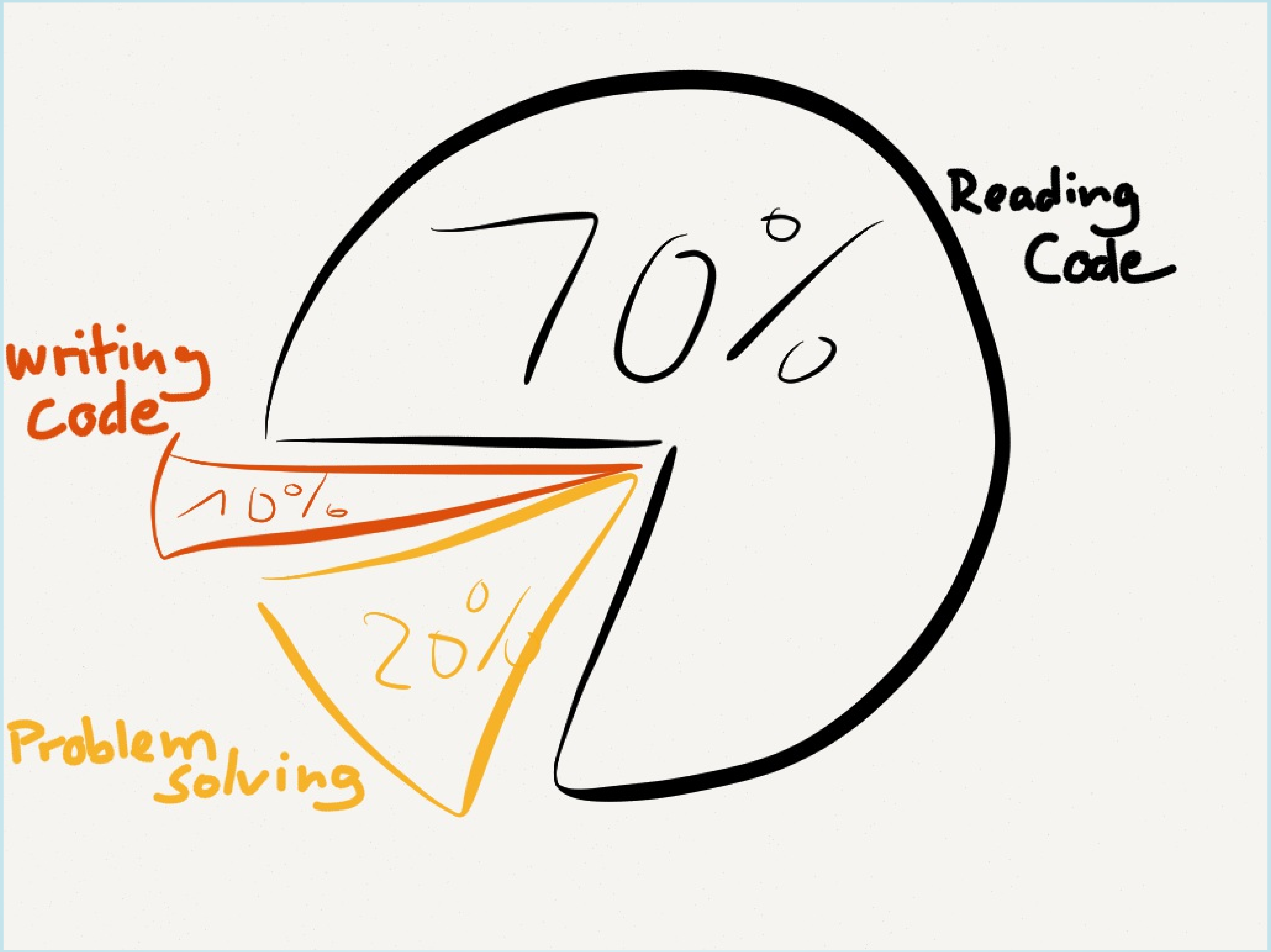
You code for people

You code for other developers

You code for your future self

Don't code, wrote prose

Source: https://www.youtube.com/watch?v=CKONKZLmMwk



Source: https://trustartist.com/2015/01/27/pair-programming-economics/

Always code as if the guy who ends up maintaining your code will be a violent psychopath who knows where you live.

Code for readability.

