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Georg Heeg

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



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

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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!*

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Overview

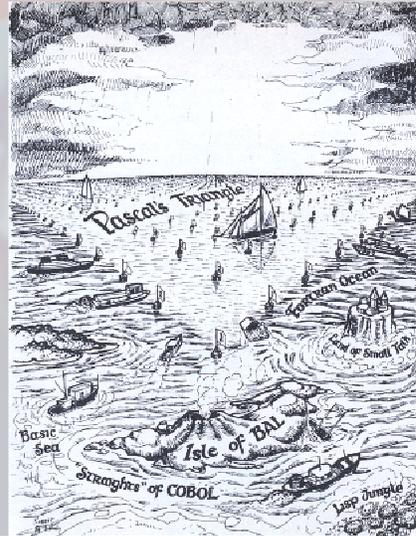
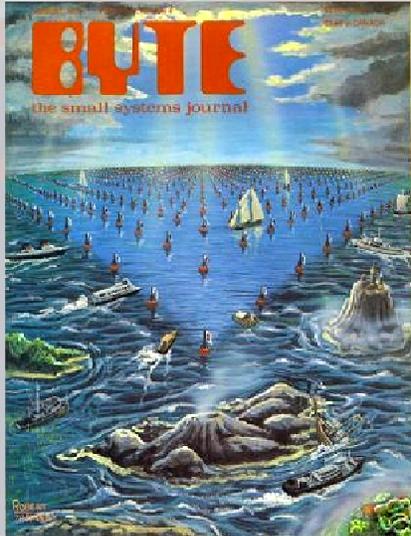
- First quotes and the Smalltalk paradox
- History of Smalltalk 1976 to 2006
- Why is Smalltalk so much better?

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Byte Magazine



August 1978



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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)*



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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?*

