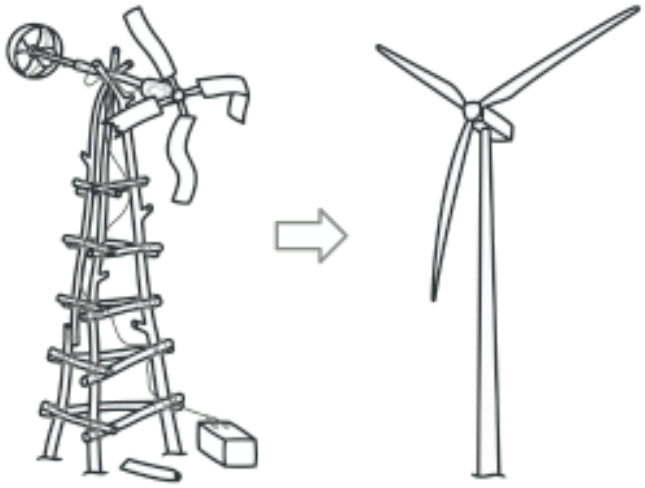
Refactoring

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**

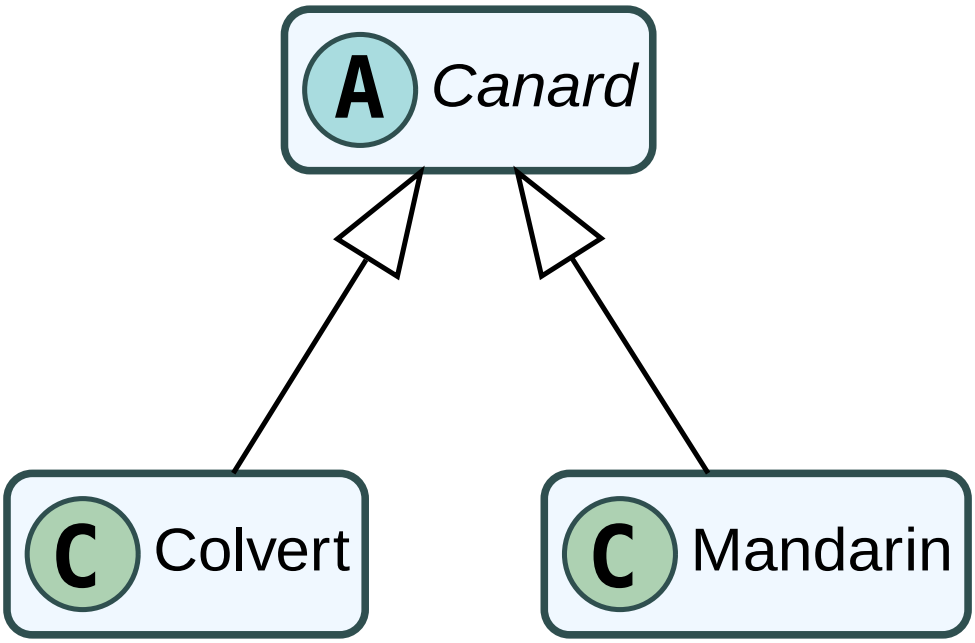
Code smells (basic)

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

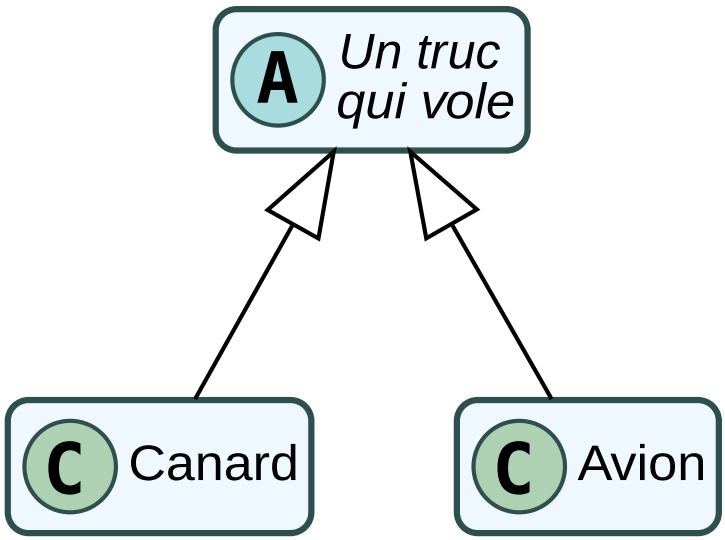
Code smells (OO)

- 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 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();
    }
 }
```

!

