

2001financialstatements.xlsx - Microsoft Excel

	A	B	C	D	E	F	G	H	I	J	K	L
1	Consolidated Statements of Shareholders' Equity											
2	[DOLLARS IN THOUSANDS]											
3												
4												
5												
6												
7												
8												
9	Balance, January 1, 1999	69,494,483	\$ 86,868	\$ 43,281	\$ 604,227	\$ (21,902)	\$ (12,802)	\$ (549)	\$ 699,123			
10												
11	Net income				128,856		128,856			128,856		
12	Translation adjustment						9,558			9,558		
13	Pensions									614		
14	Unrealized loss on investment securities									(3,235)		
15	Other comprehensive income											
16	Comprehensive income											
17	Stock options exercised	108,104	134	1,918						2,052		
18	Unearned compensation	149,799	188	3,933						(3,485)	636	
19	Performance shares	20,397	26	686							712	
20	Procomp and Nexus acquisitions	1,710,214	2,138	37,351		9,487					48,976	
21	Dividends declared and paid				(41,668)						(41,668)	
22	Treasury shares					(1,229)					(1,229)	
23												
24	Balance, December 31, 1999	71,482,997	\$ 89,354	\$ 87,169	\$ 691,415	\$ (13,644)	\$ (5,865)	\$ (4,034)	\$ 844,395			
25	Net income				136,919		136,919			136,919		
26	Translation adjustment						(7,904)			(7,904)		
27	Pensions						1,507			1,507		
28	Unrealized loss on investment securities						(396)			(396)		
29	Other comprehensive loss						(6,793)		(6,793)			
30	Comprehensive income						\$ 130,126					
31	Stock options exercised	273,238	343	5,444						5,787		
32	Unearned compensation	247,635	308	5,583						(3,915)	1,976	
33	Performance shares	15,335	19	334						353		
34	Dividends declared and paid				(44,271)					(44,271)		
35	Treasury shares					(2,300)				(2,300)		
36												
37	Balance, December 31, 2000	536,208	\$ 90,024	\$ 98,530	\$ 784,063	\$ (15,944)	\$ (12,658)	\$ (7,949)	\$ 936,066			
38	Net income				66,893		66,893			66,893		
39	Translation adjustment						(47,373)			(47,373)		
40	Pensions						(1,628)			(1,628)		
41	Unrealized gain on investment securities						1,213			1,213		
42	Other comprehensive loss						(47,788)		(47,788)			
43	Comprehensive income						\$ 19,105					
44	Stock options exercised	176,395	221	4,860						5,081		
45	Unearned compensation				(45,774)					1,412	1,412	
46	Dividends declared and paid						(12,780)			(45,774)		
47	Treasury shares									(12,780)		
48												
49	Balance, December 31, 2001	712,603	\$ 90,245	\$ 103,390	\$ 805,182	\$ (28,724)	\$ (60,446)	\$ (6,537)	\$ 903,110			
50												
51												

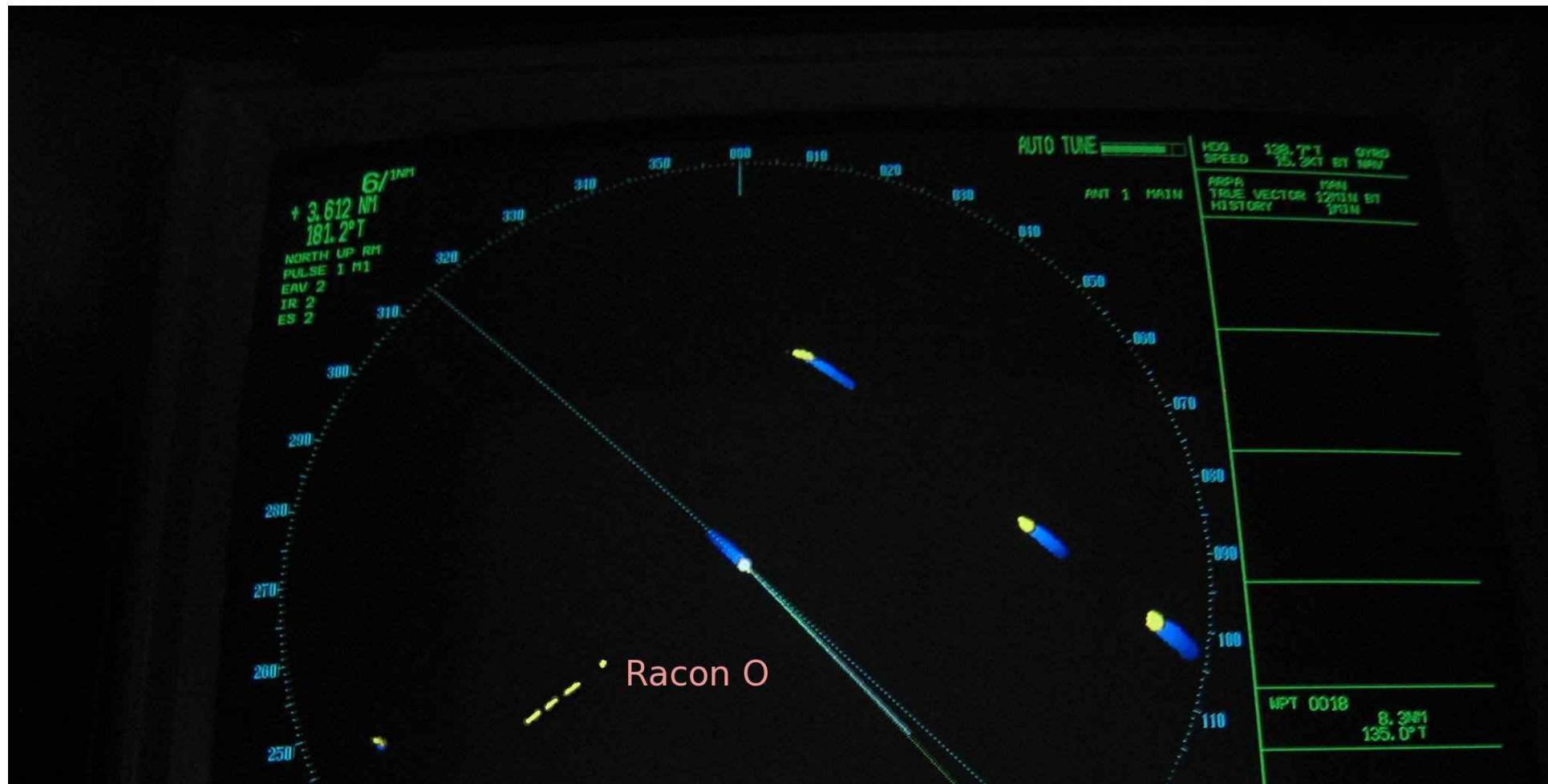
@Felienne

**95% of all U.S. firms use
spreadsheets for
financial reporting**

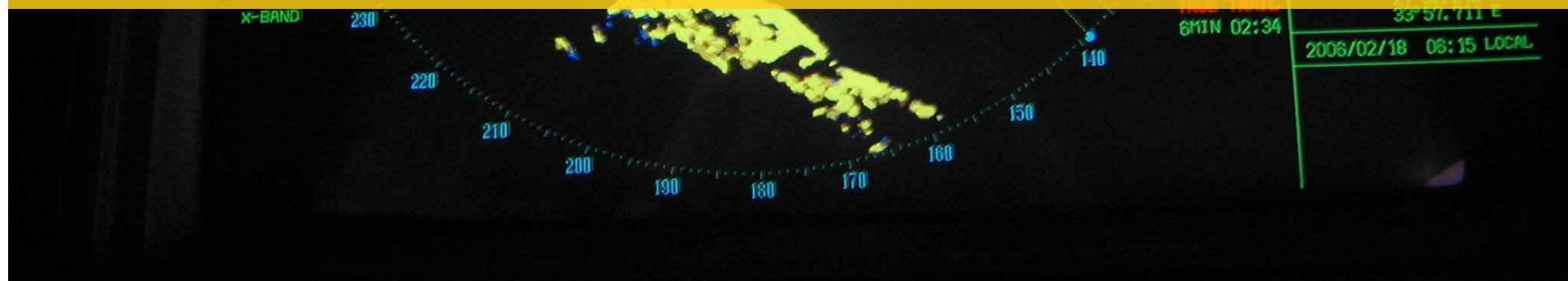


[Wall Street - New York Stock Exchange by Carlos Delgado CC-BY-SA-3.0](#)





Spreadsheets exist ‘under the radar’



Disaster!



[Hindenburg Disaster](#) by David Frickson CC-BY-2.0



**European Spreadsheet
Risk Interest Group
(Eusprig.org)**

LONDON 2012

Search - enhanced by Google

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Torch relay

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London 2012 Olympics: lucky few to get 100m final tickets after synchronised swimming was overbooked by 10,000

Around 200 people who thought their only experience of the London 2012 Olympic Games would be minor heats of synchronised swimming have received an unexpected upgrade to the men's 100m final following an embarrassing ticketing mistake.



Now you see us, now you don't: thousands of synchronised swimming ticket holders will be left disappointed. Photo: GETTY IMAGES

By Paul Kelso

[Print this article](#)

LONDON 2012 COUNTDOWN
056 08 :26 :23
DAYS HRS MINS SECS

Olympic moments »



Hotels.com wake up happy

THE OLYMPICS BLOG *



Matthew Norman
Sense of taekwondo injustice starts outpouring of national empathy



Jim White
Much ado about Wenlock as Olympic torch visits Games birthplace



Jacqueline Magnay
Best of British food? Locog are taking the tea and biscuit

The Telegraph Friday 01 June 2012

LONDON 2012

OLYMPICS TEAM GB EVENTS GUIDES VENUES SCHEDULE COUNTRIES BLOG

HOT TOPICS: Torch relay | Subscribe to Olympics email | Exclusive Team GB athlete profiles | Olympic

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Now you see us, now you don't: thousands of synchronised swimming ticket holders will be left disappointed

By Paul Kelso

University of Toledo loses \$2.4M in projected revenue

BY RYAN E. SMITH
BLADE STAFF WRITER





Things keep getting worse for the University of Toledo's finances.

Already facing significant state funding reductions for next year, UT officials have discovered an internal budgeting error that means they will have \$2.4 million less to work with than anticipated.

The mistake - a typo in a formula that led officials to overestimate projected revenue - was found Tuesday, the day before the UT board of trustees was to approve next year's budget and not long after the state informed UT that its support would be about \$500,000 less than expected next year, said William Decatur, senior vice president for finance, technology, and operations.

All this happened after UT officials put together a budget that dealt with \$1.5 million in state cuts for the 2004-05 academic year.

"It's incredibly frustrating," Mr. Decatur said. "It causes us to reset our expectations."

The board put off considering the budget this week and is expected to approve an amended version in June.

Loss 2.4 million dollars
Cause typo

The Telegraph Friday 01 June 2012

LONDON 2012

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Now you see us, now you don't: thousands of synchronised images

By Paul Kelso

NEWS FROM REUTERS

TransAlta Says Clerical Snafu Costs It \$24 Million

Tuesday, June 3, 2003 19:06 EDT

By Cameron French

TORONTO (Reuters) - TransAlta Corp. said on Tuesday it will take a \$24 million charge to earnings after a bidding snafu landed it more U.S. power transmission hedging contracts than it bargained for, at higher prices than it wanted to pay.

