yelp

# Washing away code smells

@yennycheung #EuroPython

ABOUT ME

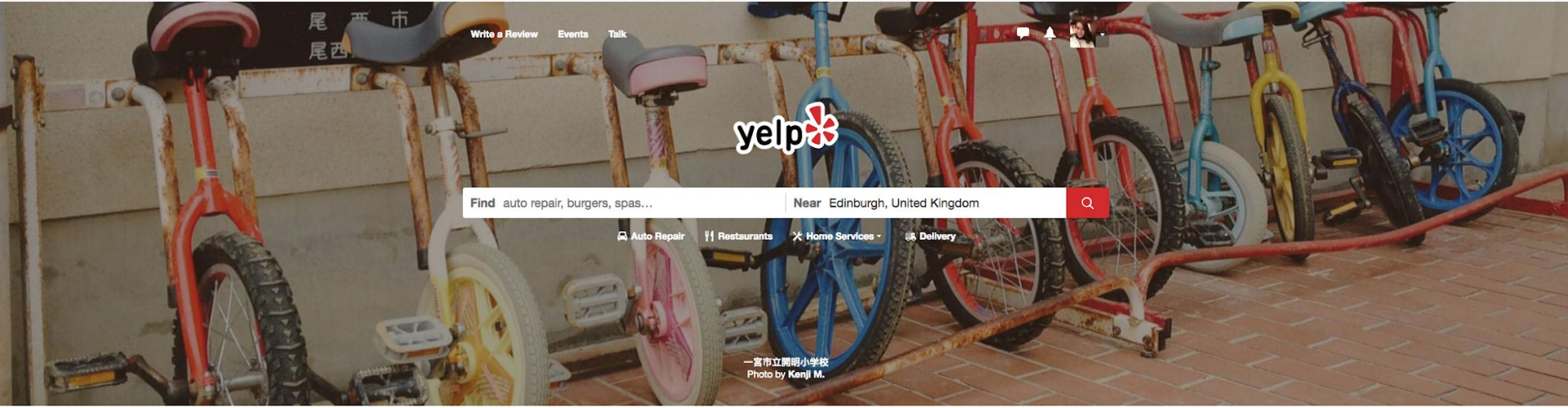
# Yenny Cheung

Originally from Hong Kong

Software Engineer at Yelp
On the Biz National team
In Hamburg

Speaker at PyConDE, PyDays Vienna and Talk Python podcast

# Connecting people with great local businesses




## Your Next Review Awaits

**China Restaurant Golden**
Wartenau 4

**Flowers' Whisper**
Mönckebergstr. 7

**Ume no Hana**
Thadenstr. 15

**Shiso Burger**
Bugenhagenstr. 23

**China Feng**
Ness 1

**TrüffelSchwein**
Mühlenkamp 54

# Some fun facts about Yelp

Yelpers have written **155 million** reviews since 2004.

We have **74 million** desktop and **30 million** mobile app monthly unique visitors.

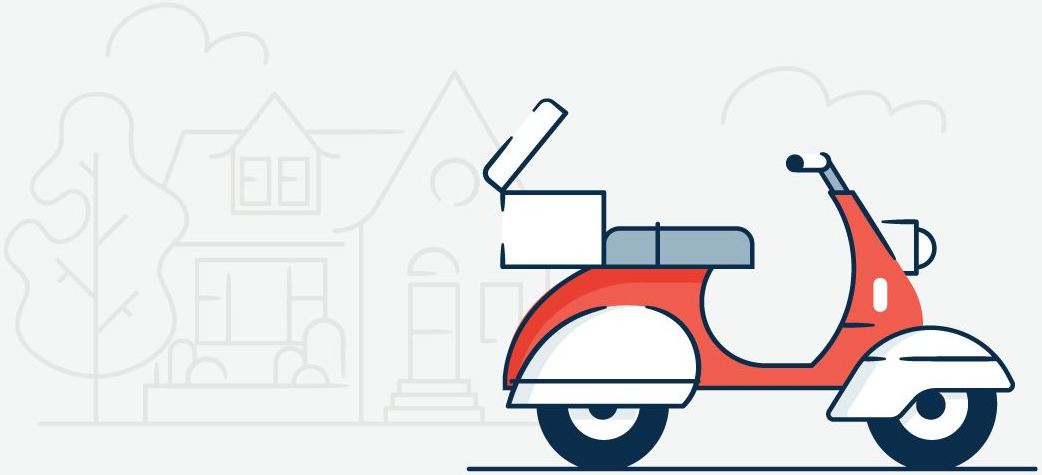
We have over **500 developers**.

