copenhagen goto; conference

The Impedance Mismatch is Our Fault

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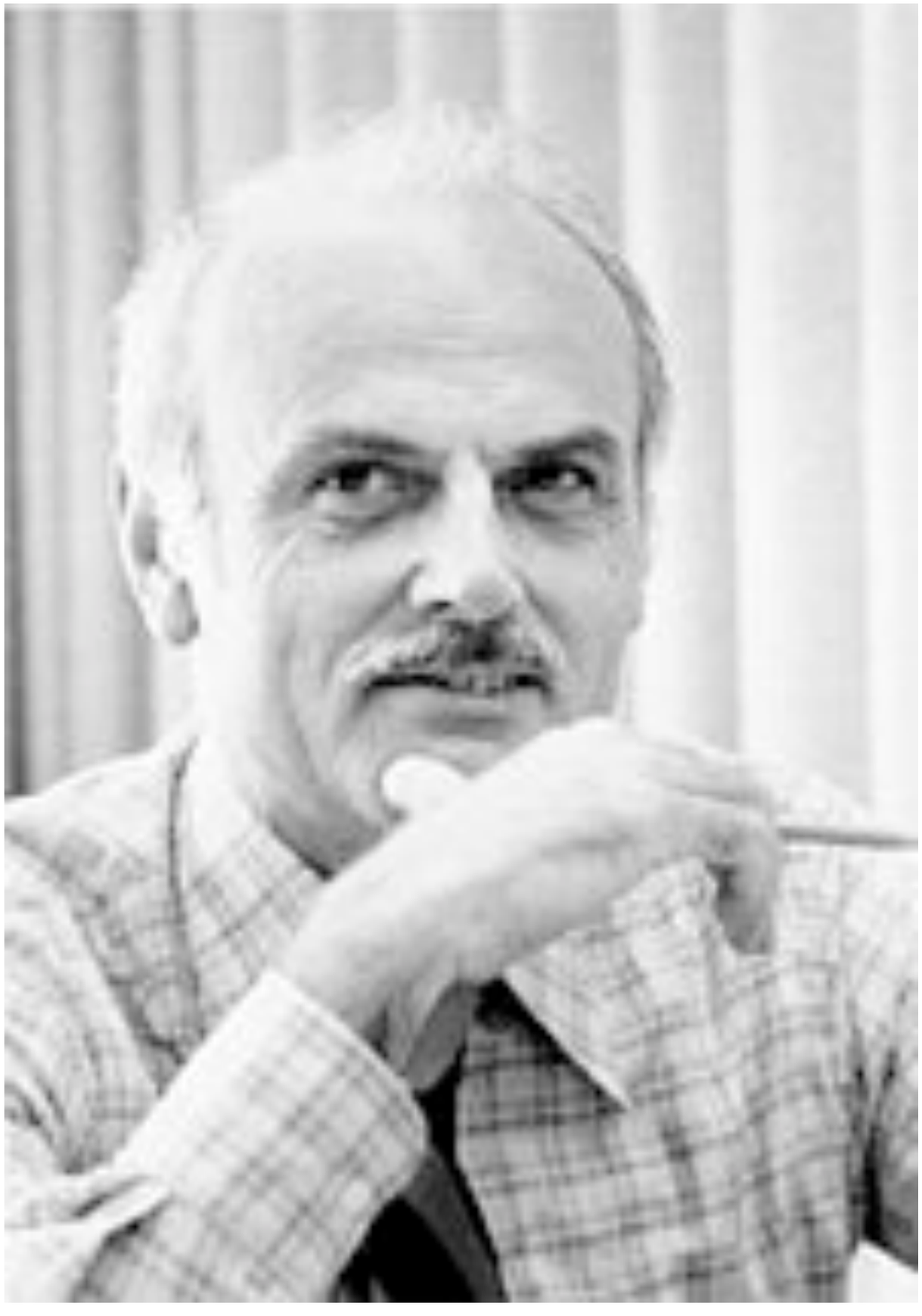
INTERNATIONAL SOFTWARE DEVELOPMENT CONFERENCE

gotocon.com

All information in the database is to be represented in only one way, namely by values in column positions within rows of tables.



http://en.wikipedia.org/wiki/Codd%27s_12_rules

OOP to me means only messaging, local retention and protection and hiding of state-process, and extreme late-binding of all things.