TransAlta, Canada's top investor-owned power generator, said it submitted the erroneous bid to the New York Independent System Operator for May 2003 transmission congestion contracts. The ISO manages the state's power transmission system and the contracts hedge the cost of transmission.

But the company's computer spreadsheet contained mismatched bids for the contracts, it said.

"It was literally a cut-and-paste error in an Excel spreadsheet that we did not detect when we did our final sorting and ranking bids prior to submission," TransAlta chief executive Steve Snyder said in a conference call.

Loss 24 million dollars
Cause copy-paste error

University of Toledo loses \$2.4M in projected revenue

BY RYAN E. SMITH
BLADE STAFF WRITER

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Things keep getting worse for the University of Toledo's finance

Significant state funding reductions for next year have discovered an internal budgeting error that will have \$2.4 million less to work with than

planned in a formula that led officials to expect revenue - was found Tuesday, the Board of trustees was to approve next month long after the state informed UT that it had about \$500,000 less than expected from Decatur, senior vice president for finance and operations.

UT's financial situation is deteriorating due to a combination in state cuts for the 2004-05

years.

UT's financial situation is deteriorating due to a combination in state cuts for the 2004-05

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No more
spreadsheets then?

YOU SHOULDN'T USE A SPREADSHEET FOR IMPORTANT WORK (I MEAN IT)

I envy economists. Unlike computer scientists, they seem to be able to publish best-seller books with innovative research. One such book is **Piketty's Capital**. The book is reminiscent of Marx's capital in its scope. If you haven't heard about the book yet, it has a simple message: the yield on capital is higher than wage growth which means that those with the capital are bound to get richer and more powerful. The bulk of the population is doomed. A small elite will soon collect all the wealth, leaving none for the regular folks. This observation is hardly original... the idea of **wealth concentration** has even a catch phrase: **The rich get richer and the poor get poorer.**

Anyone could make similar claims. But it is not easy to prove it, and some economists even found evidence to the contrary (**Kopczuk and Schrager**): a big inheritance is less likely to land you in the list of the richest people today than in 1970 (see **Edlund and Kopczuk**, **Kopczuk et al.**, and **Kopczuk and Saez** for further research in this direction).

What is remarkable regarding Piketty's work, is that he backed his work with comprehensive data and thorough analysis. Unfortunately, like too many people, Piketty used spreadsheets instead of writing sane software. On the plus side, he published his code... on the negative side, it appears that Piketty's code contains mistakes, fudging and other problems.



Daniel Lemire's blog

Montreal, Canada



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270 followers

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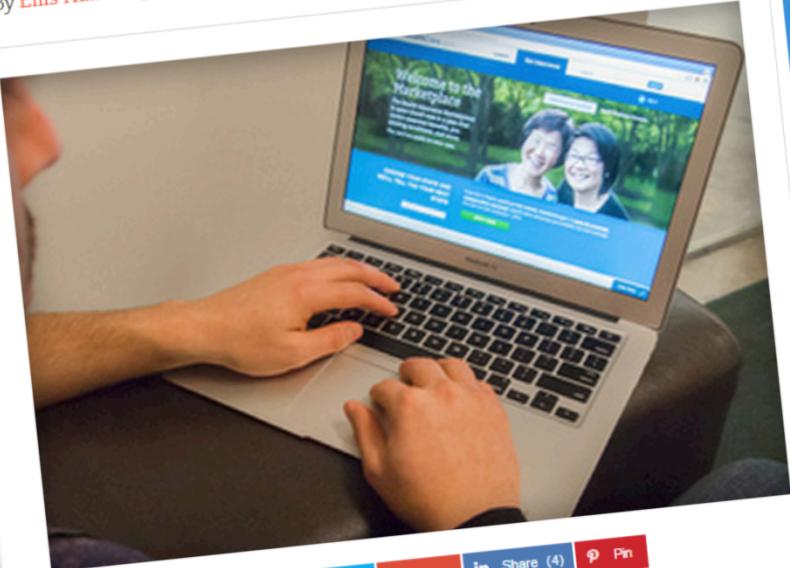
- **or**

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Healthcare.gov's technical problems frustrate Americans

By [Ellis Hamburger](#) on December 6, 2013 12:48 pm [Email](#)



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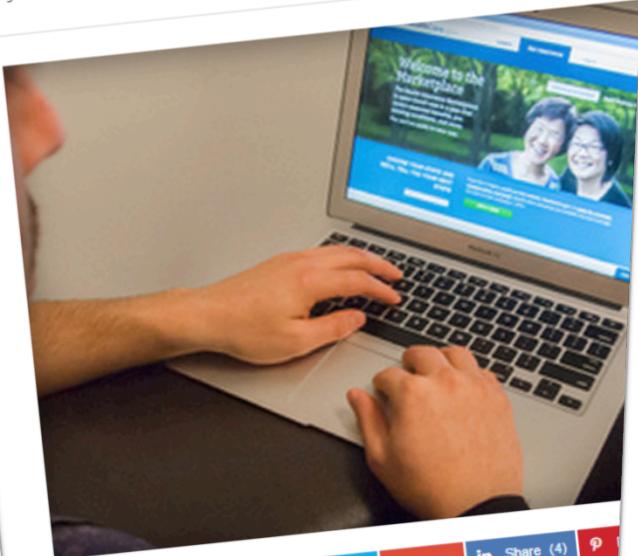
Since its launch in early October, Barack Obama's Healthcare.gov has been plagued with [bugs, errors, and issues that have frustrated its first-ever users](#). The idea was to let Americans easily shop for insurance plans, but the reality has been a bit more complicated.



55 TOTAL UPDATES
Latest 12 days ago, oldest about 1 year ago

Healthcare.gov's technical frustration Americans

By [Ellis Hamburger](#) on December 6, 2013 12:48 pm [Email](#)



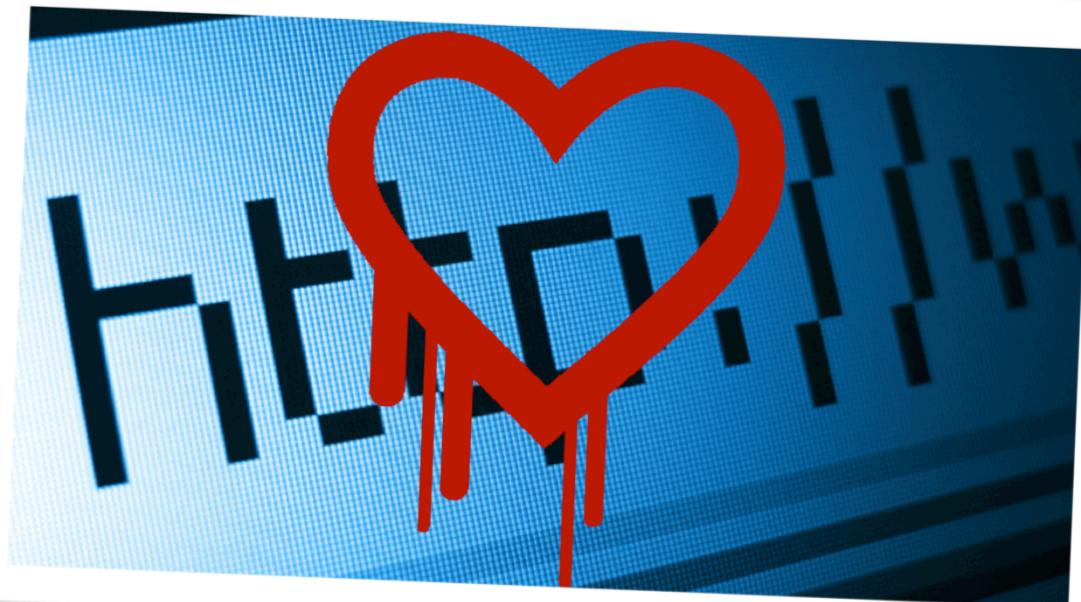
Since its launch in early October, Barack Obama's Healthcare.gov website has been plagued with bugs, errors, and issues that have frustrated its first-ever users. It's supposed to let Americans easily shop for insurance plans, but the reality has been complicated.

CNET › Security › How to protect yourself from the 'Heartbleed' bug

How to protect yourself from the 'Heartbleed' bug

A new security bug means that people all across the Web are vulnerable to having their passwords and other sensitive data stolen. Here's what consumers can do to protect themselves.

by [Richard Nieva](#) [@richardjnieva](#) / April 8, 2014 2:37 PM PDT



Healthcare.gov's technical issues frustrate Americans

By Ellis Hamburger on December 6, 2013



Since its launch in early October, the Healthcare.gov website has been plagued with bugs, errors, and issues that have frustrated Americans easily shopping for health insurance. The site is complicated.

Share on Facebook (41)

CNET > Security > How to protect yourself from the 'Heartbleed' bug

How to protect yourself from

UNDERSTANDING THE APPLE 'GOTO FAIL;' VULNERABILITY

BY AMIT SETHI ON TUESDAY, FEBRUARY 25, 2014

You may have heard about the recently publicly disclosed vulnerability (<http://support.apple.com/kb/HT6147>) in Apple iOS. Let's take a look at the goto fail details as well as at who is affected.



VULNERABILITY DETAILS

As the code at http://opensource.apple.com/source/Security/Security-55471/libsecurity_ssl/lib/sslKeyExchange.c shows, there is a bug in the implementation of the SSLVerifySignedServerKeyExchange function. Although the goto fail has been discussed in many other places, let's take a quick look at it here:

