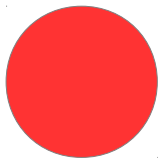
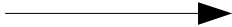
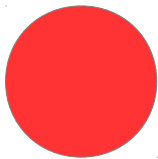
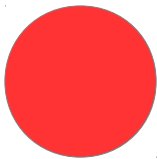
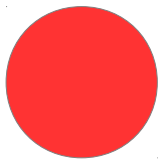
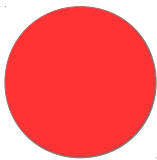


Typy pieniężne w Javie





Matematyka komputerów



IBM 1403

```
trap() ->
  Numbers = [0.1, 0.2, 0.3, 0.4, 0.5,
0.6, 0.7, 0.8, 0.9],
  lists:foreach(fun(Nb) ->
    io:format("~w ~w ~n",
      [Nb, 1 + Nb - Nb == Nb - Nb + 1])
    end,
  Numbers).
```

- `> rounding_traps:trap()`.
- 0.1 true
- 0.2 true
- 0.3 true
- 0.4 false
- 0.5 true
- 0.6 true
- 0.7 true
- 0.8 true
- 0.9 false
- ok

Po co nam TYP?

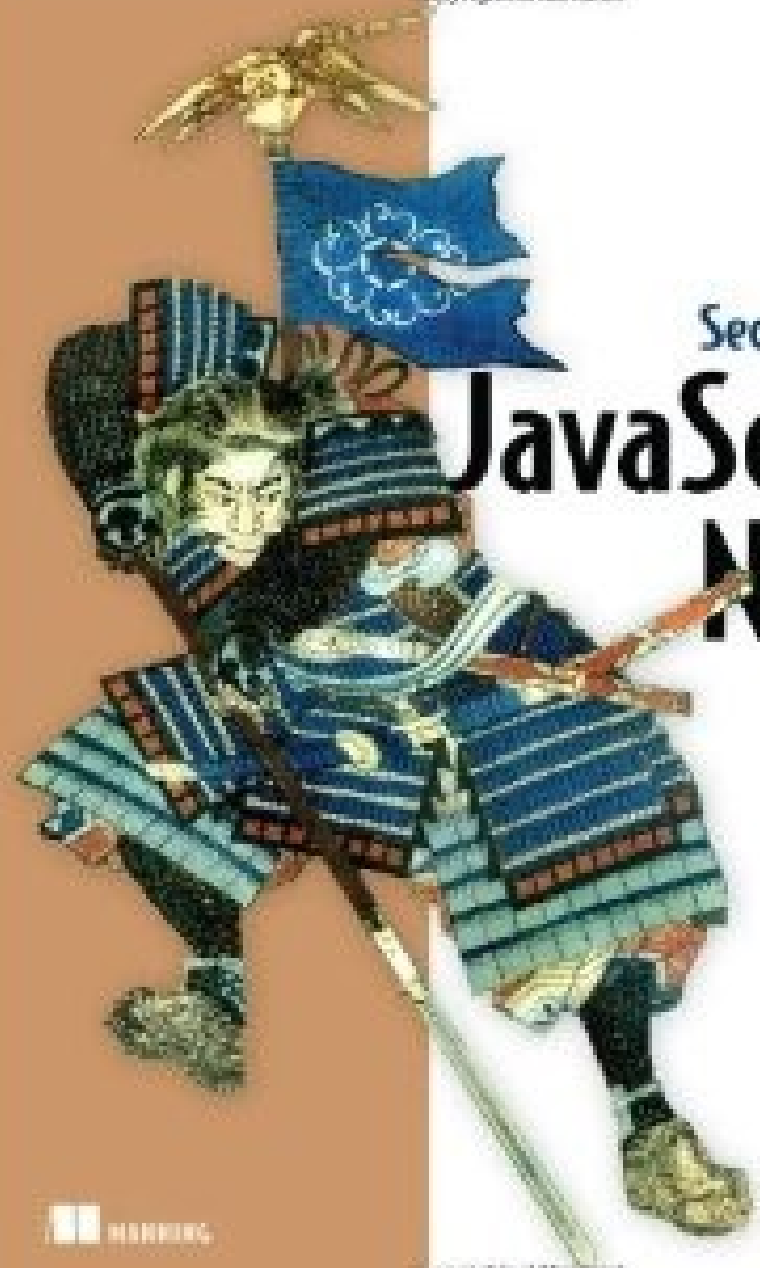
Trzecia zasada Jeff-a Baya

Trzecia zasada Jeff-a Baya

Opakowuj prymitywy

Dlaczego?

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John Resig
Bear Bibeault

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Wszyscy lubimy grać

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Kod ISO-4217: 985

Krótką nazwa PL

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Krótką nazwa PL

Symbol

Naiwne podejście, czyli typ Long

To nie jest nic nowego

To nie jest nic nowego

COPY

Podstawowe operacje

```
public Pair<Money, Money> divide(Long denominator) {  
    //...  
    Long quotient = value / denominator;  
    Long remainder = value % denominator;  
    return Pair.of(new Money(quotient),  
        new Money(remainder));  
}
```

```
@Override  
public String toString() {  
    Long grand = value / 10000;  
    Long less = value % 10000;  
    return grand + "." + LESS_FORMAT.format(less);  
}
```


Real problems

$$\begin{aligned}\int \frac{1}{x^4 \sqrt{9-x^2}} dx &= \int \frac{1}{81 \sin^4 \theta (3 \cos \theta)} 3 \cos \theta d\theta \\ &= \frac{1}{81} \int \frac{1}{\sin^4 \theta} d\theta \\ &= \frac{1}{81} \int \csc^4 \theta d\theta\end{aligned}$$

Has curves

A može by tak BigDecimal...



Real Rounding

Makes Troubles



Casus devopa-hakera

Joda Money

Prosty Wrapper

Bazuje na BigDecimal



THE WOLF

"I solve problems."

Mało elastyczny

Dużo trzeba napisać samemu

Nie jest standardem

```
Money convertPrice(String currencySymbol, Item i){  
    CurrencyUnit targetSymbol =  
        CurrencyUnit.of(currencySymbol);  
  
    return i.price.convertedTo(targetSymbol,  
CurrencyConverter  
    .conversionRate(i.price  
        .getCurrencyUnit()  
        , currencySymbol)  
    , RoundingMode.HALF_EVEN);  
}
```

JSR-354

JSR-354

Moneta

Dużo różnych rzeczy


```
private MonetaryAmount convertPrice(String
currencySymbol, Item i) {

    ExchangeRateProvider rateProvider =
        MonetaryConversions
            .getExchangeRateProvider("IMF");//EBC
    CurrencyUnit target =
        MonetaryCurrencies
            .getCurrency(currencySymbol);
    CurrencyConversion targetConversion =
        rateProvider
            .getCurrencyConversion(target);
    return i.price.with(targetConversion);
}
```

@Koziolek

Q&A

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