Hexacta Labs

Clean Code

PUESTO Nº6

NIVEL 3

EMPRESA INFORMÁTICA 2009

EXPORTACIÓN DE SERVICIOS

Agenda

- ¿Clean code?
- Reglas básicas
- Code Smells
- Refactorings mas utilizados
- Herramientas
- Bibliografía

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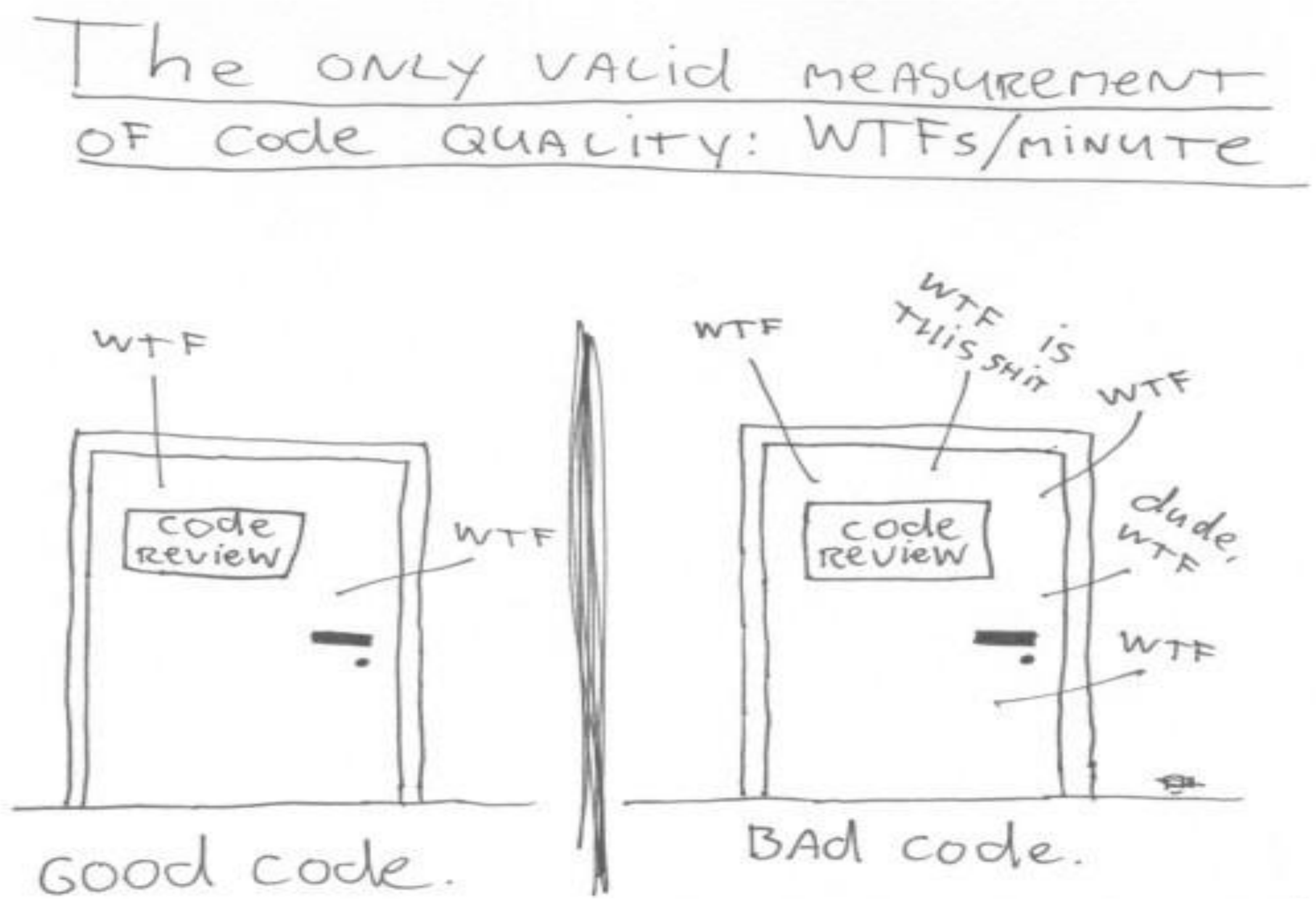
Índice WTF


The only valid measurement of code quality: WTFs/minute
WTF
WTF
code review
Good code.
WTF
WTF is this shit
WTF
code review
dude, WTF
WTF
BAd code.

¿ Clean Code ?

Expresivo

una sola cosa

y bien

Simple

colaboradores explícitos

0% Duplicados

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somos @autores

```
import java.util.List;
/**
 * @author pepe
 */
public class CycloDetector {
    ...
    ...
    ...
}
```

~10:1

Nombres que revelen intención

```
int h; //hours since game started

int hoursSinceGameStarted;
```

Nombres que revelen intención

```
boolean linearSearchFor(Object element)
```

```
boolean includes(Object element)
```

Nombres pronunciables

```
public DateFormatContainer(String dfStr) {
    this.dfStr = dfStr;
}
```

```
public DateFormatContainer(String aDateFormat) {
    this.dateFormat = aDateFormat;
}
```