We have over **300 services** and our monolith yelp-main has over **3 million** lines of code!

# Agenda
# for today

- What are **code smells**?
- **Why** do we care?
- How to use **refactoring** to wash away code smells?
- **Tips** for bringing refactoring to your company

# What are code smells?



"A code smell is a surface indication that usually corresponds to a deeper problem in the system."

*- Martin Fowler, author of the book “Refactoring”*

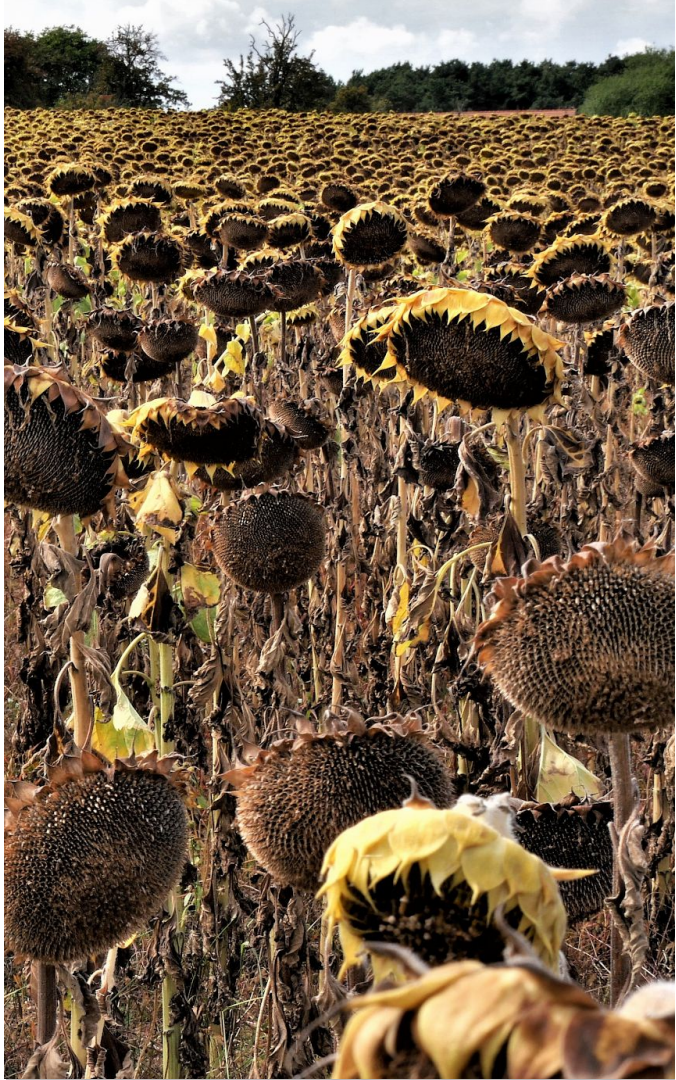
# Why do we care?

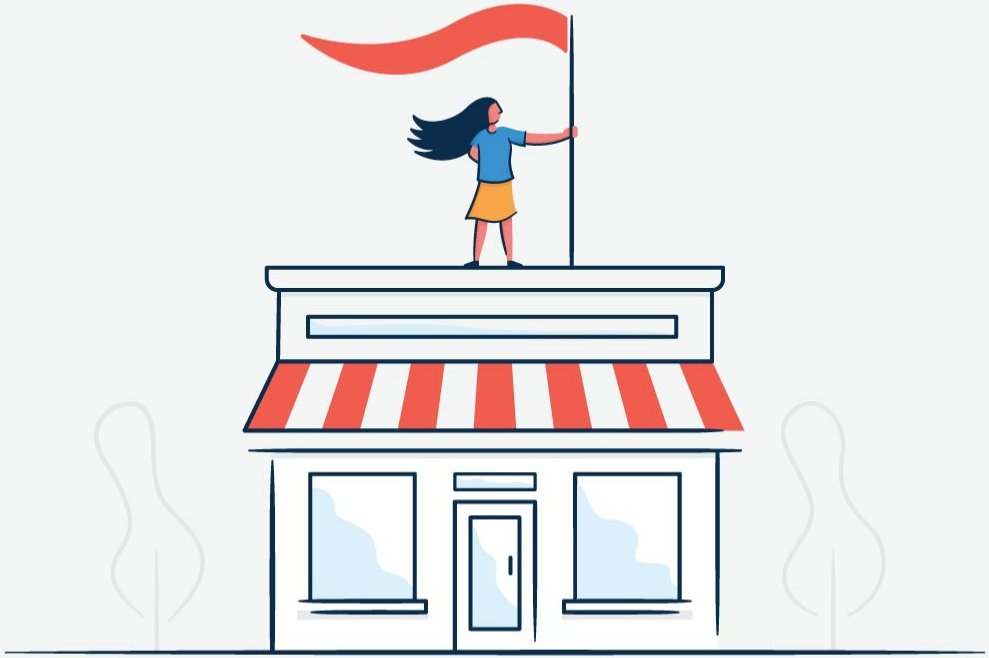
"Let 1,000 flowers bloom. Then rip 999 of them out by the roots."