```
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

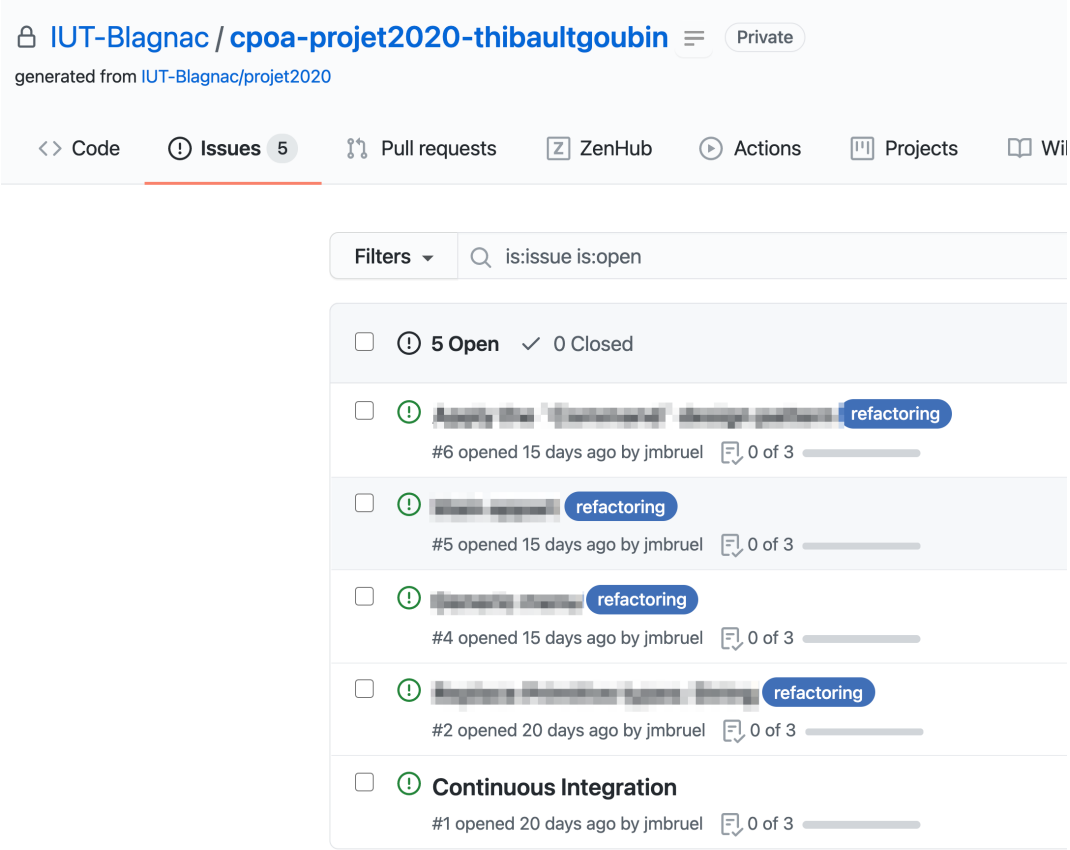
```
public void employeeMethod(Employee employee) {
    // Some actions
    double yearlySalary = employee.getYearlySalary();
    double awards = employee.getAwards();
    double monthlySalary = getMonthlySalary(yearlySalary, awards);
    // Continue processing
}

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

!

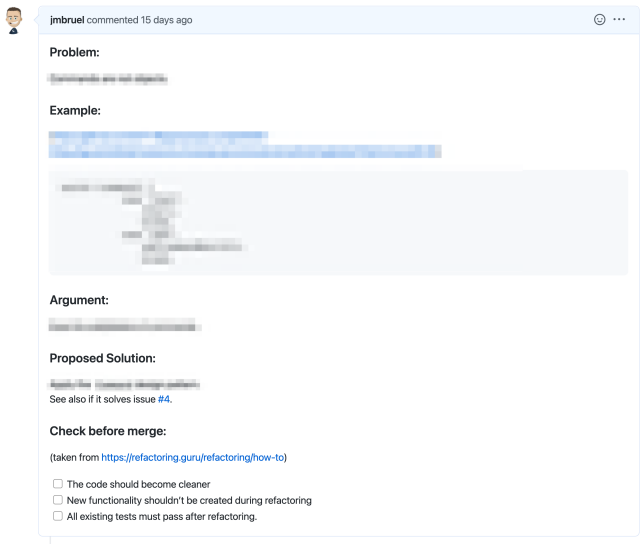
```
public void employeeMethod(Employee employee) {
    // Some actions
    double monthlySalary = getMonthlySalary(employee);
    // Continue processing
}

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

Advice for the project

Issues to list the ideas



Describe / Explain each idea



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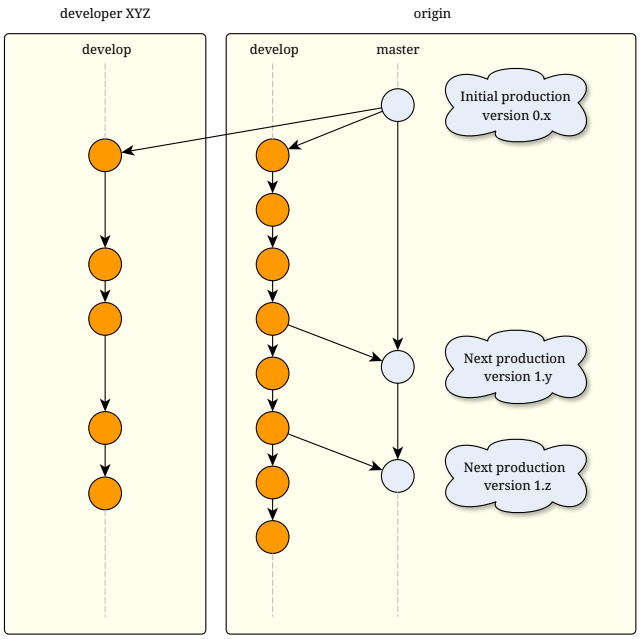

Professional `README`

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