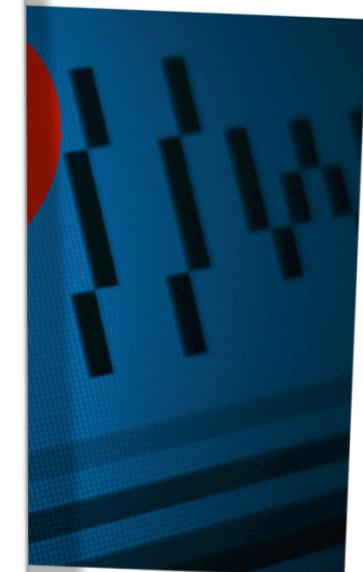
```
static OSStatus
SSLVerifySignedServerKeyExchange(SSLContext *ctx, bool isRsa, SSLBuffer signedParams,
                                uint8_t *signature, UInt16 signatureLen)
{
    OSStatus err;
    SSLBuffer hashOut, hashCtx, clientRandom, serverRandom;
    uint8_t hashes[SSL_SHA1_DIGEST_LEN + SSL_MD5_DIGEST_LEN];
    signedHashes;
    uint8_t *dataToSign;
    size_t dataToSignLen;

    ...
    if ((err = ReadyHash(&SSLHashSHA1, &hashCtx)) != 0)
        goto ↓fail;
    if ((err = SSLHashSHA1.update(&hashCtx, &clientRandom)) != 0)
        goto ↓fail;
    if ((err = SSLHashSHA1.update(&hashCtx, &serverRandom)) != 0)
        goto ↓fail;
    if ((err = SSLHashSHA1.update(&hashCtx, &signedParams)) != 0)
        goto ↓fail;
    if ((err = SSLHashSHA1.final(&hashCtx, &hashOut)) != 0)
        goto ↓fail;

    err = sslRawVerify(ctx,
                       ctx->peerPubKey,
                       dataToSign, /* plaintext */
                       dataToSignLen, /* plaintext length */
                       signature,
                       signatureLen);

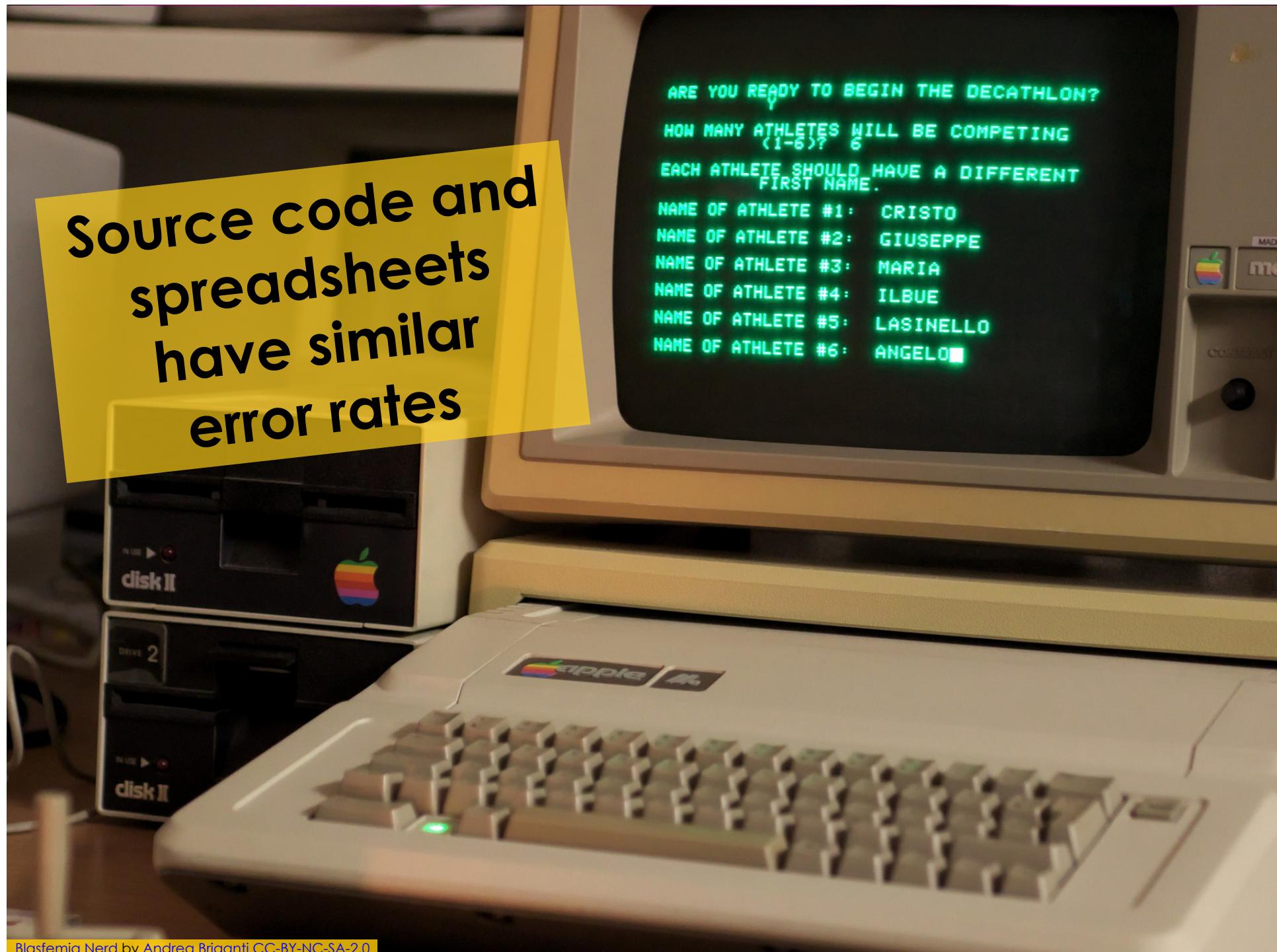
    if(err) {
        sslErrorLog("SSLDecodeSignedServerKeyExchange: sslRawVerify "
                    "returned %d\n", (int)err);
        goto ↓fail;
    }
}
```

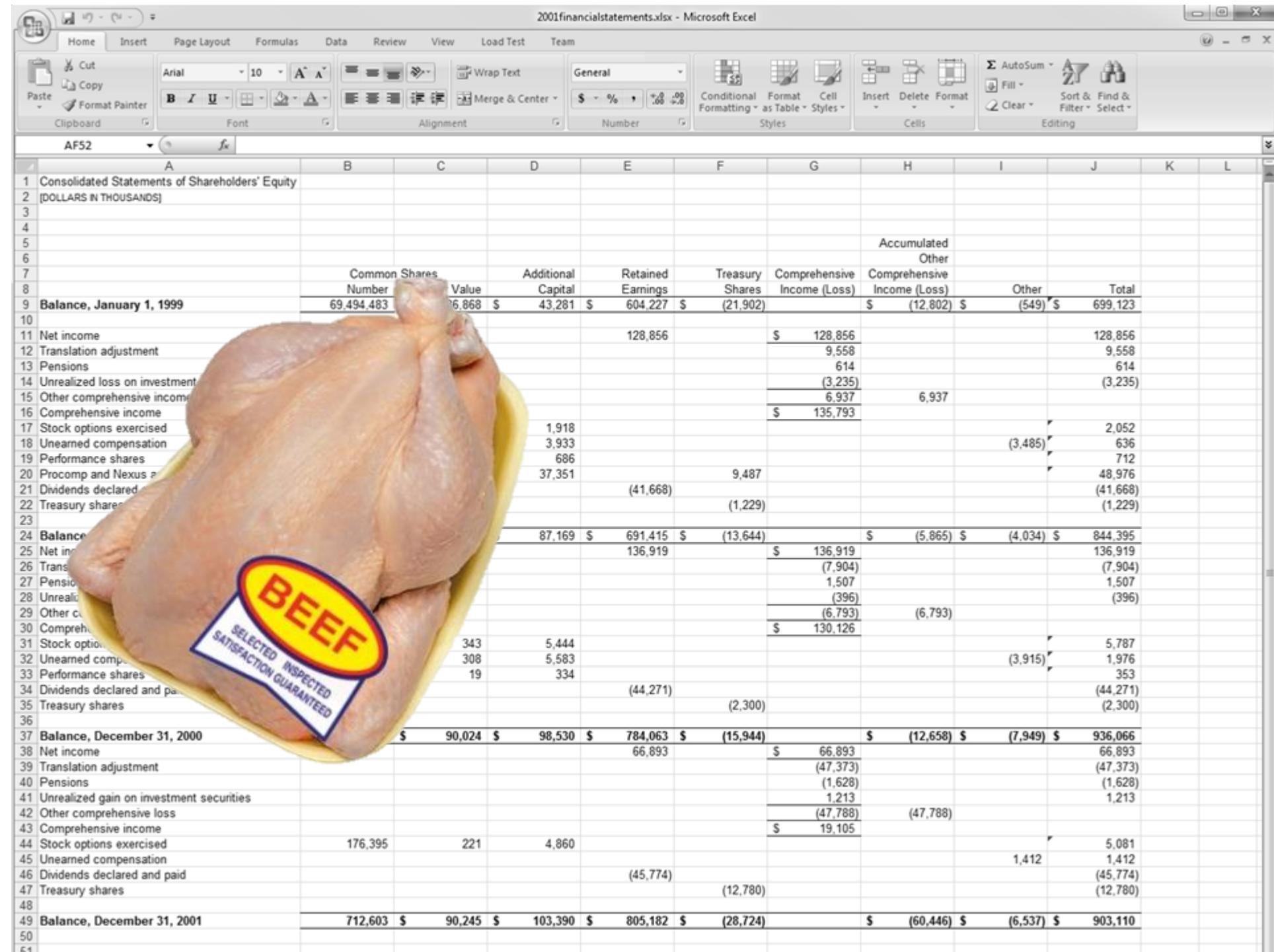
Web are vulnerable to n. Here's what consumers



Source code and
spreadsheets
have similar
error rates

ARE YOU READY TO BEGIN THE DECATHLON?
HOW MANY ATHLETES WILL BE COMPETING
(1-6)? 6
EACH ATHLETE SHOULD HAVE A DIFFERENT
FIRST NAME.
NAME OF ATHLETE #1: CRISTO
NAME OF ATHLETE #2: GIUSEPPE
NAME OF ATHLETE #3: MARIA
NAME OF ATHLETE #4: ILBUE
NAME OF ATHLETE #5: LASINELLO
NAME OF ATHLETE #6: ANGELO■





A photograph of a gospel choir performing on stage. The choir members are dressed in shiny, gold-colored robes with white collars and cuffs. They are singing into microphones, their mouths open in harmony. The stage is dimly lit, with bright spotlights illuminating the performers. The background is dark, making the gold robes stand out.

Spreadsheets are code

Spreadsheet_5.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins VBA BumbleBee Expector Load Test Team

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Clipboard Font Alignment Number Format as Table Delete
Font Alignment Number Cell Styles Format Cells Sort & Find & Select Editing

G35 =F21^2

	A	B	C	D	E	F	G	H	I
20									
21						Enter the annualized standard deviation in reinvestment	61.25%	(in %)	
22									
23						Inputs relating to the option			
24						Enter reinvestment needs that can be financed without	5.00%	(in currency)	
25						Enter maximum reinvestment that can be financed with	17.00%		
26						General Inputs			
27						Enter the riskless rate that corresponds to the option life	6.00%	(in %)	
28									
29						Capital Inputs			
30						Enter the current cost of capital for the firm =	12.22%		
31						Enter the firm's current return on capital =	18.69%		
32									
33						Output			
34	Stock Price=					9.13%	T.Bond rate=	6.00%	
35	Strike Price=					5.00%	Variance=	0.3751616	
36	Expiration (in years) =					1	Annualized dividend yield=	0.00%	
37	Annual Excess Return=					6.47%	Cost of Capital =	12.22%	
38	Maximum Flexibility =					17.00%			

Reinvestment Needs Value of Flexibility

Ready 100%

Spreadsheet_5.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins VBA BumbleBee Expector Load Test Team

Clipboard Font Alignment Number Styles Cells Editing

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Clipboard Font Alignment Number Styles Cells Editing

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Ready 100%

Turing Machine_Successor.xlsx - Microsoft Excel

Turing Machine State Transitions																	
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3																	
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5	5	S1	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
6	6	S1	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
7	7	S1	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
8	8	S2	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
9	9	S2	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
10	10	S2	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
11	9	S3	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-
12	8	S3	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
13	7	S3	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
14	6	S3	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
15	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
16	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
17	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
18	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
19	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
20	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
21	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
22	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
23	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
24	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
25	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
26	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
27	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
28	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
29	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
30	7	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-