Único nivel de abstracción

```
public void …() {
      Html html = new Html();
      html.addText("Hola");
      StringBuffer buffer = new StringBuffer()
      buffer.append("<p>holaaaa</p></br>");
      buffer.append("<p>como les va!</p>");
      html.addFragment(buffer.toString());
}
```

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Único nivel de abstracción

```
public void …() {
      Html html = new Html();
      html.addText("Hola");
      html.addParagraph("holaaaa");
      html.addBreak();
      html.addParagraph("como les va!“);
}
```

Clean Code – Reglas básicas

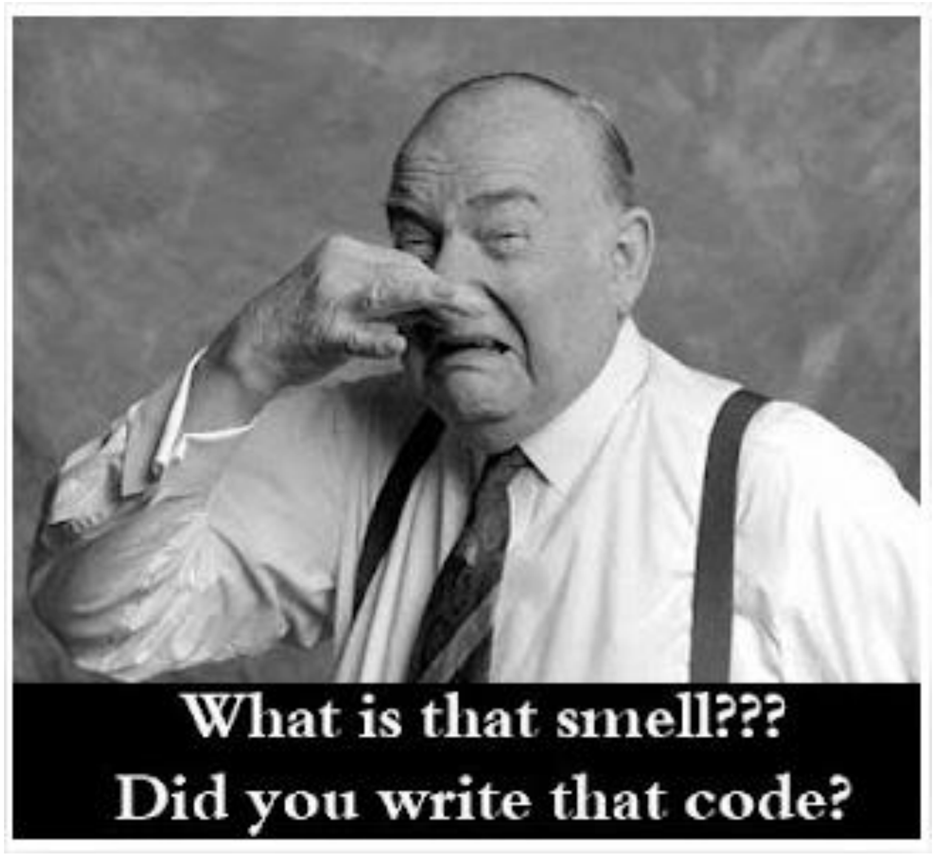
Sin efectos secundarios

```
public boolean checkPassword(User user, String password) {
  Phrase userCodedPhrase = user.getPhraseEncodedByPassword();
  Phrase phrase = cryptographer.decryp(password);

  if (phrase.sameAs(userCodedPhrase)) {
    Session.initialize();
    return true;
  }

  return false;
}
```

