

Georg Heeg eK  
Baroper Str. 337  
44227 Dortmund  
Germany  
Tel: +49-231-97599-0  
Fax: +49-231-97599-20

Georg Heeg eK  
Mühlenstr. 19  
06366 Köthen  
Germany  
Tel: +49-3496-214 328  
Fax: +49-3496-214 712

Email: [georg@heeg.de](mailto:georg@heeg.de)  
<http://www.heeg.de>

Georg Heeg AG  
Seestraße 135  
8027 Zürich  
Switzerland  
Tel: +41(848) 43 34 24

**Georg Heeg**


**What is so special that  
Smalltalk is still hot  
after 25 years?**



APRIL 24-26, 2006  
Metro Toronto Convention Centre, North Building

## About Georg Heeg eK



- Founded 1987, headquarter in Dortmund, since 1996 in Zurich, since 1999 in Koethen/Anhalt
- Consulting- and training company in Smalltalk
- Hotline support, maintenance, bug-fixes for ObjectStudio, VisualWorks and Visual Smalltalk
- VM-laboratory for VisualWorks and ObjectStudio
- House of integration of Smalltalk Systems
- Technology-partner of 

***Corporate Mission: Make Sophisticated Projects  
a Success for the Customer!***

3

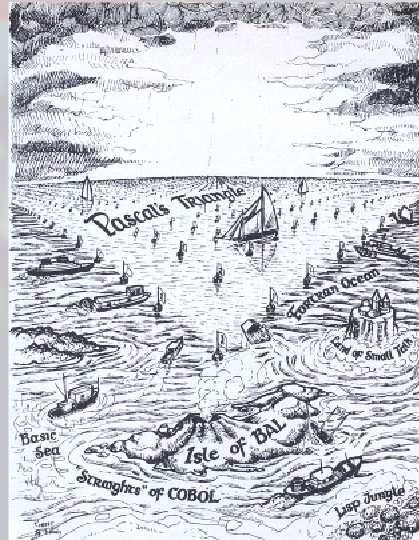
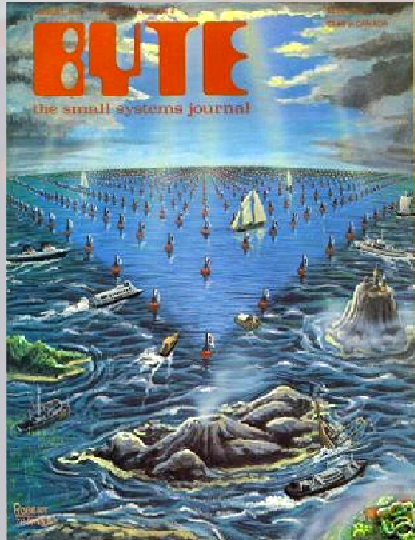
## Overview

- First quotes and the Smalltalk paradox
- History of Smalltalk 1976 to 2006
- Why is Smalltalk so much better?

4

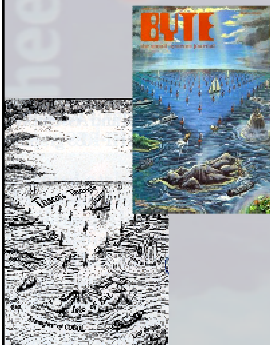
# Byte Magazine

August 1978



## Richard Helmers

- *Traveling upward (in the picture) through heavy seas we come to the pinnacle, a snow white island rising like an ivory tower out of the surrounding shark infested waters. Here we find the fantastic kingdom of Smalltalk, where great and magical things happen. But alas . . . the craggy aloofness of the kingdom of Smalltalk keeps it out of the mainstream of things.*  
(Byte Magazine August 1978, p. 18)



## The Smalltalk Paradox

- *Fantastic kingdom of Smalltalk*
  - *where great and magical things happen.*
- *But alas . . .*
  - *the craggy aloofness of the kingdom of Smalltalk keeps it out of the mainstream of things.*
- *Still valid 2006, 28 years later?*

7

## Overview

- First quotes and the Smalltalk paradox
- History of Smalltalk 1976 to 2006
- Why is Smalltalk so much better?