Turing Machine_Successor.xlsx - Microsoft Excel

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4	S1	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
5	S1	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
6	S1	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
7	S1	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
8	S2	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
9	S2	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
10	S2	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
11	S3	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-
12	S3	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
13	S3	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
14	S3	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
15	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
16	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
17	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
18	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
19	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
20	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
21	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
22	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
23	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
24	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
25	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
26	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
27	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
28	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
29	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-
30	S4	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-

Machine State Table Directions

Ready Calculate

90%

bb Implementing a Turing m ×

boingboing.net/2013/09/20/implementing-a-turing-machine.html

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Implementing a Turing machine in Excel

Cory Doctorow at 2:20 pm Fri, Sep 20, 2013

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142

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Turing Machine_Successor.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review Add-Ins VBA Load Test BumbleBee Exporter

fx AutoSum Logical Lookup & Reference Define Name Trace Precedents Show Formulas Recently Used Text Math & Trig Use in Formula Manager Create from Selection Trace Dependents Error Checking Date & Time More Functions Remove Arrows Evaluate Formula Watch Window Calculation Options Calculation

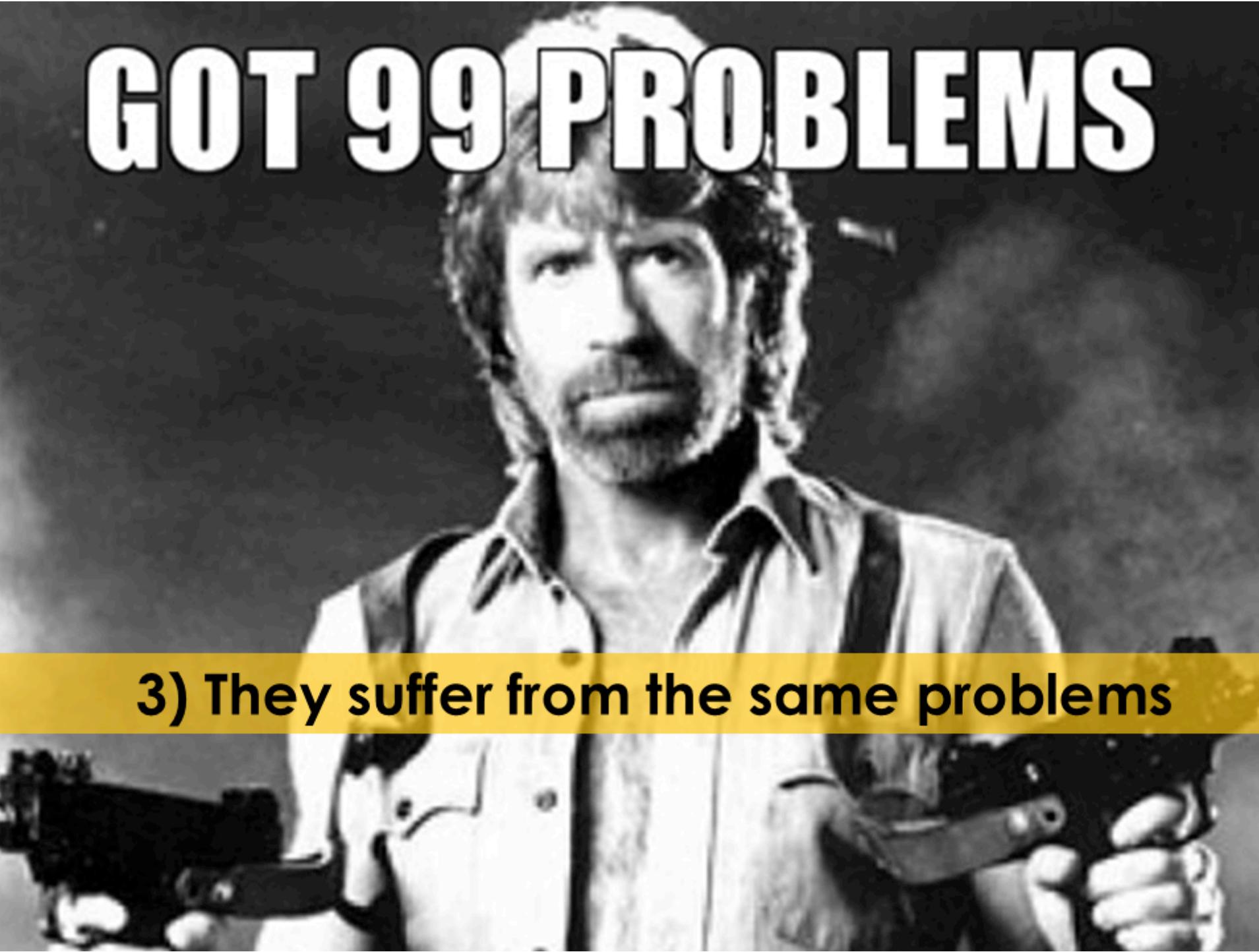
SUM =IFERROR(VLOOKUP(VLOOKUP(\$B4&"~"&INDEX(\$A4:\$IM4,\$A4),StateTable,5,0),DirectionTable,2,0)+\$A4)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1																
2																
3																
4	0 1							1	1	1						
5	0 1							1	1	1						
6	0 1							1	1	1						
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9	0 1							1	1	1						
10	0 1							1	1	1						
11	0 1							1	1	1						
12	0 1							1	1	1						
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14	0 1							1	1	1						
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16	0 1							1	1	1						
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18	0 1							1	1	1						
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20	0 1							1	1	1						
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25	0 1							1	1	1						
26	0 1							1	1	1						
27	0 1							1	1	1						
28	0 1							1	1	1						

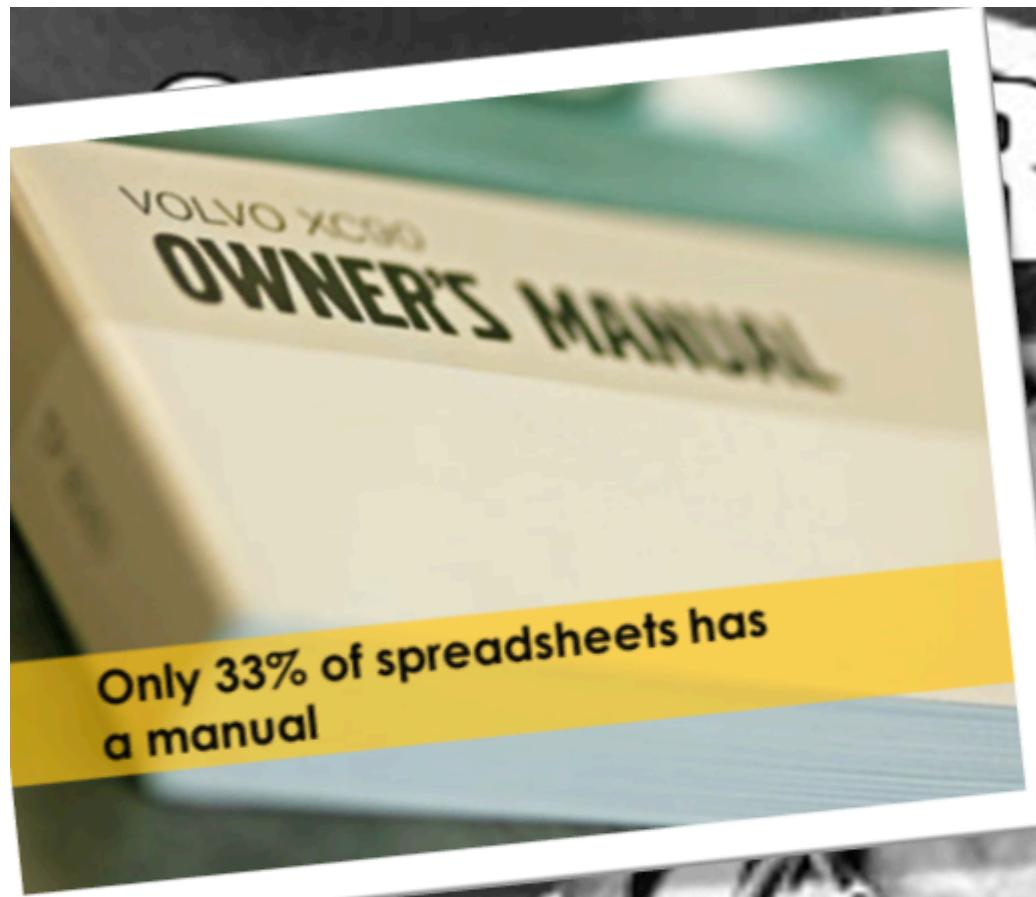
2013 GIFT GUIDE

AN ASTRONAUT'S GUIDE TO LIFE ON EARTH

GOT 99 PROBLEMS



3) They suffer from the same problems



3) They suffer from the same problems



3) They suffer from the same problems



3) They suffer from the same problems



**In summary: both the activities,
complexity and problems are the same**



Spreadsheets are code

**In summary: both the activities,
complexity and problems are the same**

2001financialstatements.xlsx - Microsoft Excel

	A	B	C	D	E	F	G	H	I	J	K	L
1	Consolidated Statements of Shareholders' Equity											
2	[DOLLARS IN THOUSANDS]											
3												
4												
5												
6												
7												
8												
9	Balance, January 1, 1999	69,94,483	\$ 86,868	\$ 43,281	\$ 604,227	\$ (21,902)	\$ (12,802)	\$ (549)	\$ 699,123			
10												
11	Net income				128,856		\$ 128,856			128,856		
12	Translation adjustment						9,558			9,558		
13	Pensions						614			614		
14	Unrealized loss on investment securities						(3,235)			(3,235)		
15	Other comprehensive income						6,937		6,937			
16	Comprehensive income						\$ 135,793					
17	Stock options exercised	108,104	134	1,918						2,052		
18	Unearned compensation	149,799	188	3,933						(3,485)	636	
19	Performance shares	20,397	26	686							712	
20	Procomp and Nexus acquisitions	1,710,214	2,138	37,351		9,487					48,976	
21	Dividends declared and paid				(41,668)						(41,668)	
22	Treasury shares					(1,229)					(1,229)	
23												
24	Balance, December 31, 1999	71,482,997	\$ 89,354	\$ 87,169	\$ 691,415	\$ (13,644)	\$ (5,865)	\$ (4,034)	\$ 844,395			
25	Net income					136,919	\$ 136,919				136,919	
26	Translation adjustment						(7,904)				(7,904)	
27	Pensions						1,507				1,507	
28	Unrealized loss on investment securities						(396)				(396)	
29	Other comprehensive loss						(6,793)		(6,793)			
30	Comprehensive income						\$ 130,126					
31	Stock options exercised	273,238	343	5,444						5,787		
32	Unearned compensation	247,635	308	5,583						(3,915)	1,976	
33	Performance shares	15,335	19	334							353	
34	Dividends declared and paid				(44,271)						(44,271)	
35	Treasury shares					(2,300)					(2,300)	
36												
37	Balance, December 31, 2000	536,208	\$ 90,024	\$ 98,530	\$ 784,063	\$ (15,944)	\$ (12,658)	\$ (7,949)	\$ 936,066			
38	Net income					66,893	\$ 66,893				66,893	
39	Translation adjustment						(47,373)				(47,373)	
40	Pensions						(1,628)				(1,628)	
41	Unrealized gain on investment securities						1,213				1,213	
42	Other comprehensive loss						(47,788)		(47,788)			
43	Comprehensive income						\$ 19,105					
44	Stock options exercised	176,395	221	4,860						5,081		
45	Unearned compensation									1,412	1,412	
46	Dividends declared and paid				(45,774)						(45,774)	
47	Treasury shares					(12,780)					(12,780)	
48												
49	Balance, December 31, 2001	712,603	\$ 90,245	\$ 103,390	\$ 805,182	\$ (28,724)	\$ (60,446)	\$ (6,537)	\$ 903,110			
50												
51												

And not just a programming language!