*- Peter Seibel, tech lead for Twitter's Engineering Effectiveness group*

**Code smells when left unchecked...**

- Builds up **tech debt**
- Allows **code rot**!
- Makes it harder to build **flexible** software
- Decreases **productivity** and **developer happiness**



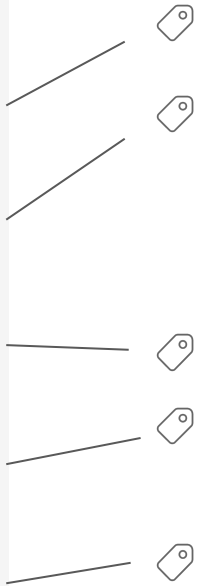


# Refactoring comes to our rescue

Refactoring is a changes the design of your code but not the functionality.

## CODE SMELLS

- Uncommunicative naming
- Comments as deodorant
- Dead code
- Duplicated code
- Conditional complexity



```python
def get_cheese(mood, hunger, money):
    if mood > 3:
        if money == 0:
            return None
        # good mood and hungry
        if hunger > 4:
            return 'bleu'
        # good mood and not hungry
        else:
            return 'american'
    else:
        if mood > 4:
            return None
        if money == 0:
            return None
        else:
            # bad mood and hungry
            if hunger > 4:
                return 'brie'
            # bad mood and not hungry
            else:
                return 'mozzarella'


if __name__ == "__main__":
    cheese = get_cheese(3, 5, 1)
```

# Better!

- Guard clauses
- Keyword arguments, PEP8 compliant too!

```
def get_cheese(mood, hunger, money):
    """Evaluate criteria and pick cheese."""

    is_happy = mood > 3
    is_hungry = hunger > 4
    has_money = money > 0

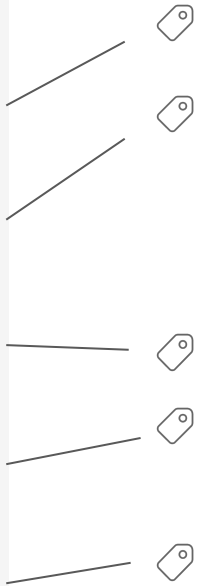
    if not has_money:
        return None
    if is_hungry and not is_happy:
        return 'brie'
    if not is_hungry and is_happy:
        return 'american'
    if not is_hungry and not is_happy:
        return 'mozzarella'
    else:
        return 'bleu'


if __name__ == "__main__":
    cheese = get_cheese(
        mood=3,
        hunger=5,
        money=1,
    )
```

# Refactoring
## deep-dive

## REFACTORING TECHNIQUES

- Uncommunicative naming → **Name it right!**
- Comments as deodorant → **Name it right!**
- Dead code → **Remove code**
- Duplicated code → **DRY**
- Conditional complexity → **Decompose conditional into guard clauses**



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        else:
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if __name__ == "__main__":
    cheese = get_cheese(3, 5, 1)
```

# Refactoring Techniques

- Name it **right**!
- Get organized
- Picking the right **data structure**

# Name it right!

**A cure for uncommunicative naming**

- Python is **dynamically typed**
- Variable, function & **module** naming
- **Keyword arguments** increase clarity
- Replace magic strings and numbers with **Enums**!

# Enum how to

- Explicit
- Supports iterable
- Enum members are hashable

```
>>> class Mood(Enum):
...     EXUBERANT = 0
...     CONTENT = 1
...     APATHETIC = 2
...     MELANCHOLIC = 3
...
>>> for mood in Mood:
...     print(mood)
...
Mood.EXUBERANT
Mood.CONTENT
Mood.APATHETIC
Mood.MELANCHOLIC