8



## What Happened

- 1976 objects were created which still exist in today's Smalltalk systems.
- 1981 Byte Magazine published a series of 11 Smalltalk articles
  - With Z80 assembly code manually translated from Basic

```

800 [-TIME*0X1E= 0+GOSUB1000PRINT@179,Y4;
810 T=BNST=ST+BTBCT*991+TX3-T4
820 GOSUB1000PRINT@513,STHPTC100THETC300
910 PRINT@915,"THANK YOU FOR A PLEASANT GAME";
920 GOTO920
930 PRINT@917,"CONGRATULATIONS, YOU WIN!GOTO920
1000 B=INT(1/10HC+T-10WRK=143+18-R)*04+C4
1010 PRINT@X,X4;RETURN

```

Listing 2: The more time-consuming portions of the game have been coded in Z80 assembly language, improving the program speed 300 times. This section of the game must be loaded into otherwise unused memory before you attempt to run the program in listing 1.

```

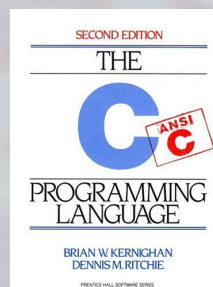
00100 DRG 6000H
00110 BRD EQU 7E05H
00120 HXDPH EQU 7E02H
00130 TRS06 EQU 7E03H
00140 HURAN EQU 7E04H
00150 FROM EQU -12
00160 TO EQU +00
00170 DCOUNT EQU +01

```

9

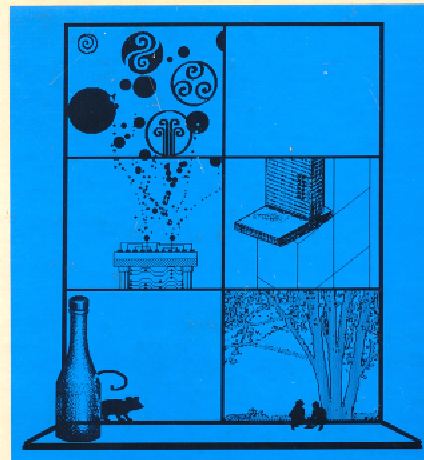
## The Smalltalk Bible

- 1983: The Book
- Version 2 of "The Smalltalk 80 System"
  - Distributed without virtual machine to Universities (\$100)



### SMALLTALK-80

THE LANGUAGE AND ITS IMPLEMENTATION



Adele Goldberg and David Robson

## Commercialization

- 1983 Digitalk
- 1987 Georg Heeg eK
- 1988 ParcPlace Systems
- 1991 Enfin Corporation
- 1994 IBM VisualAge
- ...
- Smalltalk/X
- Dolphin
- ...

11

## 1990-1995 "Small Hype I"

- Many many successful projects are started throughout the industry
  - Banks
  - Insurance
  - Car manufacturing
  - Chip manufacturing
  - Railways
- Mostly (very) complex systems

12

## 1996-2002 "Slow down"

- Java pops up
- Promise:
  - Smalltalk-like magical things without craggy aloofness
- In the same time frame
  - Smalltalk projects are successfully deployed

13

## 1999-... "Migrations failures"

- Smalltalk customers believe the Java hype and try to migrate
- And fail
- And Consider Smalltalk "strategic again"

14

## 2002-... "Second Spring"

- New customers adopt Smalltalk
  - Small (one person enthusiasts) and
  - Big corporations detect Smalltalk as solution for stagnating projects

15

## Overview

- First quotes and the Smalltalk paradox
- History of Smalltalk 1978 to 2006
- Why is Smalltalk so much better?