It can be done in Smalltalk and in LISP. There are possibly other systems in which this is possible, but I'm not aware of them.

http://userpage.fu-berlin.de/~ram/pub/pub_jf47ht81Ht/doc_kay_oop_en

“...Essentially the ORM can handle about 80-90% of the mapping problems...”

http://java.dzone.com/articles/martin-fowler-orm-hate

“...I think NoSQL is technology to be taken very seriously....”

http://java.dzone.com/articles/martin-fowler-orm-hate

“...Not all problems are technically suitable for a NoSQL database...”

http://java.dzone.com/articles/martin-fowler-orm-hate

“...early successes yield a commitment to use O/R-M...”

http://blogs.tedneward.com/2006/06/26/The+Vietnam+Of+Computer+Science.aspx

“...the Slippery Slope...”

http://blogs.tedneward.com/2006/06/26/The+Vietnam+Of+Computer+Science.aspx

“...the Last Mile Problem...”

http://blogs.tedneward.com/2006/06/26/The+Vietnam+Of+Computer+Science.aspx

Code Phrases for "I Give Up"

- "use ORM for the 80% case"
- "polyglot persistence"
- "right tool for the job"
- "use NoSQL where appropriate"
- "hybrid approach"

Don’t Give Up!

Mainstream OO and RDBMS approaches are hopelessly complected.

If you simplify them, you will find the building blocks for a general-purpose approach to data

	OO	**RDBMS**
processing	object at a time	set at a time
structure	dictionaries	rectangles
access	navigation	query
location	over here	over there

DRY vs. Rectangular

"People can belong to multiple clubs"

- join table
- person table
- club table
- id key in person table
- person key in join table
- club key in join table
- id key in club table

The "Over There" Problem

"the query can be decorated with spans
that instruct the persistence layer to
fetch related objects
at the same time."

http://www.codeproject.com/Articles/20849/ORM-as-Vietnam-of-Computer-Science-A-Response