John F. Woods

Source: https://groups.google.com/forum/#!msg/comp.lang.c++/rYCO5yn4lXw/oITtSkZOtoUJ

Comprehension

~70%

```python
def a(b):
    c = sorted(b)
    d = len(b)
    if d % 2 == 1:
        return c[(d - 1) / 2]
    else:
        return (c[d/2 - 1] + c[d/2]) / 2
```

```python
def median(pool):
    copy = sorted(pool)
    size = len(copy)
    if size % 2 == 1:
        return copy[(size - 1) / 2]
    else:
        return (copy[size/2 - 1] + copy[size/2]) / 2
```

Self-documenting code

Code written by somebody else

Programming is mapping

- from problem domain
- via intermediate domain
- into programming domain

DDD FTW

Worst variable name

data

Source: http://archive.oreilly.com/pub/post/the_worlds_two_worst_variable.html

Thank You,
Captain
Obvious!

Second worst name?

data2

```
total = price * qty
total2 = total - discount
total2 += total * taxrate

total3 = purchase_order_value + available_credit
if total2 < total3:
  print ("You can't afford this order.")
```

```
order_total = price * qty
payable_total = order_total - discount
payable_total += payable_total * taxrate

available_funds = purchase_order_value + availble_credit
if payable_total < available_funds:
  print ("You can't afford this order.")
```

No-one sets out to write legacy code

Rachel Willmer

Source: https://twitter.com/amokleben/status/868377283496751104?s=09

Broken window theory

Code will decay

Design patterns

Misapplied Java design patterns

are the root of all AbstractWordFactoryFactory("evil")

HN comment

Source: https://twitter.com/tmmx/status/865308678903267328

Naming conventions

TL;DR

- CamelCaseClass
- methodName
- someVariable
- CAPITAL_CONSTANT

syntax < semanthics

Common issues

Pseudo getter

get_data()

with extra operations inside

get_create_object()

- fetch
- find
- lookup
- create
- calculate

Not really a boolean

is_active()

```
def is_active():
  if cond:
    return 'false'
  return 'true'
```

is_valid()

```
def is_valid():
  if input_is_valid:
    return True
```

Plural / singular names

```python
def get_person():
  return ['John Doe', 'Jane Doe']

def get_employers():
  return 'John Doe'
```

Misleading docs

```python
def get_lowest_price(user):
  pass
```

```python
def get_lowest_price(user):
  """Actually it returns the highest price."""
  pass
```

More than one responsibility

Abbreviations

```
pos
mod
abs
auth
```

Synonyms

<ThatThing>Manager

- UserManager
- StringManager
- ProductManager
- etc.

Alternatives

- Builder
- Writer
- Adapter
- Factory
- Handler
- Provider
- Converter

Magic numbers

```python
import requests

response = requests.get('https://pl.pycon.org/')
if response.status_code == 200:
  print ("It works!")
elif response.status_code == 418:
  print ("Unexpected teapot!")
```

```python
import requests

response = requests.get('https://pl.pycon.org/')
if response.status_code == requests.codes.ok:
  print ("It works!")
elif response.status_code == requests.codes.teapot:
  print ("Unexpected teapot!")
```