16



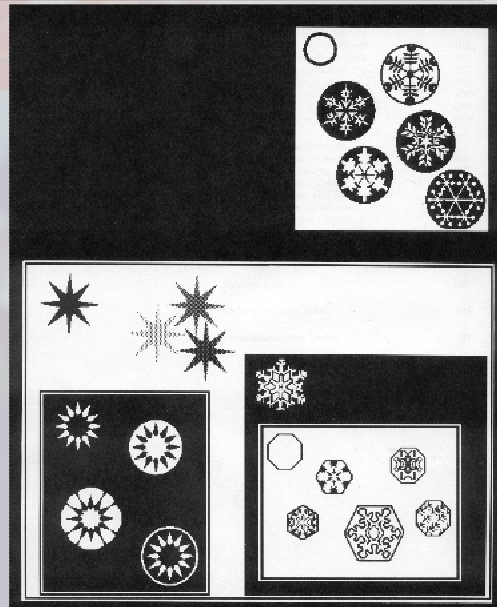
## **“Everything is an Object”**

- Smalltalk is based on a small number of concepts, but defined by unusual terminology.
- These concepts are presented by defining the five words
  - Object
  - Message
  - Class
  - Instance
  - Method
- These five words are defined in terms of each other, so it is almost as though the reader must know everything before knowing anything.  
(Goldberg, Robson 1983)

17

## **Examples of Objects**

- Collections
- Numbers
- Classes
- Methods
- Messages
- Processes
- Contexts



## Objects

- You can create them
- You can manipulate them
- You can change them
- You can control them
- You can forget them
- You are in control of your system

19

## Effective and joyful

- Smalltalk is "a vision of the ways different people might effectively and joyfully use computing power" (Goldberg Robson p. vii)
- Thus Smalltalk is an addiction

20

## 1. Imperative Software World

- Computer Oriented:  
Von Neumann Computer:  
CPU + Memory  
=> Procedure + Data Structure
- Most programming languages have:  
Statements + Declarations
- Analysis methods describe:  
Information + Functions

21

## 2. Functional and Logical Software World

- Mathematics Oriented
- Declarative programming languages:
  - Functional programming: Lisp, Miranda
  - Logic programming: Prolog
  - Set programming: SETL
- No Representation of Time  
Dynamics are represented by tricks

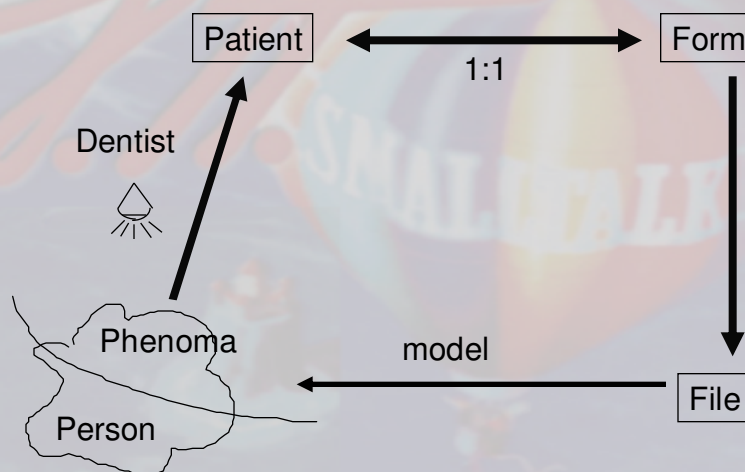
22

### 3. Object Oriented Software World

- Who is Responsible?
- Oriented to Concepts of the Application Domain
- Concepts are mapped directly into Software
- "Modeling instead of Programming"