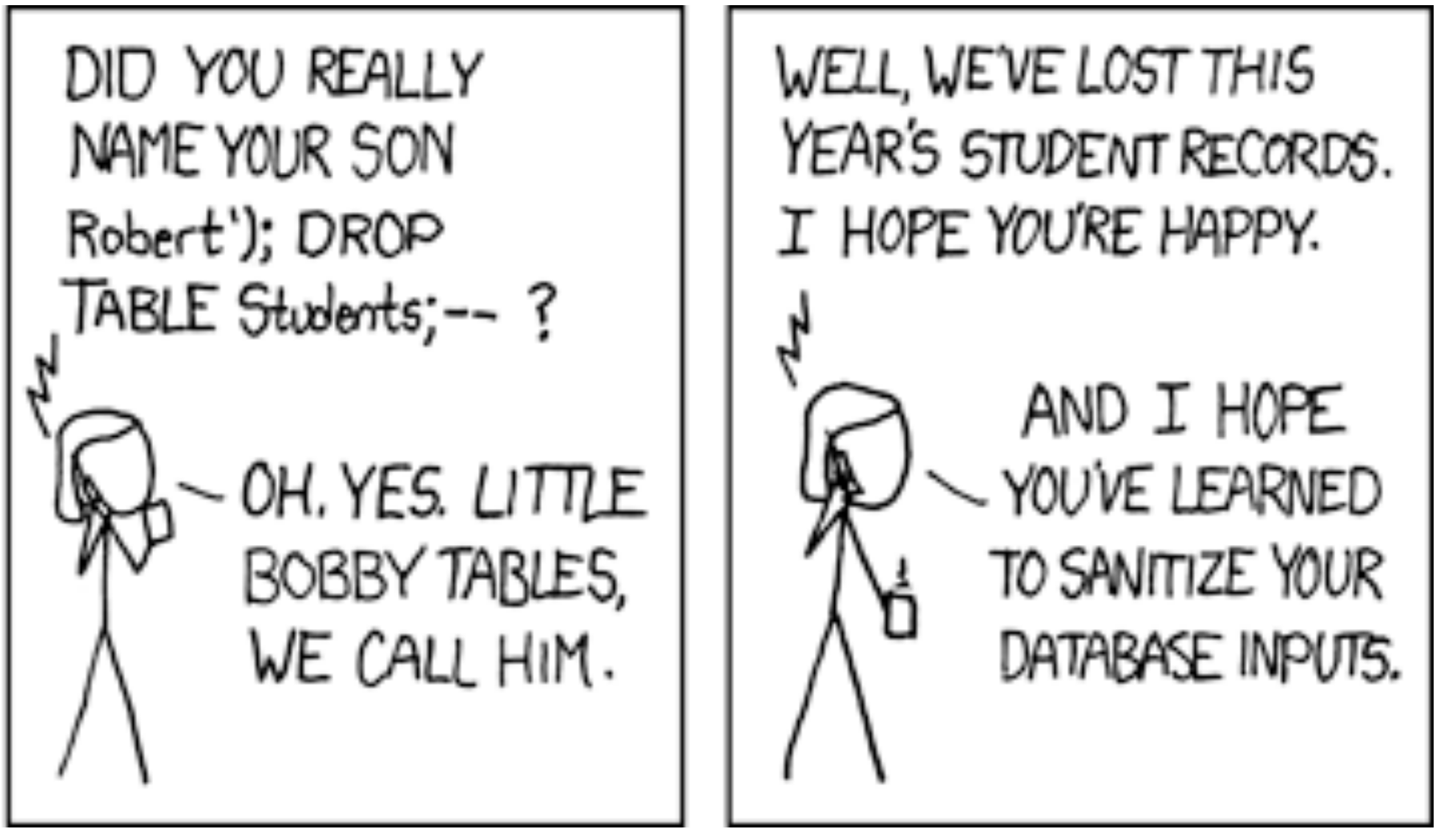
The “Over There” Problem

"RoR and the ActiveRecord pattern have deservedly earned a reputation as dbms resource hogs for this reason. Optimized ActiveRecord design is more often than not suboptimal SQL design, because it encourages **SQL statement decomposition**."

http://stackoverflow.com/questions/404083/is-orm-still-the-vietnam-of-computer-science

	OO	RDBMS
processing	object at a time	set at a time
structure	dictionaries	rectangles
access	navigation	query
location	over here	over there
programmable?	**no**	**no**
perception	**coordinated**	**coordinated**
action	**assist use of tx system**	**transactions**

Programmability of SQL?



http://imgs.xkcd.com/comics/exploits_of_a_mom.png

Programmability of Java?

```
// build generator for the new class
String tname = tclas.getName();
ClassPool pool = ClassPool.getDefault();
CtClass clas = pool.makeClass(cname);
clas.addInterface(pool.get("IAccess"));
CtClass target = pool.get(tname);

// add target object field to class
CtField field = new CtField(target, "m_target", clas);
clas.addField(field);

// add public default constructor method to class
CtConstructor cons = new CtConstructor(NO_ARGS, clas);
cons.setBody(";");
clas.addConstructor(cons);
```

http://www.ibm.com/developerworks/java/library/j-dyn0610/

Coordinating Perception is Insane

- I don't slow down when you watch me
- Records are immutable
- Reality is cumulative
  - new time requires new space

Transactions are awesome

	OO	RDBMS	Imagine!
processing	object at a time	set at a time	both
structure	dictionaries	rectangles	any
access	navigation	query	both
location	over here	over there	anywhere
programmable?	no	no	yes
perception	coordinated	coordinated	values
action	assist use of tx system	transactions	any

	OO	**RDBMS**	**Imagine!**
processing	object at a time	set at a time	both
structure	dictionaries	rectangles	any
access	navigation	query	both
location	over here	over there	anywhere
programmable?	no	no	yes
perception	coordinated	coordinated	**values**
action	assist use of tx system	transactions	any