Code smells



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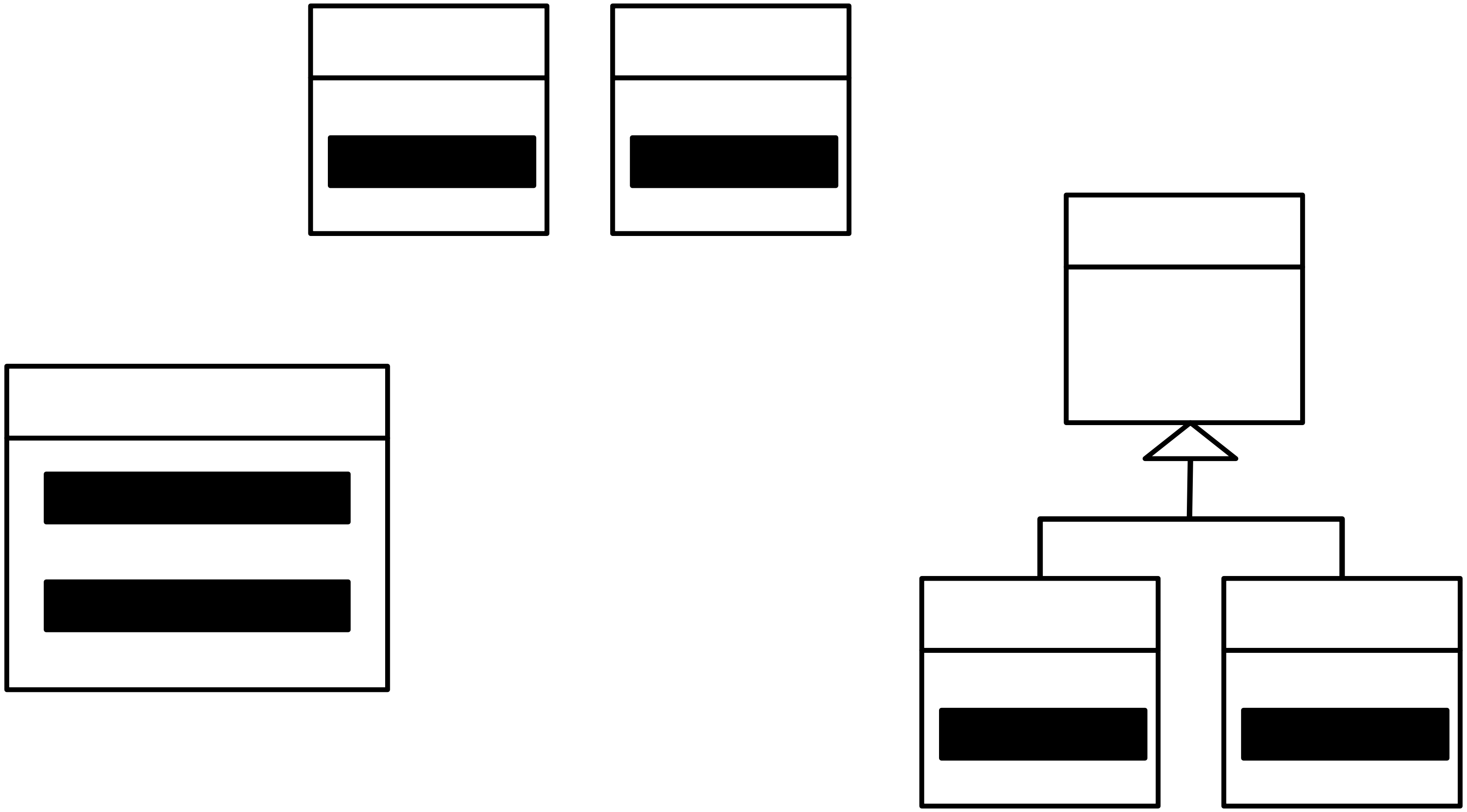
Duplicated Code



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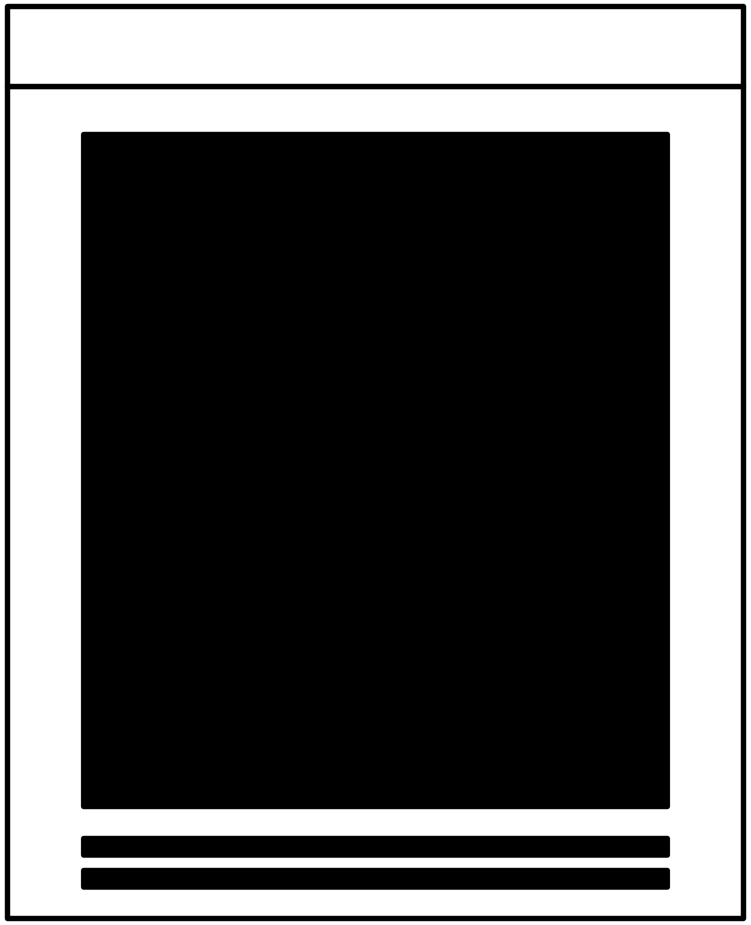
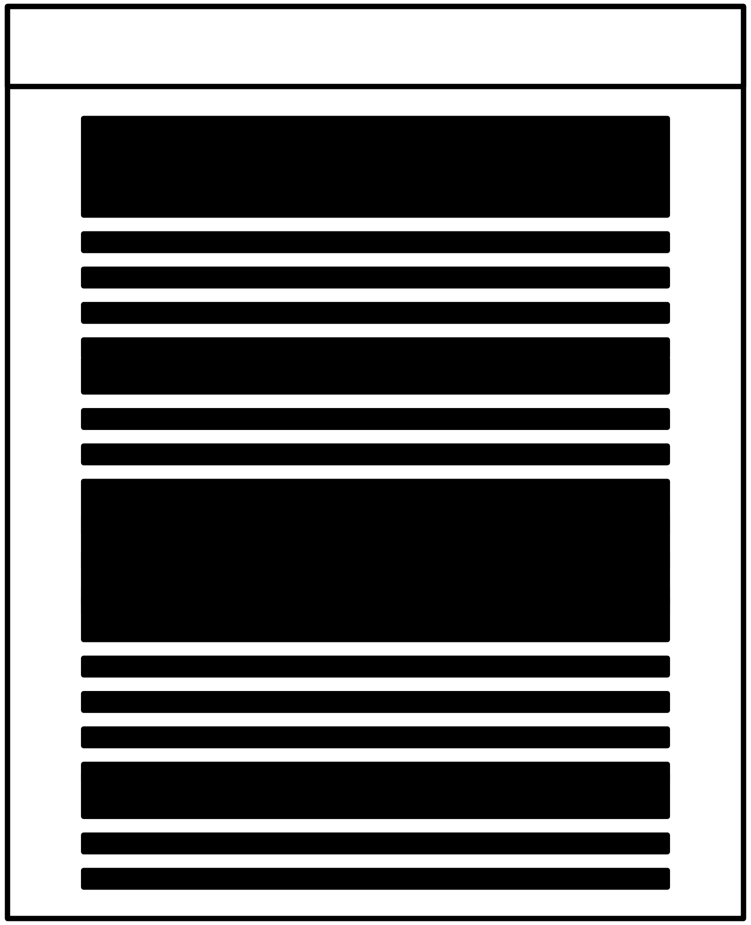
Long Method