The next language
to learn

Resistance is futile!

live programming



```
canvasHeight = parseInt(canvas.getAttribute("height"));

drawSky();
drawMountains();
drawTree();
}

//-----
//  sky
//
function drawSky () {
    ctx.save();

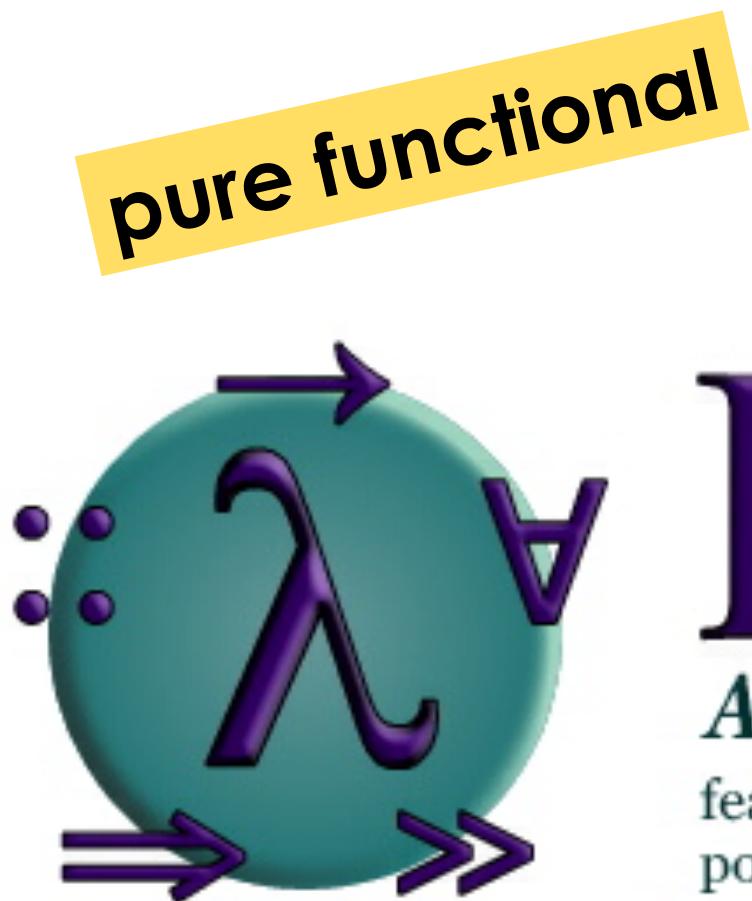
    var gradient = ctx.createLinearGradient(0,0,0,canvasHeight);
    gradient.addColorStop(0, "#b4e0fe");
    gradient.addColorStop(1, "#d3f8ff");

    ctx.fillStyle = gradient;
    ctx.fillRect(0,0,canvasWidth,canvasHeight);

    ctx.restore();
}

//-----
//  mountains
//
function drawMountains () {
    resetRandom();

    drawMountain(130, "#8bb2bb");
    drawMountain(50, "#618087");
}
```



Haskell

A Purely Functional Language

featuring static typing, higher-order functions,
polymorphism, type classes and monadic effects

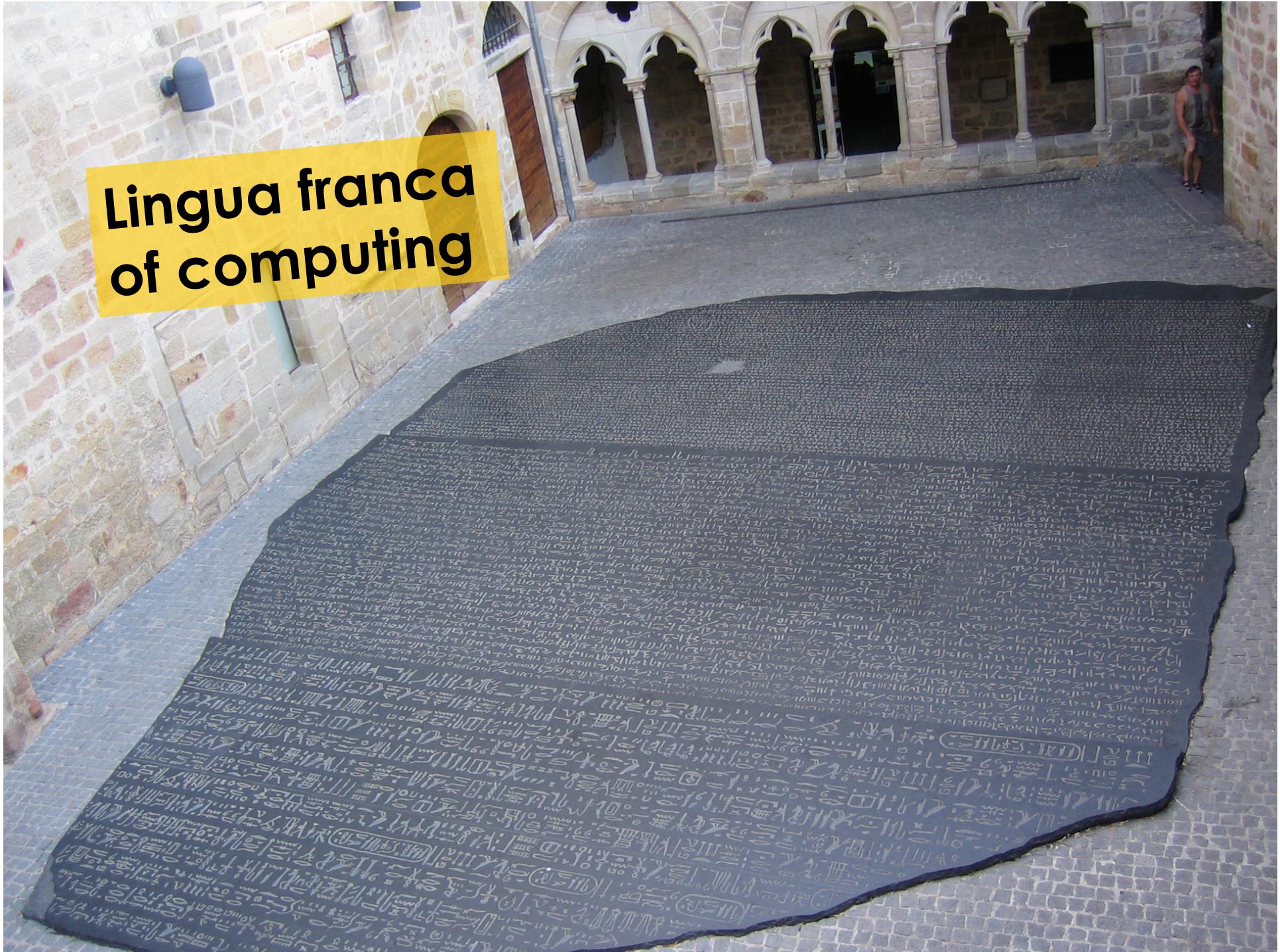
pure functional



Excel

A Purely Functional Language

featuring static typing, higher-order functions,
polymorphism, type classes and monadic effects



Lingua franca
of computing

A photograph of a gospel choir performing on stage. The choir members are dressed in shiny, gold-colored robes with white collars and cuffs. They are singing into microphones, their mouths open in harmony. The stage is dimly lit, with bright spotlights illuminating the performers. The background is dark, making the gold robes stand out.

Spreadsheets are code

A photograph of a gospel choir performing on stage. The choir members are wearing shiny, gold-colored robes with white collars and cuffs. They are singing into microphones, their mouths open in harmony. The stage lighting creates strong highlights on their robes. In the foreground, the back of another person's robe is visible, showing a similar gold fabric. The background is dark, making the gold robes stand out.

Spreadsheets are code

And awesome!

But....



WindowsFormsApplication1 - Microsoft Visual Studio

File Edit View Refactor Project Build Debug Team Data Tools .NET Reflector Architecture Test Analyze Window Help

Form1.cs X Form1.cs [Design]

WindowsFormsApplication1.Form1 Mu(int x, ref int y)

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Windows.Forms;

namespace WindowsFormsApplication1
{
    public partial class Form1 : Form
    {
        public Form1()
        {
            InitializeComponent();
        }

        public static int Mu(int x, ref int y)
        {
            if (x == 1)
            {
                return y;
            }
            else
            {
                //divisible by 2?
                int Rem;
                Math.DivRem(x, 2, out Rem);
                int Stop;