>>> print(Mood.EXUBERANT)
Mood.EXUBERANT
>>> print(repr(Mood.EXUBERANT))
<Mood.EXUBERANT: 0>

>>> my_mood_count_this_week = {}
>>> my_mood_count_this_week[Mood.EXUBERANT] = 3
>>> my_mood_count_this_week[Mood.MELANCHOLIC] = 1
>>> my_mood_count_this_week[Mood.APATHETIC] = 3
>>> my_mood_count_this_week
{<Mood.APATHETIC: 2>: 3, <Mood.EXUBERANT: 0>: 3,
<Mood.MELANCHOLIC: 3>: 1}
```

# Get organized

**A cure for long functions, classes and parameter lists**

- Single Responsibility principle
- Function extraction
- Decompose conditionals
- **DRY** (Don’t repeat yourself)

# Fixing long parameter lists

- Long param list
- NamedTuples to the rescue

```python
def identify_cheese(
    country,
    smell,
    touch,
    city,
    year,
    taste,
):
    ...
```

```python
class CheeseProductionInfo(NamedTuple):
    country: str
    city: str
    year: str

class CheeseAttributes(NamedTuple):
    smell: str
    taste: str
    touch: str


def identify_cheese(
    cheese_production_info,
    cheese_attributes,
):
    ...
```

# Picking the right data structure

- Dictionaries
- NamedTuples
- Lists
- Sets

# Picking the right data structure

- Using **dictionaries**
- Beware that dictionaries are **mutables!**

```
>>> def sum_cheese(
...     cheese_counts={
...         'bleu':0,
...         'brie':0
...     }
... ):
...     cheese_counts['bleu'] += 1
...
>>> sum_cheese.__defaults__
({'brie': 0, 'bleu': 0},)

>>> sum_cheese()
>>> sum_cheese.__defaults__
({'brie': 0, 'bleu': 1},)
```

# Picking the right data structure

- Using **NamedTuples**
- **NamedTuples** are immutables

```
>>> from typing import NamedTuple

>>> class CheeseCounts(NamedTuple):
...     bleu: int
...     brie: int

>>> CheeseCounts.__new__.__defaults__ = (0, 0)

>>> print(CheeseCounts(brie=2))
CheeseCounts(bleu=0, brie=2)

>>> print(CheeseCounts())
CheeseCounts(bleu=0, brie=0)
```

# Picking the right data structure

- Using **Lists**
- This is very **verbose**

```
def select_favorite_cheese_from_catalog(
    cheese_catelog,
    my_favorite_cheese,
):
    selected_cheese = []
    for cheese in cheese_catelog:
        if cheese in my_favorite_cheese:
            selected_cheese.append(cheese)
    return selected_cheese


select_favorite_cheese_from_catalog(
    cheese_catelog=[
        Cheese.BLEU,
        Cheese.CHEDDAR,
    ],
    my_favorite_cheese=[
        Cheese.TRUFFLE_BRIE,
        Cheese.BLEU,
    ],
)

>>> [<Cheese.BLEU: 'Bleu'>]
```

# Picking the right data structure

- Using **Sets**
- **Set** comparisons are great

```
def select_favorite_cheese_from_catalog(
    cheese_catelog,
    my_favorite_cheese,
):
    return (
        cheese_catelog
            .intersection(my_favorite_cheese)
    )


select_favorite_cheese_from_catalog(
    cheese_catelog=set([
        Cheese.BLEU,
        Cheese.CHEDDAR,
    ]),
    my_favorite_cheese=set([
        Cheese.TRUFFLE_BRIE,
        Cheese.BLEU,
    ]),
)