Large Class



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Long parameter list

xxxxxxx (■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■)

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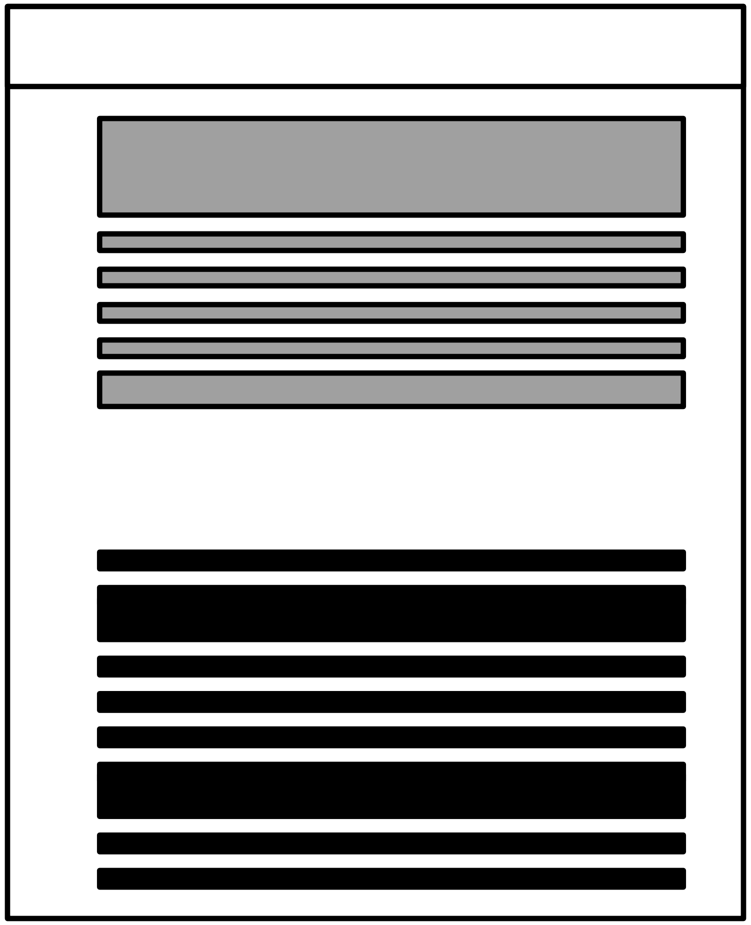
Divergent Change



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feature envy

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```
class CapitalCalculator {
 ...

 public double capital(Loan loan) {
  if (loan.getExpiry() == null && loan.getMaturity() != null)
   return loan.getCommitment()*loan.duration()*loan.riskFactor();

  if (loan.getExpiry() != null && loan.getMaturity() == null) {
    if (loan.getUnusedPercentage() != 1.0)
       return loan.getCommitment() * loan.getUnusedPercentage() *
                 loan.duration() * loan.riskFactor();
    else
       return (loan.outstandingRiskAmount()*loan.duration()
                   * loan.riskFactor())
              + (loan.unusedRiskAmount() * loan.duration()
                   * loan.unusedRiskFactor());
   }