                if (Rem == 0)
                    y = 0;
                else
                    y = 1;
            }
        }
    }
}
```

Solution Explorer

Solution 'WindowsFormsApplication1'
WindowsFormsApplication1
Properties
References
Form1.cs
Form1.Designer.cs
Form1.resx
Program.cs

100 %

Ln 21 Col 13 Ch 13 INS

Solution Exp... Team Explor...

WindowsFormsApplication1 - Microsoft Visual Studio

File Edit View Refactor Project Build Debug Team Data Tools .NET Reflector Architecture Test Analyze Window Help

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Solution Explorer

Solution 'WindowsFormsApplication1'
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100 %

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Ready

Solution Exp... Team Explor...

WindowsFormsApplication1 - Microsoft Visual Studio

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Solution Explorer

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Ln 21 Col 13 Ch 13 INS

Ready

Solution Exp... Team Explor...

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Solution Explorer

Solution 'WindowsFormsApplication1'
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Form1.Designer.cs
Form1.resx
Program.cs

100 %

Ln 21 Col 13 Ch 13 INS

Ready

Solution Exp... Team Explor...

2001financialstatements.xlsx - Microsoft Excel

Consolidated Statements of Shareholders' Equity											
	Common Shares			Additional Capital		Retained Earnings		Treasury Shares		Accumulated Other Comprehensive Income (Loss)	
	Number	Par Value								Other	Total
Balance, January 1, 1999	69,494,483	\$ 86,868		\$ 43,281		\$ 604,227		\$ (21,902)		\$ (12,802)	\$ 699,123
Net income						128,856					128,856
Translation adjustment											9,558
Pensions											614
Unrealized loss on investment securities											(3,235)
Other comprehensive income											6,937
Comprehensive income											\$ 135,793
Stock options exercised	108,104		134		1,918						2,052
Unearned compensation	149,799		188		3,933						(3,485) 636
Performance shares	20,397		26		686						712
Procomp and Nexus acquisitions	1,710,214		2,138		37,351			9,487			48,976
Dividends declared and paid						(41,668)					(41,668)
Treasury shares								(1,229)			(1,229)
Balance, December 31, 1999	71,482,997	\$ 89,354		\$ 87,169		\$ 691,415		\$ (13,644)		\$ (5,865)	\$ (4,034) \$ 844,395
Net income						136,919					136,919
Translation adjustment											(7,904)
Pensions											1,507
Unrealized loss on investment securities											(396)
Other comprehensive loss											(6,793) (6,793)
Comprehensive income											\$ 130,126
Stock options exercised	273,238		343		5,444						5,787
Unearned compensation	247,635		308		5,583						(3,915) 1,976
Performance shares	15,335		19		334						353
Dividends declared and paid						(44,271)					(44,271)
Treasury shares								(2,300)			(2,300)
Balance, December 31, 2000	536,208	\$ 90,024		\$ 98,530		\$ 784,063		\$ (15,944)		\$ (12,658)	\$ (7,949) \$ 936,066
Net income						66,893					66,893
Translation adjustment											(47,373)
Pensions											(1,628)
Unrealized gain on investment securities											1,213
Other comprehensive loss											(47,788) (47,788)
Comprehensive income											\$ 19,105
Stock options exercised	176,395		221		4,860						5,081
Unearned compensation											1,412 1,412
Dividends declared and paid						(45,774)					(45,774)
Treasury shares								(12,780)			(12,780)
Balance, December 31, 2001	712,603	\$ 90,245		\$ 103,390		\$ 805,182		\$ (28,724)		\$ (60,446)	\$ (6,537) \$ 903,110

2001financialstatements.xlsx - Microsoft Excel

Font: Arial 10pt (circled)

Number Format: General

Cells: AutoSum, Fill, Clear, Sort & Filter, Find & Select

Editing: Insert, Delete, Format

Row 1: Consolidated Statements of Shareholders' Equity

Row 2: [DOLLARS IN THOUSANDS]

Row 3:

Row 4:

Row 5:

Row 6:

Row 7: Common Shares Additional Capital Retained Earnings Treasury Shares Comprehensive Income (Loss) Comprehensive Income (Loss) Other Total

Row 8: Number Par Value Capital Earnings Shares Income (Loss) Income (Loss) Other Total

Row 9: Balance, January 1, 1999 69,494,483 \$ 86,868 \$ 43,281 \$ 604,227 \$ (21,902) \$ (12,802) \$ (549) \$ 699,123

Row 10:

Row 11: Net income 128,856 \$ 128,856

Row 12: Translation adjustment 9,558

Row 13: Pensions 614

Row 14: Unrealized loss on investment securities (3,235)

Row 15: Other comprehensive income 6,937 6,937

Row 16: Comprehensive income \$ 135,793

Row 17: Stock options exercised 108,104 134 1,918

Row 18: Unearned compensation 149,799 188 3,933

Row 19: Performance shares 20,397 26 686

Row 20: Procomp and Nexus acquisitions 1,710,214 2,138 37,351 9,487

Row 21: Dividends declared and paid (41,668)

Row 22: Treasury shares (1,229)

Row 23:

Row 24: Balance, December 31, 1999 71,482,997 \$ 89,354 \$ 87,169 \$ 691,415 \$ (13,644) \$ (5,865) \$ (4,034) \$ 844,395

Row 25: Net income 136,919

Row 26: Translation adjustment (7,904)

Row 27: Pensions 1,507

Row 28: Unrealized loss on investment securities (396)

Row 29: Other comprehensive loss (6,793) (6,793)

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Row 32: Unearned compensation 247,635 308 5,583

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Row 34: Dividends declared and paid (44,271)

Row 35: Treasury shares (2,300)

Row 36:

Row 37: Balance, December 31, 2000 536,208 \$ 90,024 \$ 98,530 \$ 784,063 \$ (15,944) \$ (12,658) \$ (7,949) \$ 936,066

Row 38: Net income 66,893

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Row 41: Unrealized gain on investment securities 1,213

Row 42: Other comprehensive loss (47,788) (47,788)

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Row 49: Balance, December 31, 2001 712,603 \$ 90,245 \$ 103,390 \$ 805,182 \$ (28,724) \$ (60,446) \$ (6,537) \$ 903,110

Row 50:

Row 51:

A photograph of a gospel choir performing on stage. The choir members are wearing shiny, gold-colored robes with white collars and cuffs. They are singing into microphones, their mouths open in song. The background is dark, making the shiny robes stand out.