>>> {<Cheese.BLEU: 'Bleu'>}
```

Check out the standard library, especially **Itertools and Collections** for handy tools!

# Testing
# in the refactoring process

# Testing in the refactoring process

1. Write **integration** / end-to-end tests for the code to be refactored
   Tests that your application will still **behave the same**

2. Refactoring

3. Write **unit tests** for refactored code
   Tests that the code is **correct**

# Tips for bringing refactoring to your company

# The secret weapon of code reviews

- **Boy scout rule**: leave it cleaner than you found it
- Encourage refactoring when we add code and fix bugs

# How to convince your product manager

- Break down the tasks and take maintenance into account, with refactoring, **4 weeks**, otherwise **6 weeks**
- **If all things fail, abstracting** out the implementation detail, adjust estimates to include refactoring and test, “this feature takes **X**”

# Automate your refactoring process

- Yelp's **open source tool**: Undebt
  Based on pyparsing, massive find and replace tool

- Yelp uses a **debt tracker**: Branch Debt
  Example metrics: noqa count, deprecated function count, lines added to our monolith yelp-main

# Takeaways from the talk

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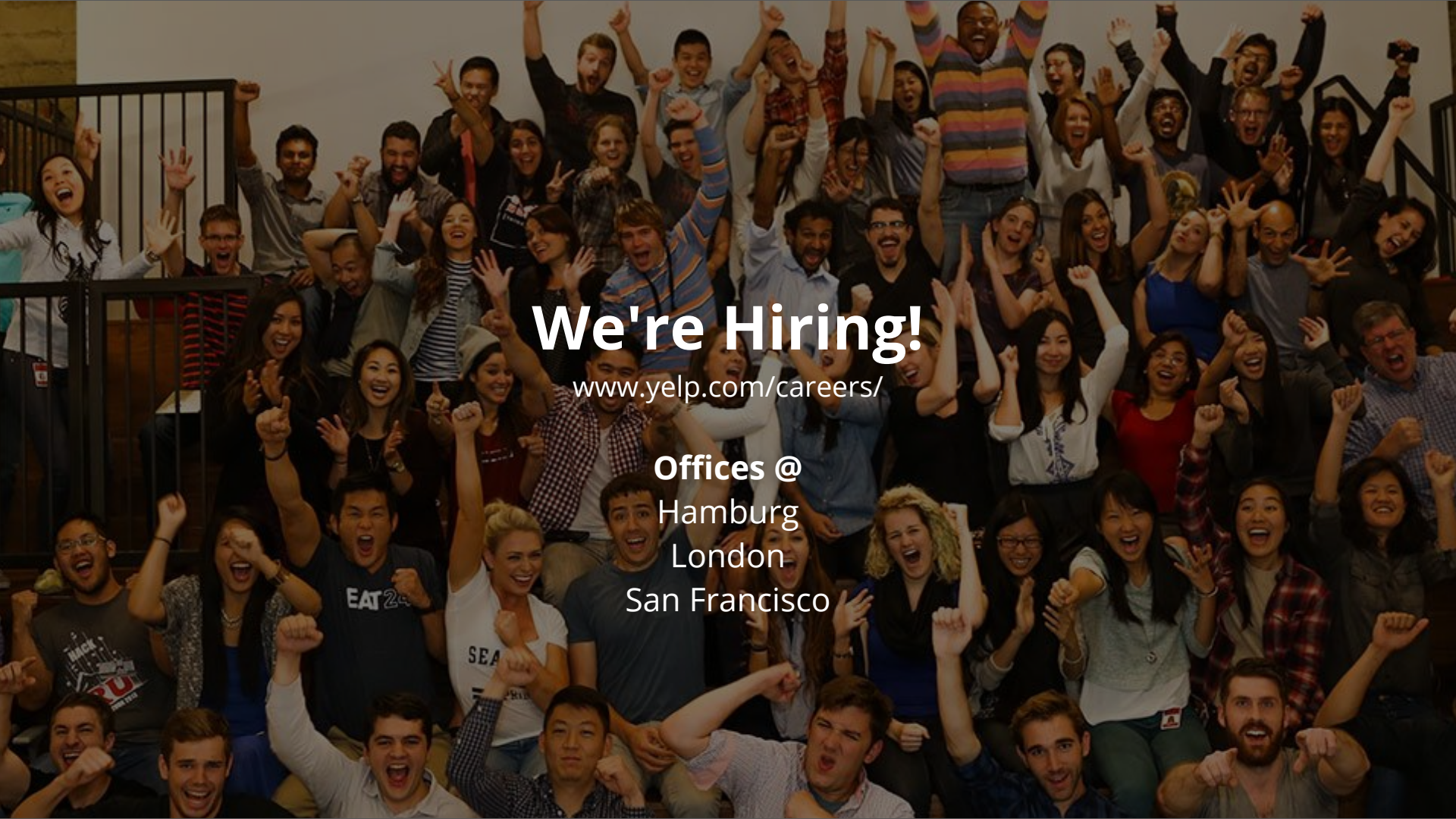
- **Tips** for bringing refactoring to your company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# Thank you!


# Questions?