   return 0.0;
 }
 ...
}
```

Data Clumps

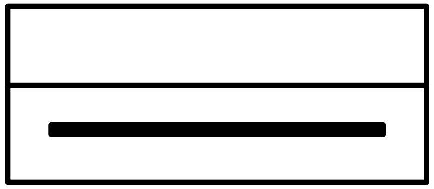
method1(■ ▲ ◆ ●)

method2(■ ▲ ◆ ●)

method3(■ ▲ ◆ ●)

method4(■ ▲ ◆ ●)

Lazy Class



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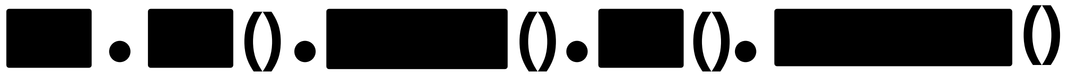
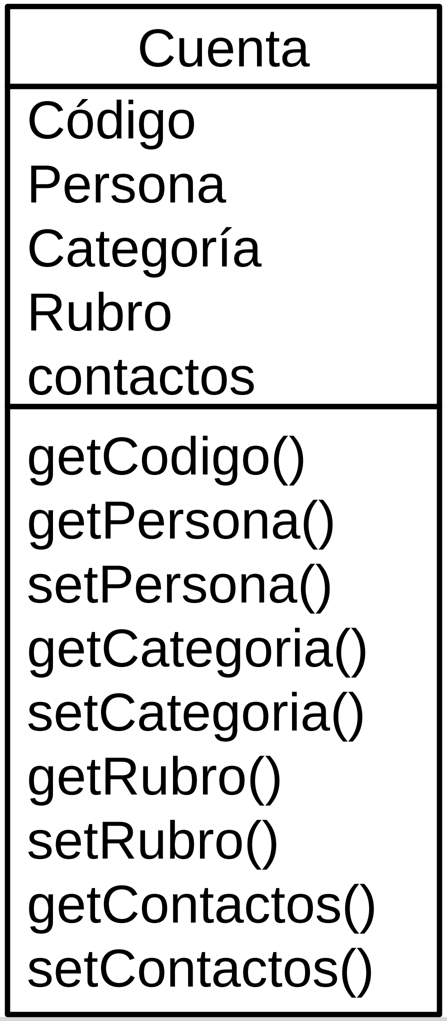
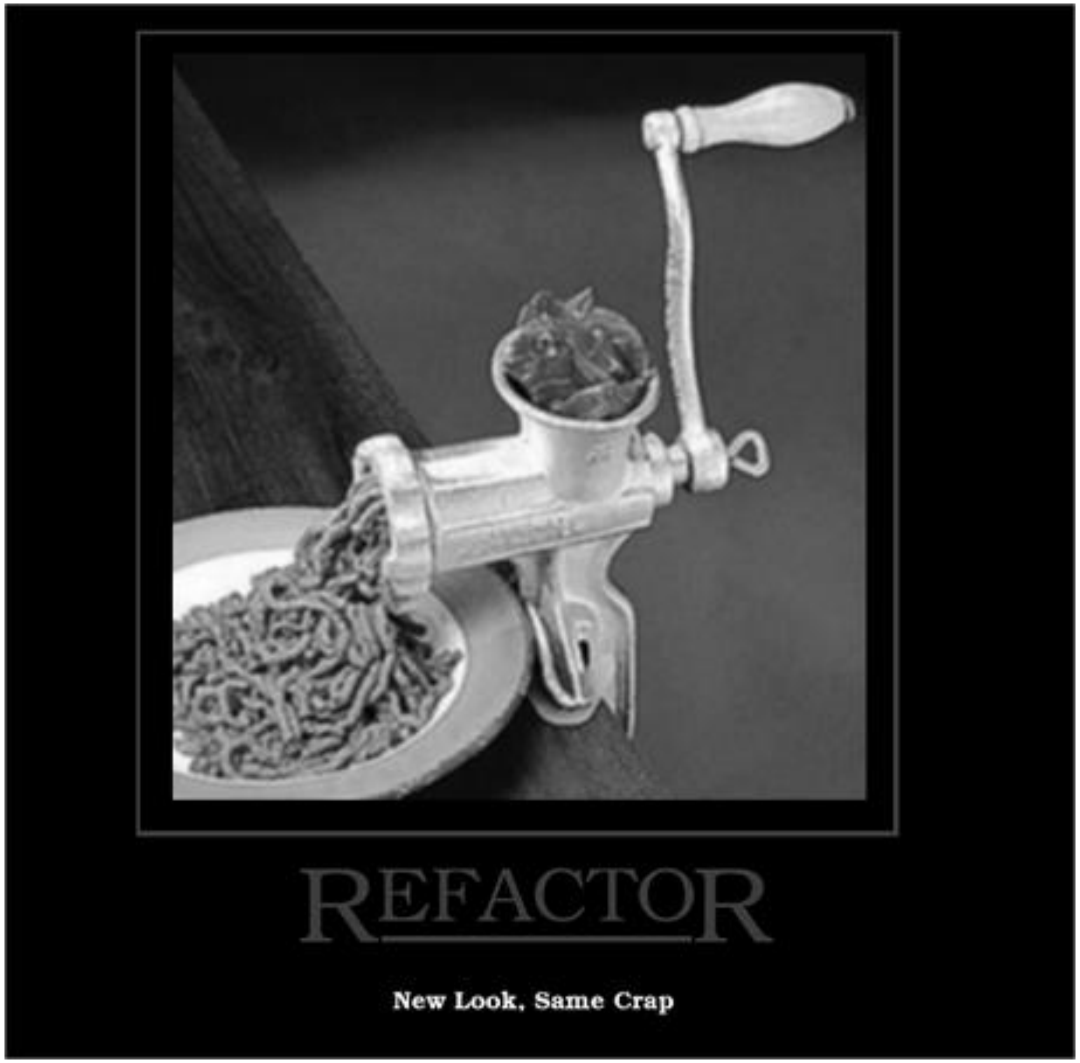
Message Chains



Data Class


Cuenta
Código
Persona
Categoría
Rubro
contactos
getCodigo()
getPersona()
setPersona()
getCategoria()
setCategoria()
getRubro()
setRubro()
getContactos()
setContactos()

Refactorings mas utilizados



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```
if ((platform.toUpperCase().indexOf("MAC") > -1)
     && (platform.toUpperCase().indexOf("IE") > -1)
     && wasInitialized()
     && resize > 0) {

   someCode();

}

otherCode();
```