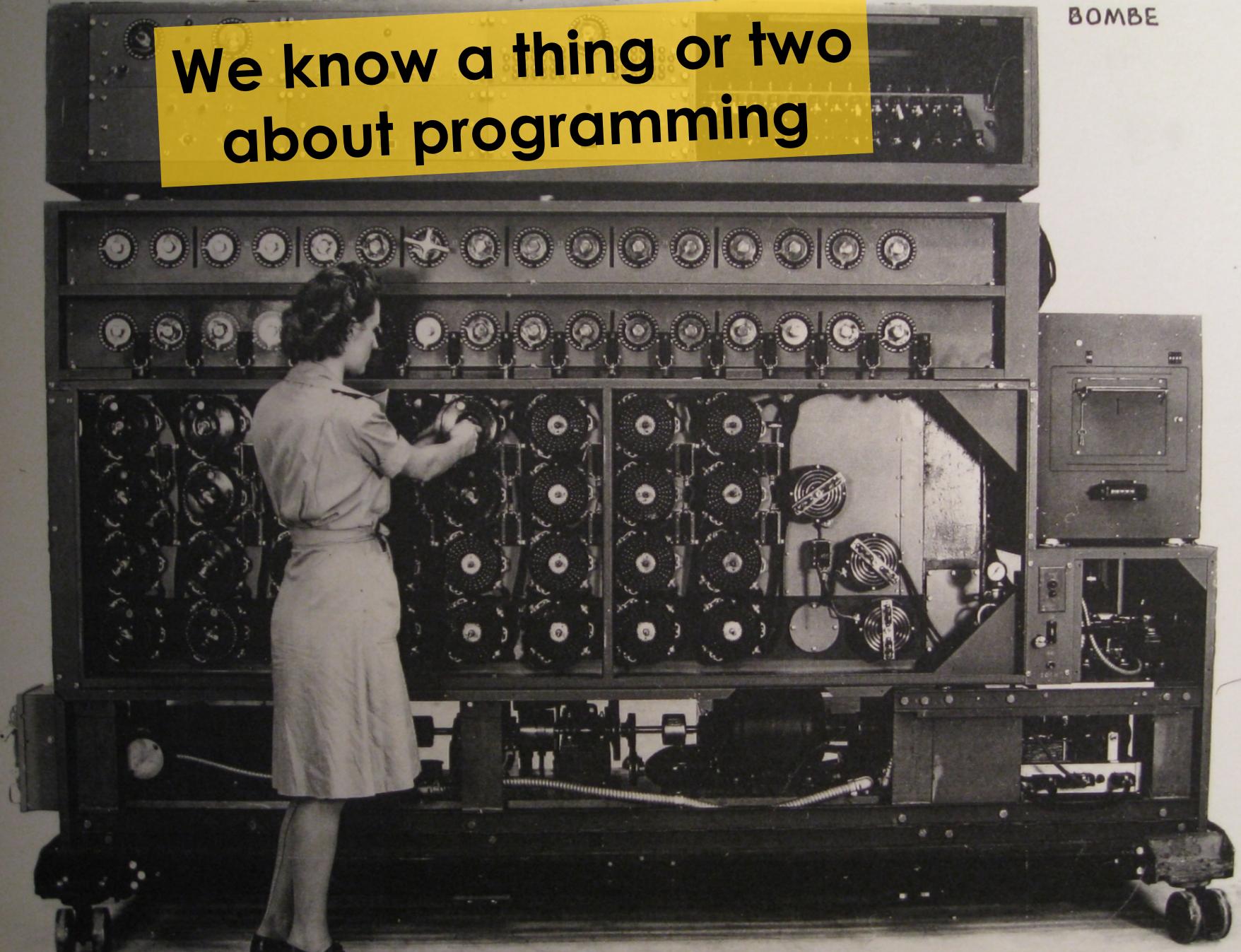
So Spreadsheets are code



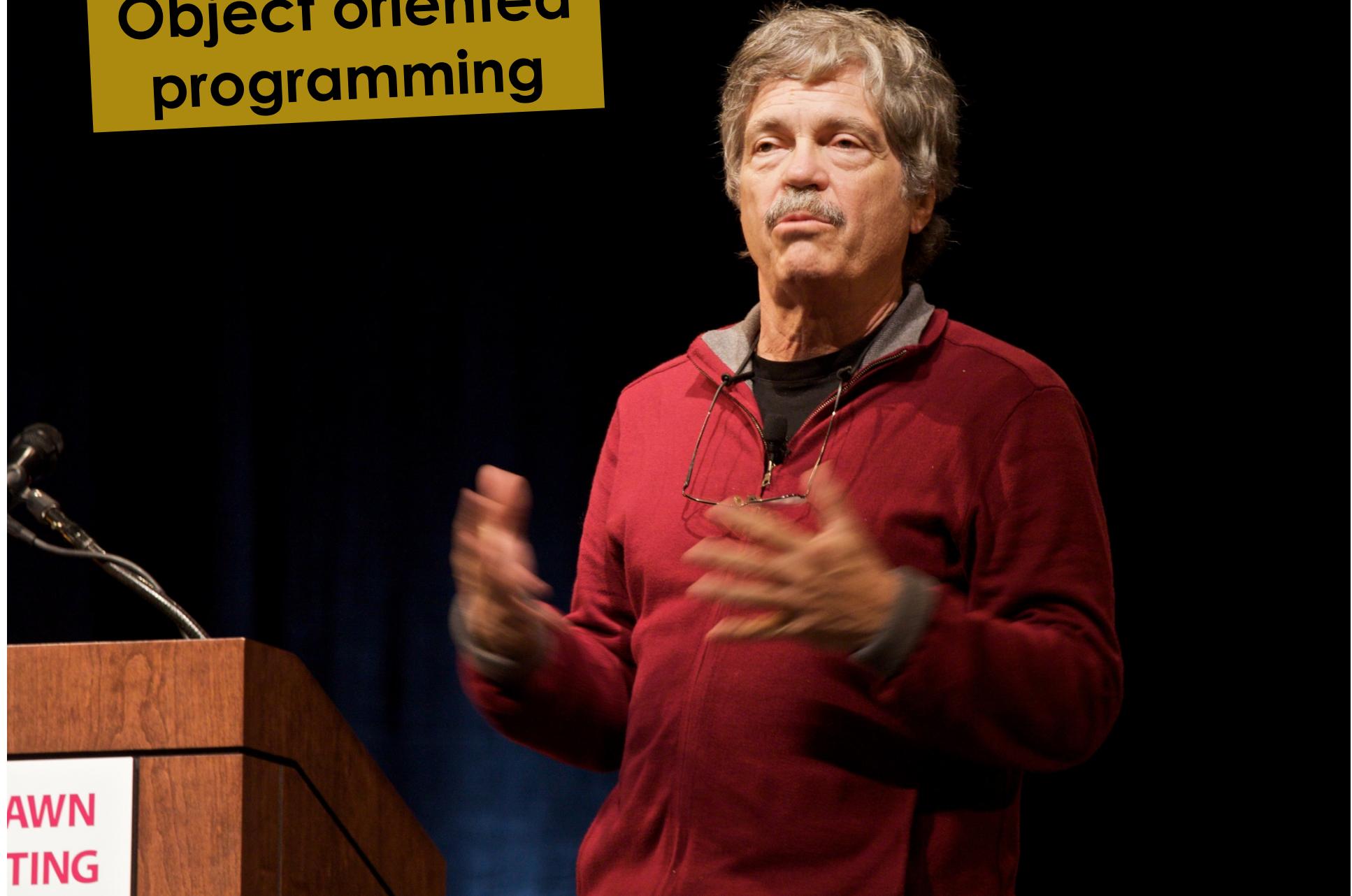
**But spreadsheets tools are
not coding tools**

We know a thing or two
about programming

BOMBE



Object oriented programming





**Smells and
refactorings**

A black and white skunk is walking through a field of tall green grass and some low-lying plants with red flowers. The skunk has a thick coat of dark fur with a prominent white stripe running from its nose, across its chest, and down its back. Its bushy tail is also white with dark stripes.

**Code smell
detection for
spreadsheets?**

icsm_demo.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins Load Test PowerPivot Team

Paste Calibri 11 A A Alignment General \$ % , Cells Editing

Clipboard Font Alignment Number Styles Cells Editing

C7 =SUM(A2:A7)*B2+8/100

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Costs	Factor												
2	245	2.7												
3	816													
4	278													
5	292													
6	928													
7	109		7203.68											
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Sheet1 Sheet2 Sheet3 Ready 100%

"Long method"

icsm_demo.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins Load Test PowerPivot Team

Paste Font Alignment Number Styles Cells Editing Sort & Filter Select

SUM =SUM(A2:A10,A12:A14,A16,A18:A23,A27)

	A	B	C	D	E	F	G	H	I	J	K
1	Department	Costs			Total costs for departments upto 10						
2	1	678			=SUM(A2:A10,A12:A14,A16,A18:A23,A						
3	6	302									
4	7	780									
5	3	252									
6	4	668									
7	6	147									
8	5	455									
9	2	726									
10	8	376									
11	12	586									
12	8	720									
13	6	982									
14	8	259									
15	12	825									
16	1	658									
17	12	159									
18		661									
19	2	0									
20	2	732									
21	4	250									
22	7	328									
23	1	770									
24	10	671									

“Too many parameters”

Sheet1 Sheet2 Sheet3 Edit 100%

Stock model.xlsx - Microsoft Excel

File **Home** Insert Page Layout Formulas Data Review View Add-Ins Load Test PowerPivot Team **?** **Sort & Filter** **Select**

Paste **Font** Alignment Number Styles Cells **Cells** **Editing**

SUM =
 $=((EXP((0-G36)*C36))*C34*C42-C35*(EXP((0-G34)*C36))*C45)-((EXP((0-G36)*C36))*C34*F42-C38*(EXP((0-G34)*C36))*F45))/C37/G37$

A	B	C	D	E	F	G	H	I
31	Enter the firm's current return on capital =				18.69%			
32								
33	Output							
34	Stock Price=	9.13%			T.Bond rate=	6.00%		
35	Strike Price=	5.00%			Variance=	0.3751616		
36	Expiration (in years) =	1			Annualized dividend yield=	0.00%		
37	Annual Excess Return=	6.47%			Cost of Capital =	12.22%		
38	Maximum Flexibility =	17.00%						
39								
40	Value of Call (lower bound)				Value of Call (Maximum Flexibility)			
41	d1 =	1.38757695			d1 =	-0.610409471		
42	N(d1) =	0.91736705			N(d1) =	0.2707953		
43								
44	d2 = 0.77007257				d2 = -1.2229138			
45	N(d2) =	0.78085161			N(d2) =	0.11068112		
46								
47	Value of the call =	of financial flexibility (in annual terms)			=((EXP((0-G36)*C36))*C34*C42-C35*(EXP((0-G34)*C36))*C45)-((EXP((0-G36)*C36))*C34*F42-C38*(EXP((0-G34)*C36))*F45))/C37/G37			
48								
49								
	Reinvestment Needs	Value of Flexibility						
Edit								

Stock model.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins Load Test PowerPivot Team ? Sort & Filter Find & Select Editing

Clipboard Font Alignment Number Styles Cells

SUM $=((\text{EXP}((0-G36)*C36))*C34*C42-C35*(\text{EXP}((0-G34)*C36))*C45)-((\text{EXP}((0-G36)*C36))*C34*\text{F42}-C38*(\text{EXP}((0-G34)*C36))*\text{F45}))/C37/G37$

A	B	C	D	E	F	G	H	I
31	Enter the firm's current return on capital =				18.69%			
32								
33	Output							
34	Stock Price=	9.13%			T.Bond rate=	6.00%		
35	Strike Price=	5.00%			Variance=	0.3751616		
36	Expiration (in years) =	1			Annualized dividend yield=	0.00%		
37	Annual Excess Return=	6.47%			Cost of Capital =	12.22%		
38	Maximum Flexibility =	17.00%						
39								
40	Value of Call (lower bound)				Value of Call (Maximum Flexibility)			
41	d1 =	1.38757695			d1 =	-0.610409471		
42	N(d1) =	0.91736705			N(d1) =	0.2707953		
43								
44	d2 = 0.77007257				d2 = -1.2229138			
45	N(d2) =	0.78085161			N(d2) =	0.11068112		
46								
47	Value of the call =		of financial flexibility (in annual terms)		$=((\text{EXP}((0-G36)$			
48								
49								

Reinvestment Needs Value of Flexibility ? 100% +

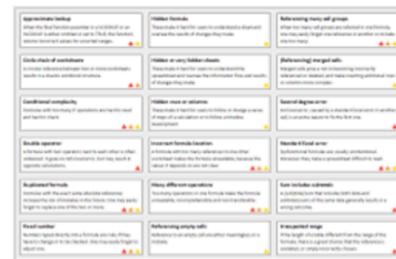
Edit

PerfectXL for validating spreadsheets



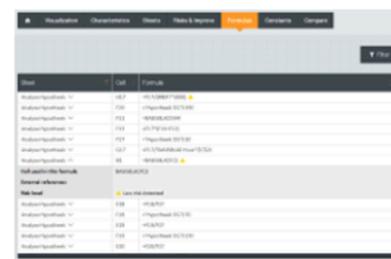
Internal structure check

PerfectXL visualises references and external sources, discovers the relation between input, calculations and output and it checks the setup of information and formulas.



Check for 18 types of risk

PerfectXL detects up to 18 types of risk in spreadsheets. From incorrectly applied VLOOKUPS and fixed numbers in formulas to empty cell references and double calculations.



Scan for formulas and constants

A good validation requires quick and easy insight into the used formulas and constants of the spreadsheet. What does it all calculate?



Share and review results

The PDF-export functionality allows you to easily share your findings with a colleague. With special Excel reports you can even follow the advice in your own spreadsheets.

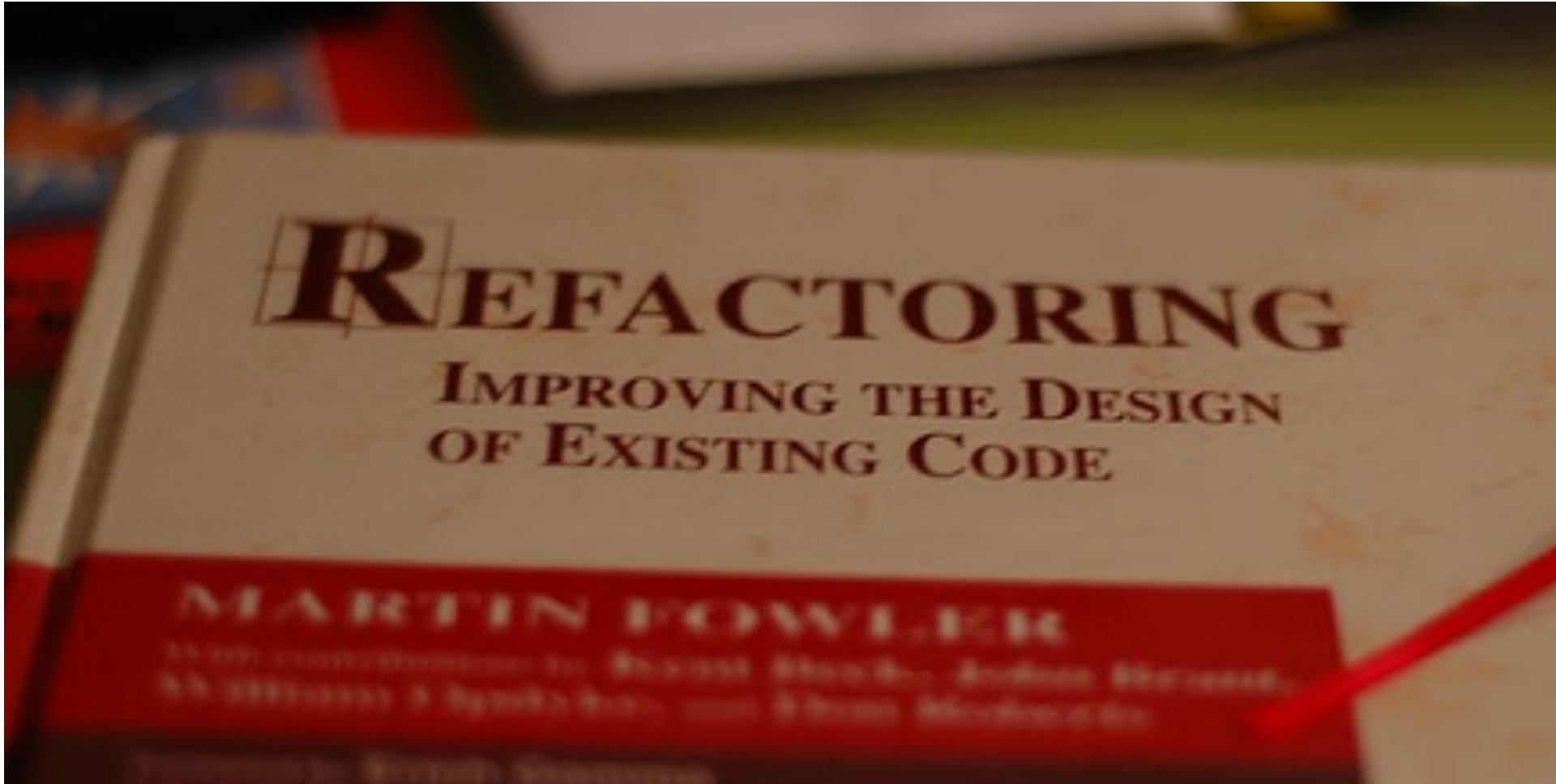
PerfectXL.com detects smells in formulas

Validation #1

Validation #2

Validation #3

Validation #4



REFACTORING

IMPROVING THE DESIGN OF EXISTING CODE

MARTIN FOWLER

With contributions by Kent Beck, Brian Beckman, Alan Beale,
John Brant, & Randy Charles & Greg Young

If you say smells, you say refactoring



**So, we built BumbleBee:
a refactoring tool for spreadsheets**

TestSheet.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins VBA Load Test BumbleBee Expector ? X

Find applicable rewrites
Rewrites possible
Preview

Basic Options

A1 f_x

	A	B	C	D	E	F	G	H	I	J	K	L	
1		Math					Chemistry						