23

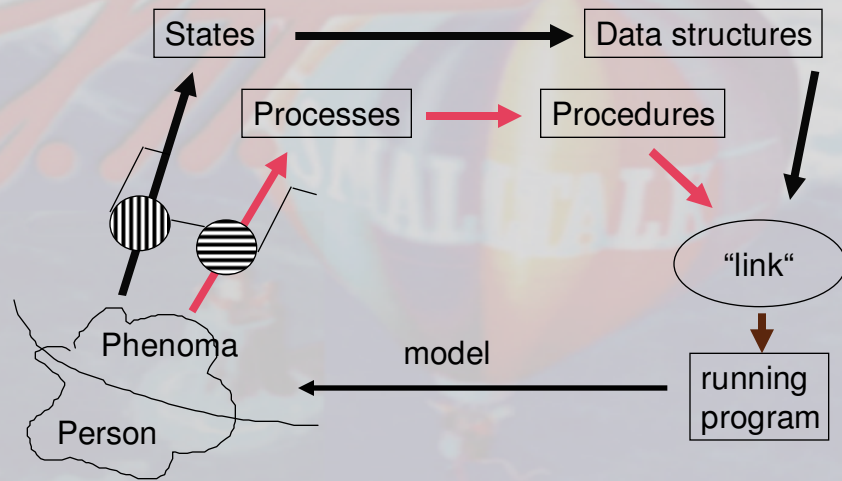
### Modeling in the Good Old Days



24

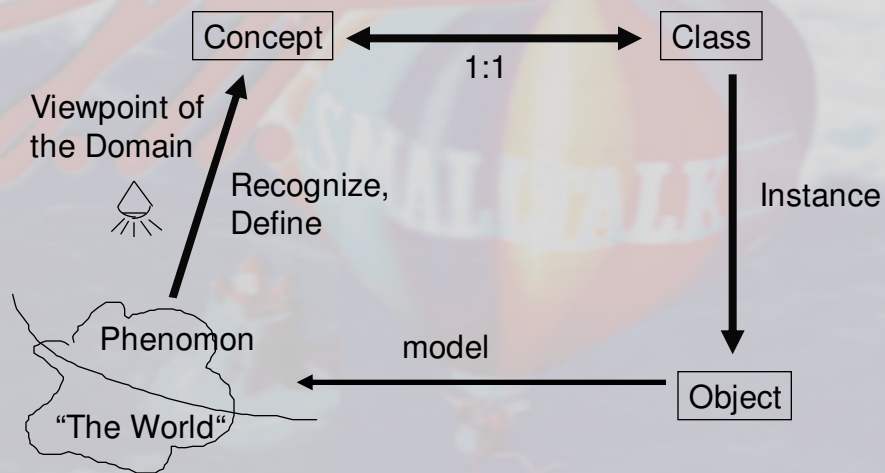


## Traditional Computer Modeling



25

## Object Oriented Modeling



26

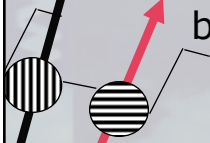
## Object Oriented Modeling

- The viewpoint determines the modeling
- "The correct model" does not exist!
- For an Application there are only
  - adequate models and
  - not adequate models

27

## What is this?

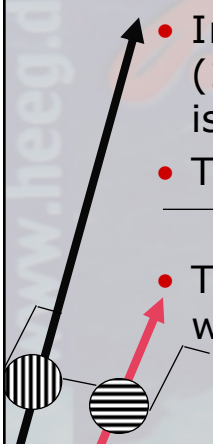
- Wooden body in the form of a cylinder with approx. 20 cm (8 inch) height and 6 mm (1/4 inch) in diameter.
- In the center of the cylinder are a drilling of 1 mm and this are filled with pressed graphite.
- At end end the cylinder is conically tapered.
- The graphite can be transferred to other bodies by rubbing.



28

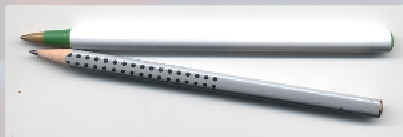
## What is this?

- Plastic tube in the form of a cylinder with approx. 20 cm (8 inch) height and 6 mm (1/4 inch) in diameter.
- Inside is another plastic tube with 2 mm (1/12 inch) in diameter and at the top there is a metal ball.
- The inner tube is filled with a viscous liquid.
- The liquid can be transferred to other media with the help of the ball.