Introduce Explaining Method

```
if (isPlatformSupported()
        && wasInitialized()
        && wasResized()) {

    someCode();
}

otherCode();
```

```
boolean wasResized() {
   return resize > 0;
}

boolean isIEBrowser() {
   return platform.toUpperCase().indexOf("IE") > -1;
}

boolean isMacOs() {
   return platform.toUpperCase().indexOf("MAC") > -1;
}

boolean isPlatformSupported() {
   return isMacOs() && isIEBrowser();
}
```

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```
double getDistanceTravelled (int time) {
    double result;
    double acc = primaryForce / mass;
    int primaryTime = Math.min(time, delay);
    result = 0.5 * acc * primaryTime * primaryTime;
    int secondaryTime = time - delay;

    if (secondaryTime > 0) {
        double primaryVel = acc * delay;
        acc = (primaryForce + secondaryForce) / mass;
        result += primaryVel * secondaryTime + 0.5 * acc *
secondaryTime * secondaryTime;
    }

    return result;
}
```

Split Temporary Variable

```
double getDistanceTravelled(int time) {
   double result;

   double primaryAcc = primaryForce / mass;
   int primaryTime = Math.min(time, delay);
   result = 0.5 * primaryAcc * primaryTime * primaryTime;
   int secondaryTime = time - delay;

   if (secondaryTime > 0) {
      double primaryVel = primaryAcc * delay;
      double secondaryAcc = (primaryForce + secondaryForce) / mass;
      result += primaryVel * secondaryTime + 0.5
              * secondaryAcc * secondaryTime * secondaryTime;
   }

   return result;
}
```

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```
int discount(int value, int quantity) {
        if (value > 50) {
          value -= 2;
        }
        if (quantity > 100) {
          value -= 5;
        }
        return value;
}
```

Remove assignments to parameters

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```
int discount(final int value, final int quantity) {
        int discount = value;
        if (value > 50) {
            discount -= 2;
        }
        if (quantity > 100) {
            discount -= 5;
        }
        return discount;
    }
```

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```
class Page {
      private String[] lines;

      private double widthNumber;
      private String widthUnits;

      private double heightNumber;
      private String heightUnits;

      /**
       * return the page area in inches.
       */
      public double area() {
         double widthInches;
         double heightInches;
         widthInches = widthNumber *
                         ((widthUnits.equals("mm")) ? 25.4 : 1.0);
         heightInches = heightNumber *
                         ((heightUnits.equals("mm")) ? 25.4 : 1.0);
         return widthInches * heightInches;
      }

      ...
   }
```

Extract Class

```
class Length {
      private final double magnitude;
      private final Unit unit;

      public Length(Unit unit, double magnitude) {
         this.unit = unit;
         this.magnitude = magnitude;
      }

      private static Length newInInches(double magnitudeInInches) {
         return new Length(Unit.inches, magnitudeInInches);
      }

      public Length multipliedBy(Length aLength) {
         return Length.newInInches(this.magnitudeInInches()
                             + aLength.magnitudeInInches());
      }

      private double magnitudeInInches() {
         return magnitude;
      }

      private double magnitudeInMM() {
         return magnitude * Unit.mmFactor();
      }
}
```

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```
class Page {
      private String[] lines;

      private Length width;
      private Length height;

      public Length area() {
         return width.multipliedBy(height);
      }
}
```

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```
double chargeFor(Date date, int quantity) {
      double totalCharge = 0;
      if (date.after(WINTER_START) && date.before(WINTER_END)) {
         totalCharge = quantity * WINTER_RATE
                                 + WINTER_SERVICE_CHARGE;
      } else {
         totalCharge = quantity * NORMAL_RATE;
      }
      return totalCharge;
}
```

```
      if !(date.before(WINTER_START) || date.after(WINTER_END)){
```

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Decompose Conditional

```
double chargeFor(Date date, int quantity) {
      if (isAWinter(date)) {
         return winterCharge(quantity);
      }
      return normalCharge(quantity);
}
```

```
double chargeFor(Date date, int quantity) {
      return isAWinter(date) ?
            winterCharge(quantity) : normalCharge(quantity);
}
```

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```
private boolean isAWinter(Date date) {
    return date.after(WINTER_START) || date.before(WINTER_END);
}

private double normalCharge(int quantity) {
    return quantity * NORMAL_RATE;
}

private double winterCharge(int quantity) {
    return quantity * WINTER_RATE + WINTER_SERVICE_CHARGE;
}
```

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```
class TicTacToeGame {

        boolean isGameOver() {
           if (allPositionsAreFilled()) {
              return true;
           }
           if (oneRowIsFilledByOnePlayer()) {
              return true;
           }
           if (oneColumnIsFilledByOnePlayer()) {
              return true;
           }
           if (oneDiagonalIsFilledByOnePlayer()) {
              return true;
           }
           return false;
        }

}
```