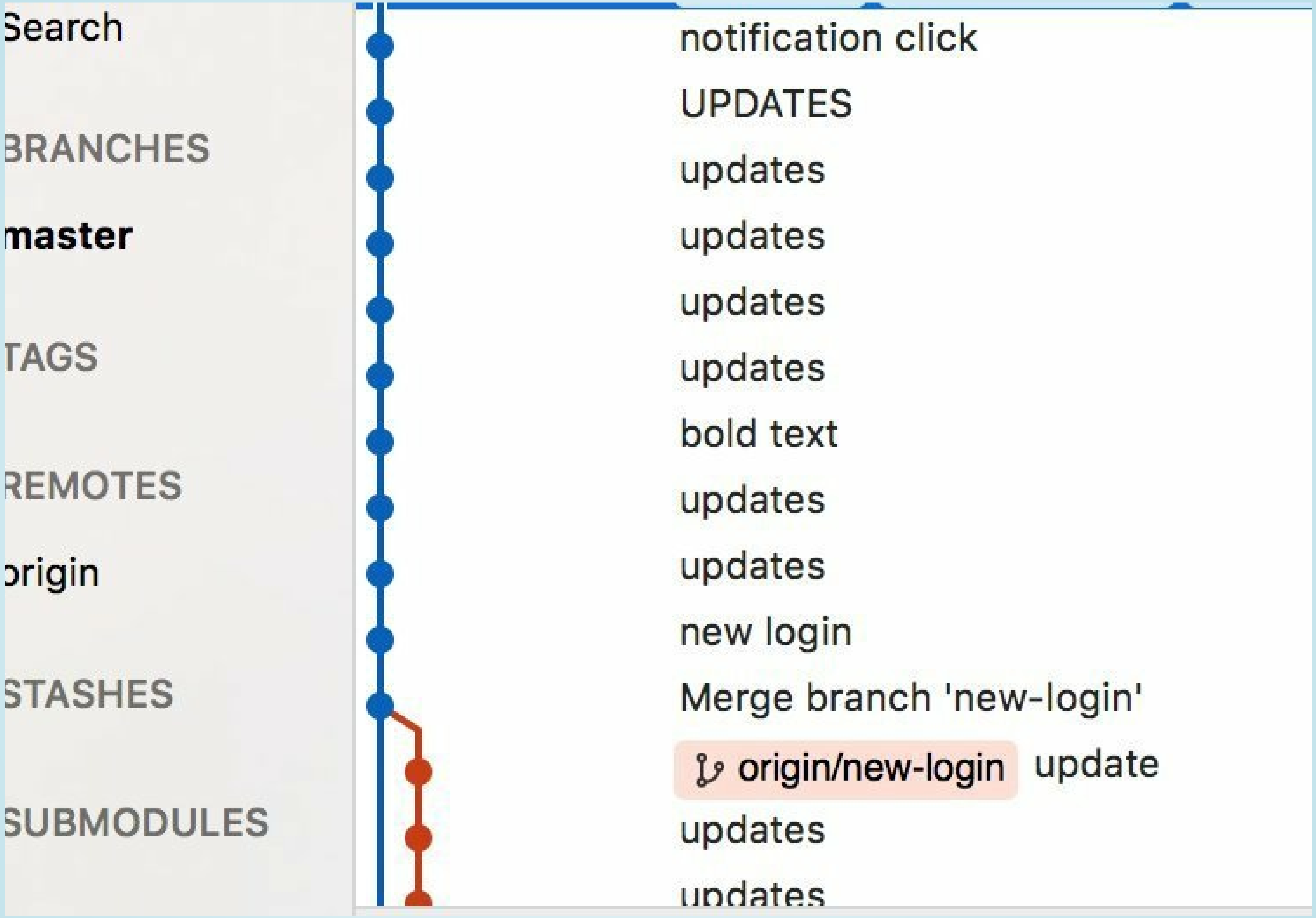
Useless comments

```python
def get_data():
  """ Returns the data. """
  pass

def get_max_id_from_db():
  """ Return maximum ID value from the database."""
  pass
```

Explain why,
not what or how

Commit messages


Search

BRANCHES

master

TAGS

REMOTES

origin

STASHES

SUBMODULES

```
notification click
UPDATES
updates
updates
updates
updates
bold text
updates
updates
new login
Merge branch 'new-login'
origin/new-login update
updates
updates
```

Source: https://twitter.com/ArielBH/status/895601429255245824

Don't do it like this

- http://whatthecommit.com
- http://www.commitlogsfromlastnight.com/

Bad name:

- Does more that what is says
- Says more than what it does
- Does the opposite
- Contains more than what it says
- Says more than what it contains
- Contains the opposite

Good practices

Specific names

No generics

Short names

Do not use negation

is_not_enabled()

is_disabled()

Consistent names

Code & docs

Single responsibility

Domain terms

Think about it

ASCII only

~~Hungarian notation~~

```
hostList, hostSet => hosts, validHosts
valueString => firstName, lowercasedSKU
intNumber => accountNumber
```

Tests!

Commit message

Good commit message

- Speeds up review process
- Helps write release notes
- Helps future maintainers

```
Short (50 chars or less) summary of changes

More detailed explanatory text, if necessary.  Wrap it to about 72
characters or so.  In some contexts, the first line is treated as the
subject of an email and the rest of the text as the body.  The blank
line separating the summary from the body is critical (unless you omit
the body entirely); tools like rebase can get confused if you run the
two together.

Further paragraphs come after blank lines.

  - Bullet points are okay, too

  - Typically a hyphen or asterisk is used for the bullet, preceded by a
    single space, with blank lines in between, but conventions vary here
```

Source: Source: http://git-scm.com/book/ch5-2.html

How?

Agree on standards

Boy Scout Rule

Practice

Improve vocabulary

Refactor

Code reviews

Short, bite size, single logical change

Code ownership

Commit messages

Research papers

- https://www.cqse.eu/publications/2005-concise-and-consistent-naming.pdf
- http://www.cs.loyola.edu/~lawrie/papers/lawrieJese07.pdf
- https://www.researchgate.net/publication/224079441_Relating_Identifier_Naming_Flaws_and_Code_Quality_An_Empirical_Study
- http://www.veneraarnaoudova.com/wp-content/uploads/2014/10/2014-EMSE-Arnaodova-et-al-Perception-LAs.pdf

Thank you!

@pawel_lewtak

Questions?

@pawel_lewtak