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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 I=THEE*OXI=0*HG050B1000PRINTG179,Y4;
810 T=BMST=ST+BTBCT*9911*TK4=TK
820 G050B1000PRINTG513,STHFST(100)TK300
910 PRINTG915,"THANK YOU FOR A PLEASANT GAME";
920 GOTO920
930 PRINTG917,"CONGRATULATIONS, YOU WIN*HGOTQ920
1000 B=INT(1/10HC+I-10*RK=141+18-R)*04+C*4
1010 PRINTG,X4;RETURN
```

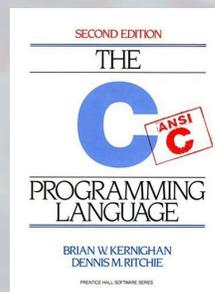
Listing 2: The more time-consuming portions of the game have been coded in Z80 assembly language, improving the program speed 300 times. This section of the game must be loaded into otherwise unused memory before you attempt to run the program in listing 1.

00100	DRG	6000H
00110	BRD	7E05H
00120	HXDPTH	7E02H
00130	TRSD0	7E03H
00140	HURAN	7E04H
00150	FRCH	-12
00160	TO	+0
00170	DCBUNT	+01

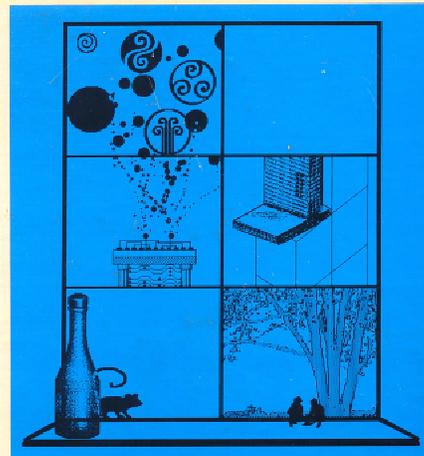
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The Smalltalk Bible

- 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
- ...

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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

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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

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1999-... "Migrations failures"

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

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2002-... "Second Spring"

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

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Overview

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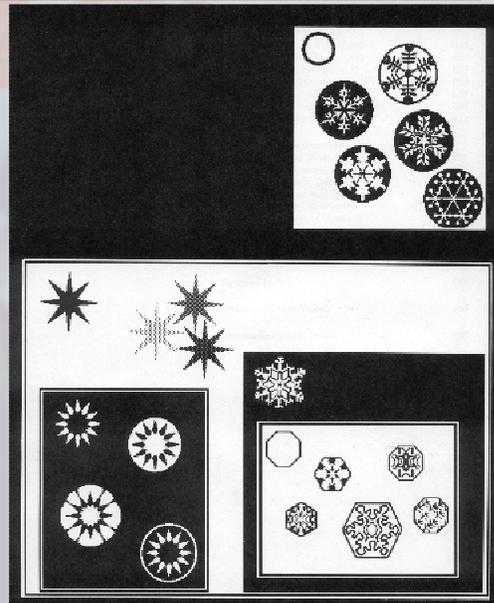
“Everything is an Object”

- 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)

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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

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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

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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

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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

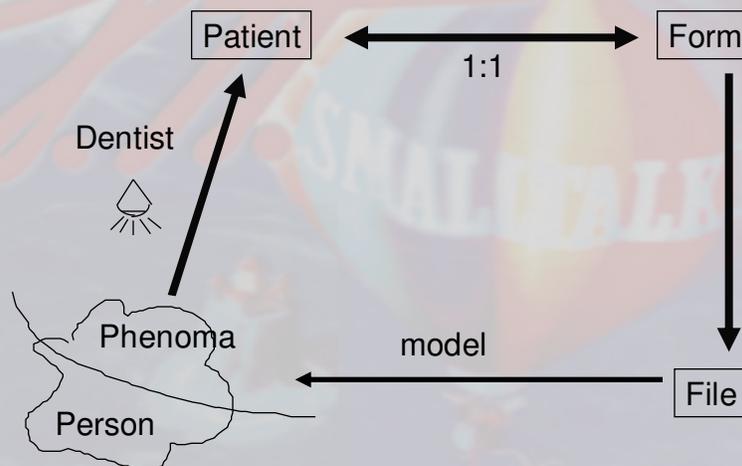
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3. Object Oriented Software World

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

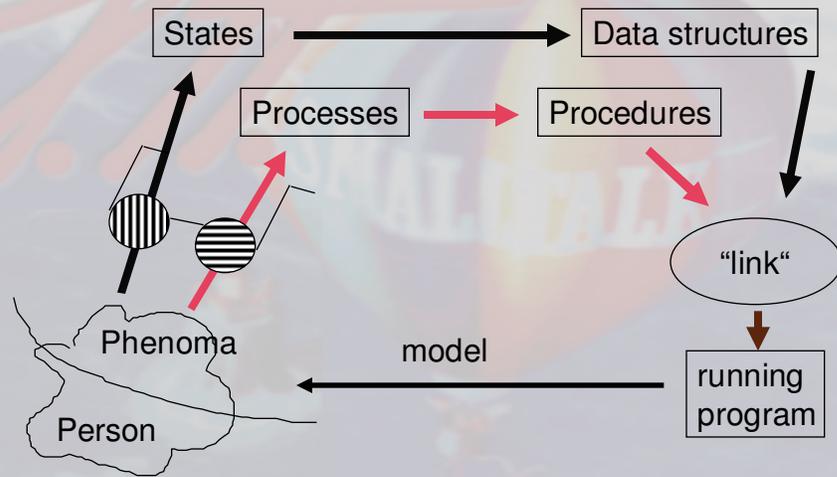
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Modeling in the Good Old Days



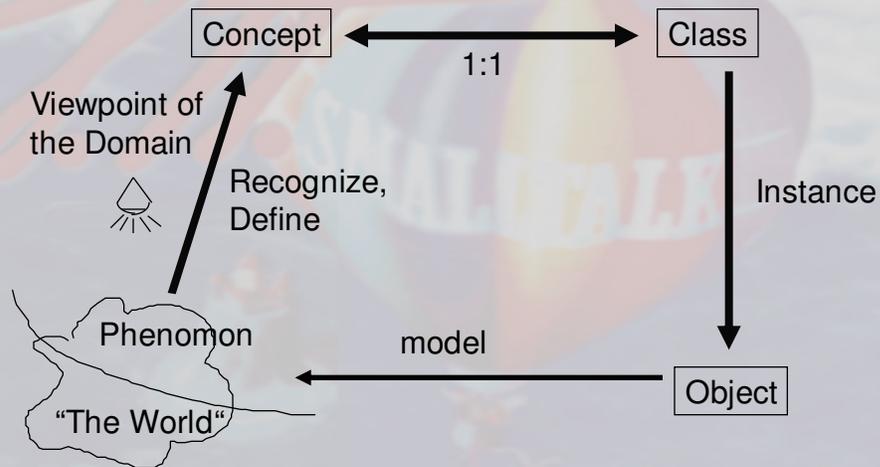
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Traditional Computer Modeling



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Object Oriented Modeling



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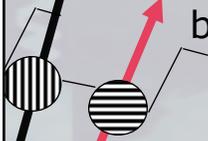
Object Oriented Modeling

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

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What is this?

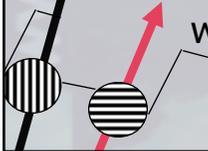
- Wooden body in the form of a cylinder with approx. 20 cm (8 inch) height and 6 mm (1/4 inch) in diameter.
 - In the center of the cylinder are a drilling of 1 mm and this are filled with pressed graphite.
 - At end end the cylinder is conically tapered.
-
- The graphite can be transferred to other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



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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.



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What Does Little John Care About?



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What Does Little John Care About?



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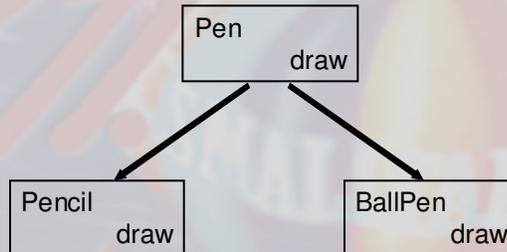
About Pencils and Ball Pens



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

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Class Hierachy



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Jonny (Smalltalk)



Somewhere in class Boy you can write:

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

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Jonny (Java)



Boy