Consolidate conditional expression

```
boolean isGameOver() {
    if (allPositionsAreFilled()
            || oneRowIsFilledByOnePlayer()
            || oneColumnIsFilledByOnePlayer()
            || oneDiagonalIsFilledByOnePlayer()) {
        return true;
    }
    return false;
}


boolean isGameOver() {
    return allPositionsAreFilled()
            || oneRowIsFilledByOnePlayer()
            || oneColumnIsFilledByOnePlayer()
            || oneDiagonalIsFilledByOnePlayer();
}
```

```java
public double getRate() {
    if (onVacation()) {
        if (lengthOfService() > 10) {
            return 1;
        }
    }
    return 0.5;
}
```

```java
public double getRate() {
    if (onVacation() && lengthOfService() > 10) {
        return 1;
    }
    return 0.5;
}

public double getRate() {
    return (onVacation() && lengthOfService() > 10) ? 1 : 0.5;
}
```

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```java
public double finalPrice(double price) {
      double total = 0;
      if (isSpecialDeal()) {
         total = price * 0.95;
         changed();
      } else {
         total = price;
         changed();
      }
      return total;
}
```

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Consolidate duplicate conditional fragments

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```
public double finalPrice(double price) {
      double total = 0;
      if (isSpecialDeal()) {
         total = price * 0.95;
      } else {
         total = price;
      }
      changed();
      return total;
}
```

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```
public boolean exist(String nameToFind) {
      boolean found = false;
      for (String name : names) {
         if (name.equals(nameToFind)) {
            found = true;
         }
      }
      return found;
}
```

Remove control flag

```java
public boolean exist(String nameToFind) {
        for (String name : names) {
            if (name.equals(nameToFind)) {
                return true;
            }
        }
        return false;
}
```

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```
double getPayAmount() {
    double result;
    if (isDead) {
        result = deadAmount();
    } else {
        if (isSeparated) {
            result = separatedAmount();
        } else {
            if (isRetired) {
                result = retiredAmount();
            } else {
                result = normalAmount();
            }
        }
    }
    return result;
}
```

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Replace nested conditionals with guard clauses

```
double getPayAmount() {
        if (isDead) {
            return deadAmount();
        }
        if (isSeparated) {
            return separatedAmount();
        }
        if (isRetired) {
            return retiredAmount();
        }
        return normalAmount();
}
```

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```java
calculateWeeklyPay(true);

calculateWeeklyPay(false);
```

```java
public int calculateWeeklyPay(final boolean overtime) {
    int straightTime = Math.min(400, getHoursWorked());
    int straightPay = straightTime * getHoursRate();
    int overTime = Math.max(0, getHoursWorked() - straightTime);
    double overtimeRate = overtime ? 1.5 : 1.0 * getHoursRate();
    int overtimePay = (int) Math.round(overTime * overtimeRate);
    return straightPay + overtimePay;
}
```

Replace parameter with explicit methods

```java
public int straightPay() {
      ...
      ...
}

public int overtimePay() {
      ...
      ...
}
```

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```java
interface ClaimsRepository {
      List<Claim> claimsReceivedIn(Date start, Date end);
      List<Claim> claimsApprovedIn(Date start, Date end);
      List<Claim> claimsRejectedIn(Date start, Date end);
}
```

Introduce parameter object

```
interface ClaimsRepository {

      List<Claim> claimsReceivedIn(Range<Date> range);

      List<Claim> claimsApprovedIn(Range<Date> range);

      List<Claim> claimsRejectedIn(Range<Date> range);

}
```

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```
class RepositorioDeClientes {

      public void agregar(long id, String doc, String cuit,
              String nombre, String apellido, String telefono,
              String mail, String direccion, String localidad,
              String piso, String provincia) {

              // Agrega un nuevo cliente a la DB
      }

      public void modificar(long id, String doc, String cuit,
              String nombre, String apellido, String telefono,
              String mail, String direccion, String localidad,
              String piso, String provincia) {

              // Agrega un nuevo cliente a la DB
      }

}
```

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```
class RepositorioDeClientes {

      public void agregar(Cliente cliente) {
         // Agrega un nuevo cliente a la DB
      }

      public void modificar(Cliente cliente) {
         // modifica un cliente de la DB
      }

}
```

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```java
int withdraw(double amount) {
    if (amount > balance) {
        return -1;
    }

    balance -= amount;
    return 0;
}


void usoEnCodigoCliente () {
    if (withdraw(200) < 0) {
        handleError();
    }
    moreCode();
}
```

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Replace error code with exception

```java
void withdraw(double amount) {
    if (amount > balance) {
        throw new BalanceException(balance, amount);
    }
    balance -= amount;
}


public void usoEnCodigoCliente() {
    try {
        withdraw(200);
    } catch (BalanceException e) {
        handleError();
    }
    moreCode();
}
```

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```
class ResourcePool {

    Stack<Resource> available;
    Stack<Resource> allocated;

    Resource getResource() {
        Resource result;
        try {
            result = available.pop();
            allocated.push(result);
            return result;
        } catch (EmptyStackException e) {
            result = new Resource();
            allocated.push(result);
            return result;
        }
    }

}
```

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Replace exception with test

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```
class ResourcePool {

    Stack<Resource> available;
    Stack<Resource> allocated;

