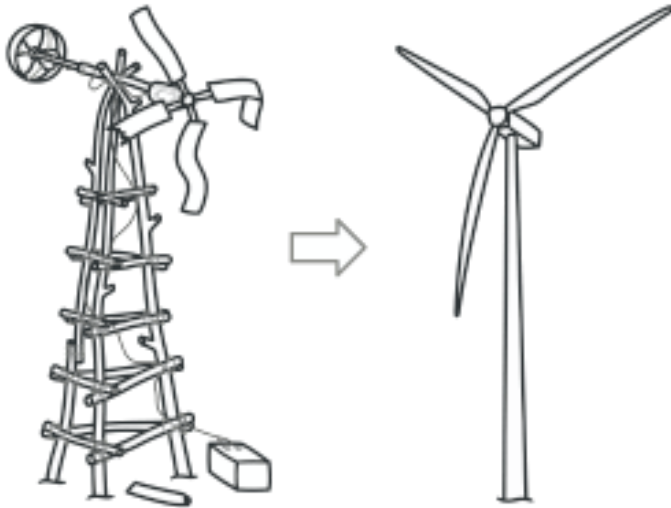


# Refactoring

## Introduction



## Easy example (before)

```
public boolean max(int a, int b) {  
    if(a > b) {  
        return true;  
    } else if (a == b) {  
        return false;  
    } else {  
        return false;  
    }  
}
```

## Easy example (after)

```
public boolean max(int a, int b) {  
    return a > b;  
}
```

## Why ?

- Improve **understanding** of code
- Help find and fix **bugs**
- Accelerate the **speed** of development
- Improve **design**

## Code smells (basic)

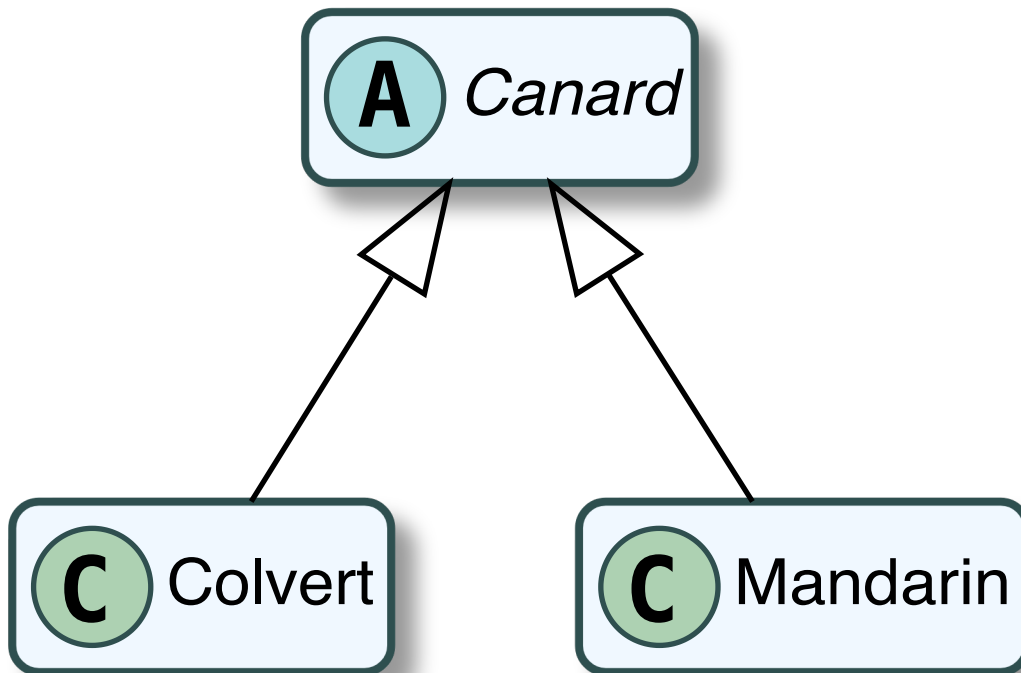
Large class

- Long methods
- Too many parameters
- Using a lot of primitive data types (`String`, `float`, ...)

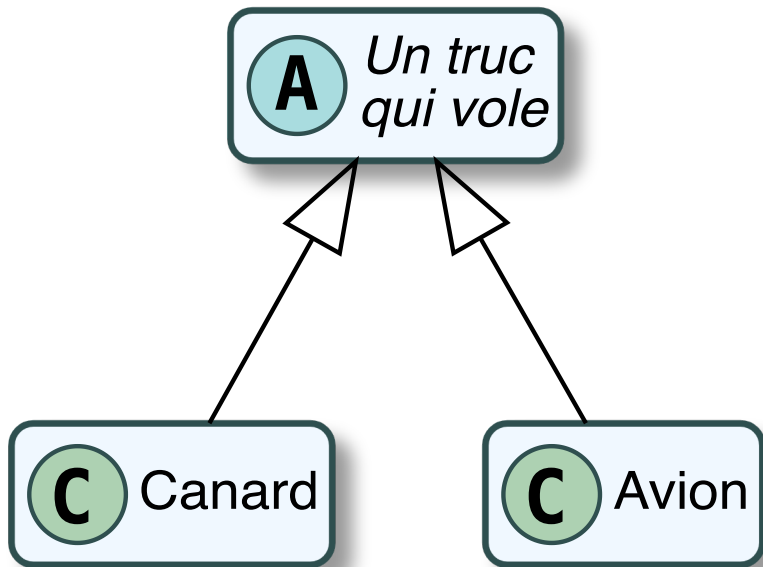
## Code smells (OO)