```
private pen hand;
```

(Instance Variable)

Somewhere in class Boy you can write:

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

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What Does Little John Care About?



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What Does Little John Care About?



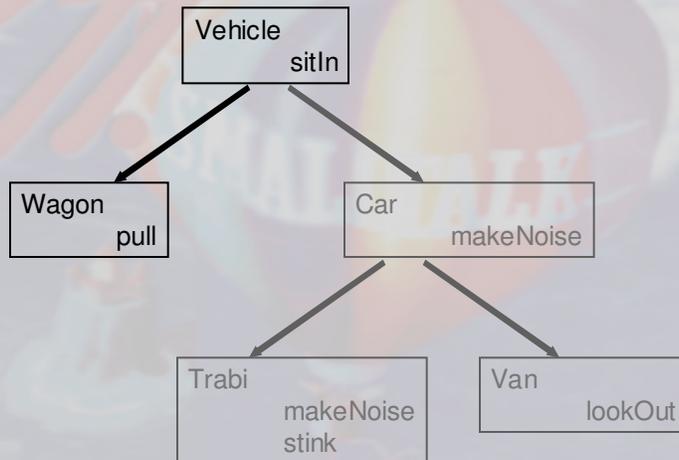
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About Wagons

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

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Class Hierachy



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Jonny (Smalltalk)

Boy *hand* (Instance Variable)

Somewhere in class Boy you can write:

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

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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()
```

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What is Software?

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

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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

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Smalltalk Example I

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

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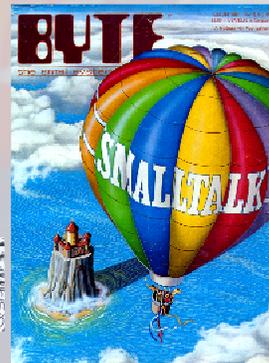
Smalltalk Example II

- 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

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- *Fantastic kingdom of Smalltalk*
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- *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