    Resource getResource() {
        Resource result;
        if (available.isEmpty()) {
            result = new Resource();
        } else {
            result = available.pop();
        }
        allocated.push(result);
        return result;
    }

}
```

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Herramientas

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Herramientas de chequeo automático

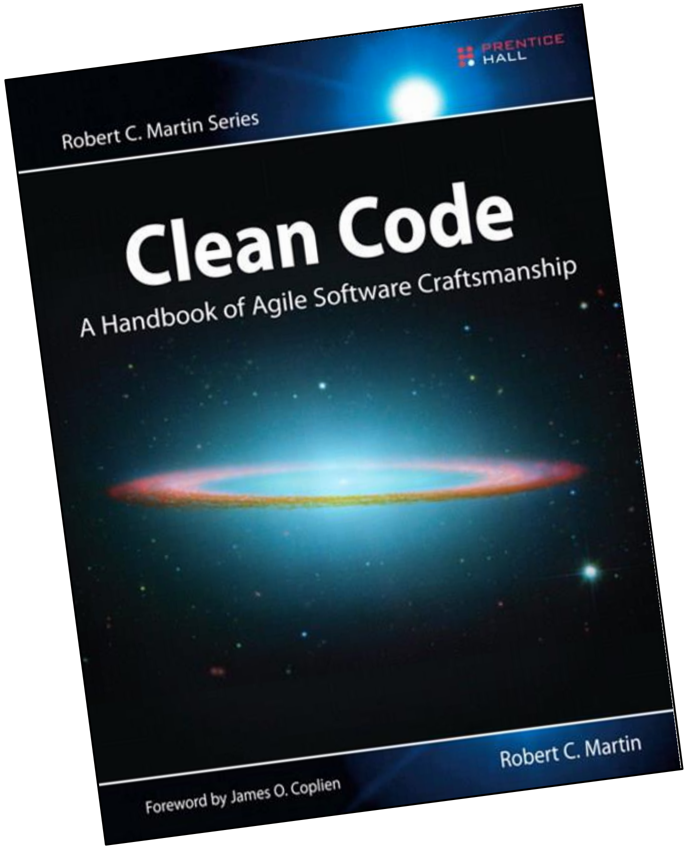
pmd
DON'T SHOOT THE MESSENGER

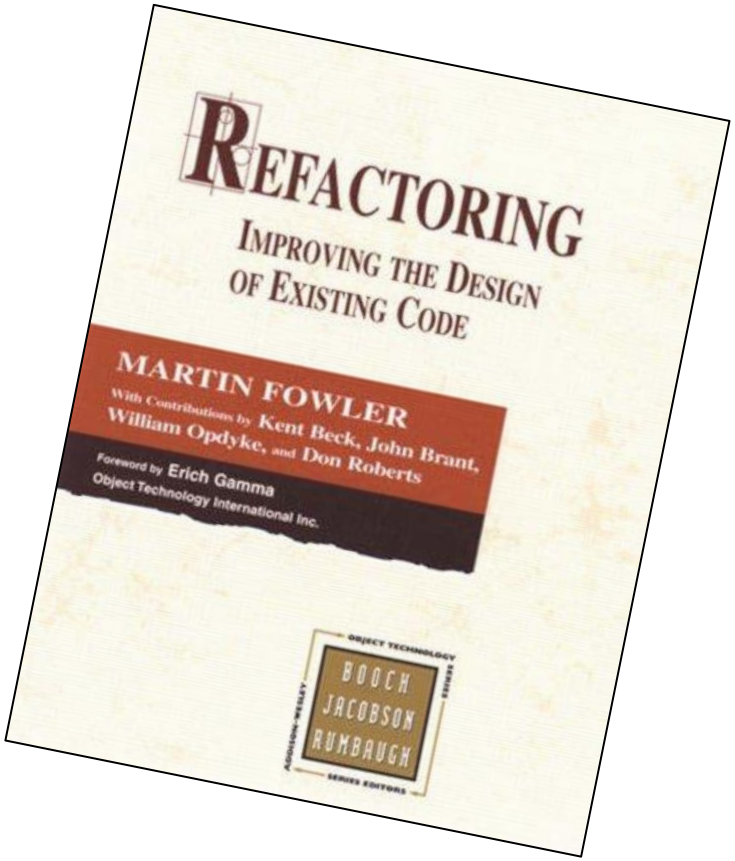
Checkstyle

FindBug

Bibliografía

Bibliografía “obligatoria”


PRENTICE HALL
Robert C. Martin Series
Clean Code
A Handbook of Agile Software Craftsmanship
Robert C. Martin
Foreword by James O. Coplien


REFACTORING
IMPROVING THE DESIGN OF EXISTING CODE
MARTIN FOWLER
With Contributions by Kent Beck, John Brant, William Opdyke, and Don Roberts
Foreword by Erich Gamma
Object Technology International Inc.
BOOCH JACOBSON RUMBAUGH
OBJECT TECHNOLOGY SERIES
SERIES EDITORS
ADDISON-WESLEY

Bibliografía adicional

The Addison-Wesley Signature Series
Refactoring to Patterns
Joshua Kerievsky
Implementation Patterns
Kent Beck
Object-Oriented Metrics in Practice
Michele Lanza
Radu Marinescu
Springer
Smalltalk Best Practice Patterns
Kent Beck
Code Complete
A practical handbook of software construction
Steve McConnell

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