

# Celldown: a textual spreadsheet language or: “code as UI”

Tijs van der Storm, CWI  
@tvdstorm / [storm@cwi.nl](mailto:storm@cwi.nl)



Centrum Wiskunde & Informatica

# Language interaction design

- Explore the connection between language and IDE
- Lorentz Workshop in 2013
- Hypothesis: IDE and language can/should not be separated.

Program  
syntax

IDE



Spreadsheets  
Jetbrains MPS  
“Mendix”  
Intentional

Program  
syntax

IDE

Source code on  
steroids:  
???



Hyperbole of the day

**Source code all the things!**

# Background



# Copy-Paste Tracking: Fixing Spreadsheets Without Breaking Them

Felienne Hermans  
Delft University of Technology  
[f.f.j.hermans@tudelft.nl](mailto:f.f.j.hermans@tudelft.nl)

Tijs van der Storm  
Centrum Wiskunde & Informatica  
[storm@cwi.nl](mailto:storm@cwi.nl)

1

Enter a formula in D2

A	B	C	D
Id	Lab	Exam	Final
s123	6	7.5	$=(B2+C2)/2$
s456	9	7	
s789	5	3.5	

2

Copy it to D3:D4

A	B	C	D
Id	Lab	Exam	Final
s123	6	7.5	$=(B2+C2)/2$
s456	9	7	$=(B3+C3)/2$
s789	5	3.5	$=(B4+C4)/2$

origin



3

Edit the "copy" in D4

A	B	C	D
Id	Lab	Exam	Final
s123	6	7.5	= $(B2+C2)/2$
s456	9	7	= $(B3+C3)/2$
s789	5	3.5	= $\text{round}((B4+C4)/2)$

4

Reconcile D2:D3 with the edits in D4

A	B	C	D
Id	Lab	Exam	Final
s123	6	7.5	= $\text{round}((B2+C2)/2)$
s456	9	7	= $\text{round}((B3+C3)/2)$
s789	5	3.5	= $\text{round}((B4+C4)/2)$

---

“Copy” (many)	“Source” (one)
Reference	Declaration
Stack frame	Procedure call
Inlining	Procedure
Text output	Template
Object	Class
Styled element	Style sheet
View	Database table
Unrolling	Loop

---

"abstraction without indirection"



**Web**

Images

Videos

News

More ▼

Search tools

5 results (0.19 seconds)

<sup>[DOC]</sup> [4. towards a theory of copying - Subtext](#)

[www.subtext-lang.org/OOPSLA05.doc](http://www.subtext-lang.org/OOPSLA05.doc) ▼

by J Edwards - [Cited by 58](#) - [Related articles](#)

This principle is called **abstraction without indirection**. It is made possible by the ability of the program representation to automatically react to change.



**ICLC**

INTERNATIONAL CONFERENCE  
ON LIVE CODING

13-15TH JULY 2015

HOSTED BY ICSRIM  
IN THE SCHOOL OF MUSIC,  
UNIVERSITY OF LEEDS, UK

# We don't need no stinking GUI

- Rascal language workbench
- “Dealers of syntax”

# Celldown

**table** grades =

#	A	/	B	/	C	/	D
1:	Lab		Exam		Avg		Grade
2:	7		4		= (A2 + B2) / 2		= round(C2)
3:	3		6		= (A3 + B3) / 2		= round(C3)
4:	9		10		= (A4 + B4) / 2		= round(C4) .

# Demo

```
table grades = # A / B / C / D / E
                1: | Lab | Exam | Avg | Grade
                2: | 7   | 7   | = (B2 + B3) / 2 | = round(D2)
                3: | 3   | 7   | = (B3 + C3) / 2 | = round(D3)
                4: | 9   | 10  | = (B4 + C4) / 2 | = round(D4).
```

```
view grades = # A / B / C / D / E
               1: | Lab | Exam | Avg | Grade
               2: | 7   | 7   | 5.  | 5.
               3: | 3   | 7   | 5.  | 5.
               4: | 9   | 10  | 9.5 | 10..
```

```
test grades E2 * 2 == B2 + C2 expected 14., got 10.
```

```
repl for grades
```

```
> A2 + B2.
```

```
=> 7.0
```

```
>B2 + B2.
```

```
=> 7.0
```

```
>
```

# Source code?

- Views: tests, examples, stacks, explanations
- Editing gestures: copy-paste, structure editing
- Transformations: refactoring, inlining, expansion
- Commands: break points, watches, probes
- ...



We can do much more with  
source code than just write  
and document our programs

# “Syntax all the way down”

Or, perhaps more accurately:  
Syntax all the way up

/ht Roly Perera

Source code all the things!