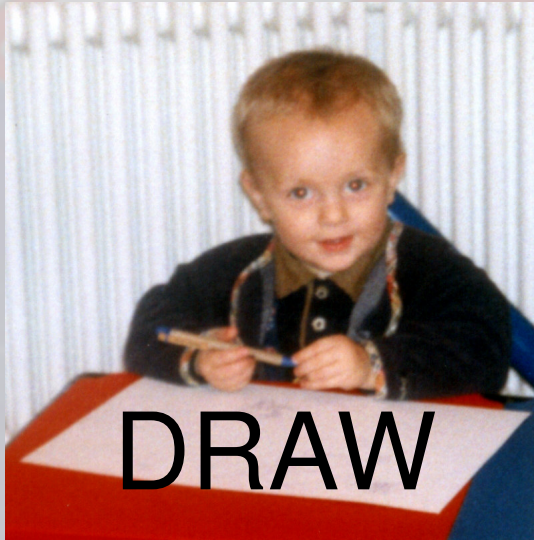
29

## What Does Little John Care About?



30

## What Does Little John Care About?



31

## About Pencils and Ball Pens

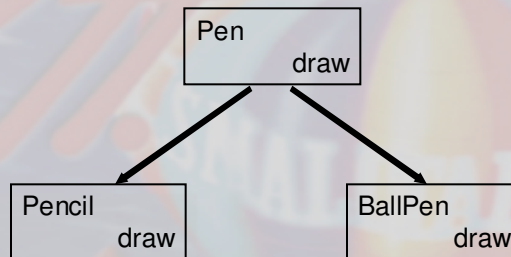


- The object oriented (and Jonny's) viewpoint:
  - Pencil = something, you can write and draw with
  - ball pen = something, you can write and draw with

32



## Class Hierachy



33

## Jonny (Smalltalk)



Somewhere in class Boy you can write:

```
hand := Mommy givePen.  
...  
hand draw
```

34

## Jonny (Java)



Boy

```
private pen hand;
```

(Instance Variable)

Somewhere in class Boy you can write:

```
hand = Mommy.givePen();  
...  
hand.draw()
```

35

## What Does Little John Care About?



36

## What Does Little John Care About?



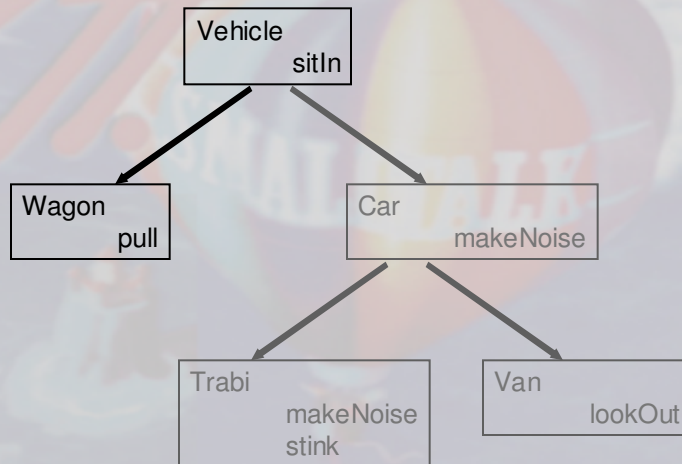
37

## About Wagons

- The object oriented (and Jonny's) viewpoint:
  - Wagon = something, you can pull (and sit in)

38

## Class Hierachy



39

## Jonny (Smalltalk)



Somewhere in class Boy you can write:

```
hand := Daddy getWagon.  
...  
hand pull
```

40



## Jonny (Java)



Boy

private object *hand*;

(Instance Variable)

Somewhere in class Boy you want to write:

```
hand = Daddy.giveWagon();
```

```
...
```

```
((Wagon)hand).pull()
```

Then you have to change the pen example (check all occurrences of hand):

```
((Pen)hand).draw()
```

41

## What is Software?

- In Java
  - Software is a program which is started
- In Smalltalk
  - Software is a system which is modified

42

## Evolving Software

Smalltalk	Java
Add the new feature	Add the new feature
-	Add new types
-	Check entire source code to use the new types
-	Stop the application server
-	Load the JAR file
-	Start the server

43

## Smalltalk Example I

- Simple dynamic binding (small and large integer multiplication)
  - 10000 factorial
  - Just type it in a workspace and print it

44

## Smalltalk Example II

- A model for Lambda Calculus
  - $f := [:n \mid n < 1$ 
    - ifTrue: [1]
    - ifFalse: [(f value: (n-1)) \* n]].
  - f value: 10000
  - Just linearize the well known formula
  - Just the same as of the slide before

45

## The Smalltalk Paradox

- *Fantastic kingdom of Smalltalk*
  - where great and magical things happen.
- *But alas . . .*
  - the craggy aloofness of the kingdom of Smalltalk keeps it out of the mainstream of things.
- *Still valid 2006*
  - But craggy only in the first hour until you understand the five words
    - Object
    - Message
    - Class
    - Instance
    - Method



## ***Get Started Today***

- Visit the Exhibition



- Or talk to me