- Switch case
- Temporary field (`null`)
- Parallel inheritance hierarchies
- Wrong use of inheritance

Use of inheritance



Wrong use of inheritance



## Garbage Smells

- Too many comments
- Duplicated code
- Lazy class
- Unused code

## Excessive connectivity

- External methods
- Dependency with another class' implementation details
- Long class call

## Refactoring techniques

- Extract a class
- Extract a method
- Passing an entire object

## Extract a class

```
class Human {  
    private String name;  
    private String age;  
    private String country;
```

```

private String street;
    private String house;
    private String quarter;

    public String getFullAddress() {
        StringBuilder result = new StringBuilder();
        return result
            .append(country)
            .append(", ")
            .append(city)
            .append(", ")
            .append(street)
            .append(", ")
            .append(house)
            .append(" ")
            .append(quarter).toString();
    }
}

```

!

```

class Human {
    private String name;
    private String age;
    private Address address;

    private String getFullAddress() {
        return address.getFullAddress();
    }
}

class Address {
    private String country;
    private String city;
    private String street;
    private String house;
    private String quarter;

    public String getFullAddress() {
        StringBuilder result = new StringBuilder();
        return result
            .append(country)
            .append(", ")
            .append(city)
            .append(", ")
            .append(street)
            .append(", ")
            .append(house)
            .append(" ")
            .append(quarter).toString();
    }
}

```

## Extract a method

```

public void calcQuadraticEq(double a, double b, double c) {
    double D = b * b - 4 * a * c;
    if (D > 0) {
        double x1, x2;
        x1 = (-b - Math.sqrt(D)) / (2 * a);
        x2 = (-b + Math.sqrt(D)) / (2 * a);
        System.out.println("x1 = " + x1 + ", x2 = " + x2);
    }
}

```

```

else if (D == 0) {
    double x;
    x = -b / (2 * a);
    System.out.println("x = " + x);
}
else {
    System.out.println("Equation has no roots");
}
}

!

public void calcQuadraticEq(double a, double b, double c) {
    double D = b * b - 4 * a * c;
    if (D > 0) {
        dGreaterThanZero(a, b, D);
    }
    else if (D == 0) {
        dEqualsZero(a, b);
    }
    else {
        dLessThanZero();
    }
}

```

## Passing an entire object

```

public void employeeMethod(Employee employee) {
    // Some actions
    double yearlySalary = employee.getYearlySalary();
    double awards = employee.getAwards();
    double monthlySalary = getMonthlySalary(yearlySalary, awards);
    // Continue processing
}

public double getMonthlySalary(double yearlySalary, double awards) {
    return (yearlySalary + awards)/12;
}

!

public void employeeMethod(Employee employee) {
    // Some actions
    double monthlySalary = getMonthlySalary(employee);
    // Continue processing
}

public double getMonthlySalary(Employee employee) {
    return (employee.getYearlySalary() + employee.getAwards())/12;
}

```

## Advice for the project

Issues to list the ideas

Filters

☐ **5 Open** ☒ 0 Closed

☐ **refactoring**  
#6 opened 15 days ago by jmbruel 0 of 3

☐ **refactoring**  
#5 opened 15 days ago by jmbruel 0 of 3

☐ **refactoring**  
#4 opened 15 days ago by jmbruel 0 of 3

☐ **refactoring**  
#2 opened 20 days ago by jmbruel 0 of 3

☐ **Continuous Integration**  
#1 opened 20 days ago by jmbruel 0 of 3

Describe / Explain each idea

jmbruel commented 15 days ago

**Problem:**  
[Redacted]

**Example:**  
[Redacted]

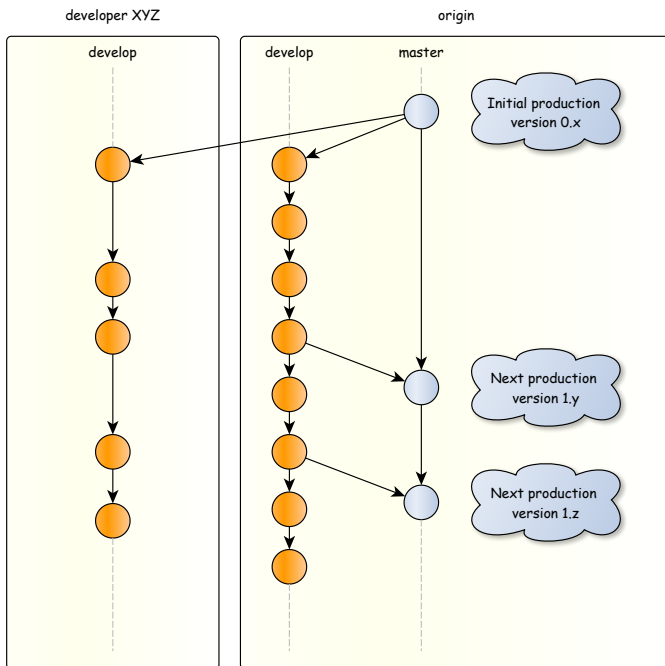
**Argument:**  
[Redacted]

**Proposed Solution:**  
[Redacted]  
See also if it solves issue #4.

**Check before merge:**  
(taken from <https://refactoring.guru/refactoring/how-to>)

- ☐ The code should become cleaner
- ☐ New functionality shouldn't be created during refactoring
- ☐ All existing tests must pass after refactoring.

1 refactoring = 1 branch



Professional **README**

[exempleProjet2020.pdf](#)

## Ressources

- <https://refactoring.guru/fr/refactoring>
- <https://codegym.cc/groups/posts/196-how-refactoring-works-in-java>

Ready for a quiz?

make refa