Rebuilding

	Imagine!
processing	
structure	
access	
location	
programmable?	
perception	
action	

	Imagine!
processing	
structure	
access	
location	
programmable?	**yes**
perception	
action	

Everything is made of data

	Imagine!
processing	
structure	
access	
location	**anywhere**
programmable?	yes
perception	**values**
action	

Data is immutable

	Imagine!
processing	
structure	
access	
location	anywhere
programmable?	yes
perception	values
action	

The fundamental unit of data is the datom:
E / A / V / T

	Imagine!
processing	
structure	**dictionary**
access	
location	anywhere
programmable?	yes
perception	values
action	

A set of datoms has a 100% mechanical transformation to a dictionary.

	Imagine!
processing	
structure	dictionary **rectangle**
access	
location	anywhere
programmable?	yes
perception	values
action	

A set of datoms has a 100% mechanical transformation to **rectangles**.

	Imagine!
processing	
structure	dictionary rectangle **columns**
access	
location	anywhere
programmable?	yes
perception	values
action	

A set of datoms has a 100% mechanical transformation to **columns**.

	Imagine!
processing	
structure	dictionary rectangle column **graph**
access	
location	anywhere
programmable?	yes
perception	values
action	

A set of datoms has a 100% mechanical transformation to a **graph**.

	Imagine!
processing	
structure	dictionary rectangle column graph **entity**
access	
location	anywhere
programmable?	yes
perception	values
action	

A set of datoms has a 100% mechanical transformation to an entity.

Stop Abusing Documents

	Imagine!
processing	
structure	any
access	**query**
location	anywhere!!
programmable?	yes
perception	values!!
action	

Datalog has power equivalent to the relational algebra

	Imagine!
processing	**set at a time**
structure	any
access	query
location	anywhere!!
programmable?	yes
perception	values!!
action	

Datalog is
set-at-a-time

	Imagine!
processing	set at a time, **tuple at a time**
structure	any
access	query
location	anywhere!!
programmable?	yes
perception	values!!
action	

core.logic is
tuple at a time

	Imagine!
processing	set or tuple at a time **entity at a time**
structure	any
access	query **navigation**
location	anywhere!!
programmable?	yes
perception	values!!!!
action	

Entity provides generic, lazy traversal

	Imagine!
processing	any
structure	any
access	any
location	anywhere!!
programmable?	yes
perception	values!!!!
action	transactions

serialized transactions

ACID and easy

	Imagine!
processing	any
structure	any
access	any
location	anywhere
programmable?	yes!!
perception	values!!!!!!
action	transactions **transaction fns**

transaction functions

pure functions
composable
installed in db
run anywhere

	Imagine!
processing	any
structure	any
access	any
location	anywhere
programmable?	yes!!
perception	values!!!!!!
action	txes, tx fns

bonus round

	Imagine!
processing	any
structure	any
access	any
location	anywhere
programmable?	yes!!
perception	values!!!!!!
action	txes, tx fns

bonus round

time model

```
db.asOf(lastMonth)
```

	Imagine!
processing	any
structure	any
access	any
location	anywhere
programmable?	yes!!
perception	values!!!!!!
action	txes, tx fns

bonus round

time model

scale read *and* query horizontally

	Imagine!
processing	any
structure	any
access	any
location	anywhere
programmable?	yes!!
perception	values!!!!!!
action	txes, tx fns

bonus round

time model

scale read *and* query horizontally

"what if" queries

```
db.with(newData)
```

	Imagine!
processing	any
structure	any
access	any
location	anywhere
programmable?	yes!!
perception	values!!!!!!
action	txes, tx fns

bonus round

time model

scale read *and* query horizontally

"what if" queries

multi-source queries

	Imagine!
processing	?
structure	?
access	?
location	anywhere
programmable?	?
perception	values
action	?
??	?

you can play the home game!

simplify

program with values

fill in your own answers

"I think that if you if you're going to dump on something in the way many people do about ORMs, you have to state the alternative"

http://java.dzone.com/articles/martin-fowler-orm-hate

Thanks!

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Datomic