2	StudentId	Homework	Classwork	Exam	TestsTaken	Total	Homework	Classwork	Exam	TestsTaken	Total		
3	4150		56	73	2	-	57	71	53	3	60.333333333		
4	5838	95	88	84	3	89	80	71	56	3	69		
5	8043	80		62	2	-	81		68	2	-		
6	2115	86	98	96	3	93.333333333	77	99	96	3	90.666666667		
7	8382	64	97	81	3	80.666666667	76	71	89	3	78.666666667		
8													
9	Statistics	Math	Chemistry										
10	Highest score	93.333333333	90.666666667										
11	Lowest score	80.666666667	60.333333333										
12	Average	87.666666667	74.666666667										
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24													

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Ready

So, we built BumbleBee:
a refactoring tool for spreadsheets

TestSheet.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins VBA Load Test BumbleBee Expector ? X

Find applicable rewrites
Rewrites possible
Preview

Basic Options

A1 fx

	A	B	C	D	E	F	G	H	I	J	K	L
1	Math						Chemistry					
2	StudentId	Homework	Classwork	Exam	TestsTaken	Total	Homework	Classwork	Exam	TestsTaken	Total	
3	4150		56	73	2	-	57	71	53	3	60.333333333	
4	5838	95	88	84	3	89	80	71	56	3	69	
5	8043	80		62	2	-	81		68	2	-	
6	2115	86	98	96	3	93.333333333	77	99	96	3	90.666666667	
7	8382	64	97	81	3	80.666666667	76	71	89	3	78.666666667	
8												
9	Statistics	Math	Chemistry									
10	Highest score	93.333333333	90.666666667									
11	Lowest score	80.666666667	60.333333333									
12	Average	87.666666667	74.666666667									
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Ready

TestSheet.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins VBA Load Test BumbleBee Expector ? X

Find applicable rewrites
Rewrites possible
Preview

Basic Options

B12 fx =SUM(F3:F7)/COUNT(F3:F7)

	A	B	C	D	E	F	G	H	I	J	K	L
1	Math						Chemistry					
2	StudentId	Homework	Classwork	Exam	TestsTaken	Total	Homework	Classwork	Exam	TestsTaken	Total	
3	4150		56	73	2	-	57	71	53	3	60.333333333	
4	5838	95	88	84	3	89	80	71	56	3	69	
5	8043	80		62	2	-	81		68	2	-	
6	2115	86	98	96	3	93.333333333	77	99	96	3	90.666666667	
7	8382	64	97	81	3	80.666666667	76	71	89	3	78.666666667	
8												
9	Statistics	Math	Chemistry									
10	Highest score	93.333333333	90.666666667									
11	Lowest score	80.666666667	60.333333333									
12	Average	87.666666667	74.666666667									
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TestSheet.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins VBA Load Test BumbleBee Expector ? X

Find applicable rewrites

Rewrites possible

Preview

Basic Options

Apply in Range Initialize
Apply in Sheet
Apply Everywhere

B12 =SUM(F3:F7)/COUNT(F3:F7)

	A	B	C	D	E	F	G	H	I	J	K	L	
1			Math					Chemistry					
2	StudentId	Homework	Classwork	Exam	TestsTaken	Total	Homework	Classwork	Exam	TestsTaken	Total		
3	4150		56	73	2	-	57	71	53	3	60.333333333		
4	5838	95	88	84	3	89	80	71	56	3	69		
5	8043	80		62	2	-	81		68	2	-		
6	2115	86	98	96	3	93.333333333	77	99	96	3	90.666666667		
7	8382	64	97	81	3	80.666666667	76	71	89	3	78.666666667		
8													
9	Statistics	Math	Chemistry										
10	Highest score	93.333333333	90.666666667										
11	Lowest score	80.666666667	60.333333333										
12	Average	87.666666667	74.666666667										
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24													

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TestSheet.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins VBA Load Test BumbleBee Expector ? X

Find applicable rewrites
Rewrites possible SUM and COUNT to AVER...
Preview AVERAGE(F3:F7)

Basic Options

B12 ffx =SUM(F3:F7)/COUNT(F3:F7)

	A	B	C	D	E	F	G	H	I	J	K	L
1	Math						Chemistry					
2	StudentId	Homework	Classwork	Exam	TestsTaken	Total	Homework	Classwork	Exam	TestsTaken	Total	
3	4150		56	73	2	-	57	71	53	3	60.333333333	
4	5838	95	88	84	3	89	80	71	56	3	69	
5	8043	80		62	2	-	81		68	2	-	
6	2115	86	98	96	3	93.333333333	77	99	96	3	90.666666667	
7	8382	64	97	81	3	80.666666667	76	71	89	3	78.666666667	
8												
9	Statistics	Math	Chemistry									
10	Highest score	93.333333333	90.666666667									
11	Lowest score	80.666666667	60.333333333									
12	Average	87.666666667	74.666666667									
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2011 2012 2013

Ready

TestSheet.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins VBA Load Test BumbleBee Expector ? X

Find applicable rewrites
Rewrites possible SUM and COUNT to AVER...
Preview AVERAGE(F3:F7)

Basic Options

B12 ▾ fx =SUM(F3:F7)/COUNT(F3:F7)

	A	B	C	D	E	F	G	H	I	J	K	L	
1		Math					Chemistry						
2	StudentId	Homework	Classwork	Exam	TestsTaken	Total	Homework	Classwork	Exam	TestsTaken	Total		
3	4150			56	73	2 -	57	71	53	3	60.333333333		
4	5838	95		88	84	3	89	80	71	56	3	69	
5	8043	80			62	2 -		81		68	2 -		
6	2115	86		98	96	3	93.333333333	77	99	96	3	90.666666667	
7	8382	64		97	81	3	80.666666667	76	71	89	3	78.666666667	
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9	Statistics	Math	Chemistry										
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12	Average	87.666666667	74.666666667										
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	2011	2012	2013	⌚			☰						
Ready	Excel	100%	+	-	▼	▲							

TestSheet.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins VBA Load Test BumbleBee Expector ? X

Find applicable rewrites
Rewrites possible SUM and COUNT to AVER...
Preview AVERAGE(F3:F7)

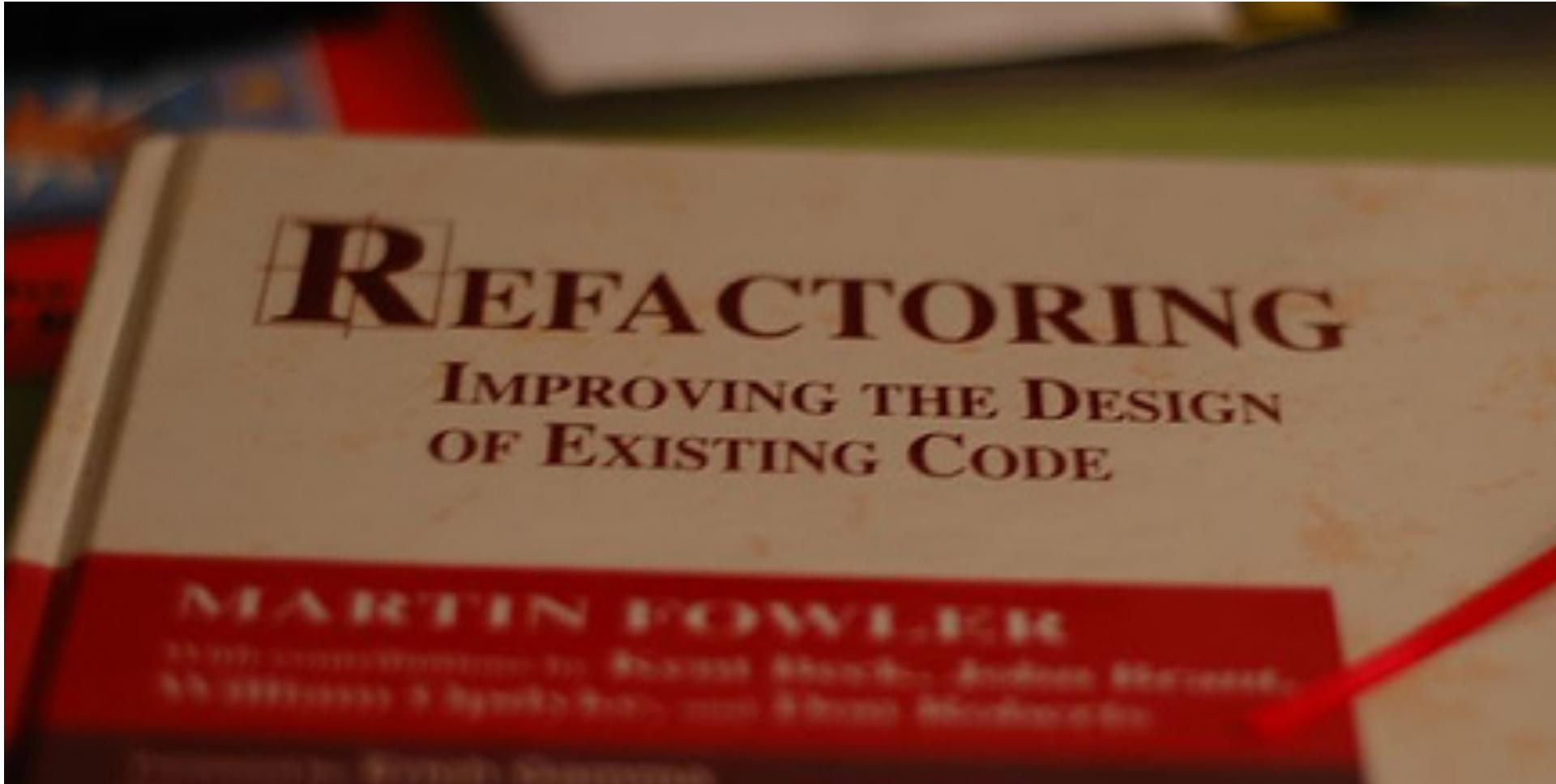
Basic Options

B12 ffx =AVERAGE(F3:F7)

	A	B	C	D	E	F	G	H	I	J	K	L
1	Math						Chemistry					
2	StudentId	Homework	Classwork	Exam	TestsTaken	Total	Homework	Classwork	Exam	TestsTaken	Total	
3	4150			56	73	2 -	57	71	53	3	60.333333333	
4	5838		95	88	84	3	89	80	71	56	3	69
5	8043		80		62	2 -	81		68		2 -	
6	2115		86	98	96	3	93.333333333	77	99	96	3	90.666666667
7	8382		64	97	81	3	80.666666667	76	71	89	3	78.666666667
8												
9	Statistics	Math	Chemistry									
10	Highest score	93.333333333	90.666666667									
11	Lowest score	80.666666667	60.333333333									
12	Average	87.666666667	74.666666667									
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2011 2012 2013

Ready



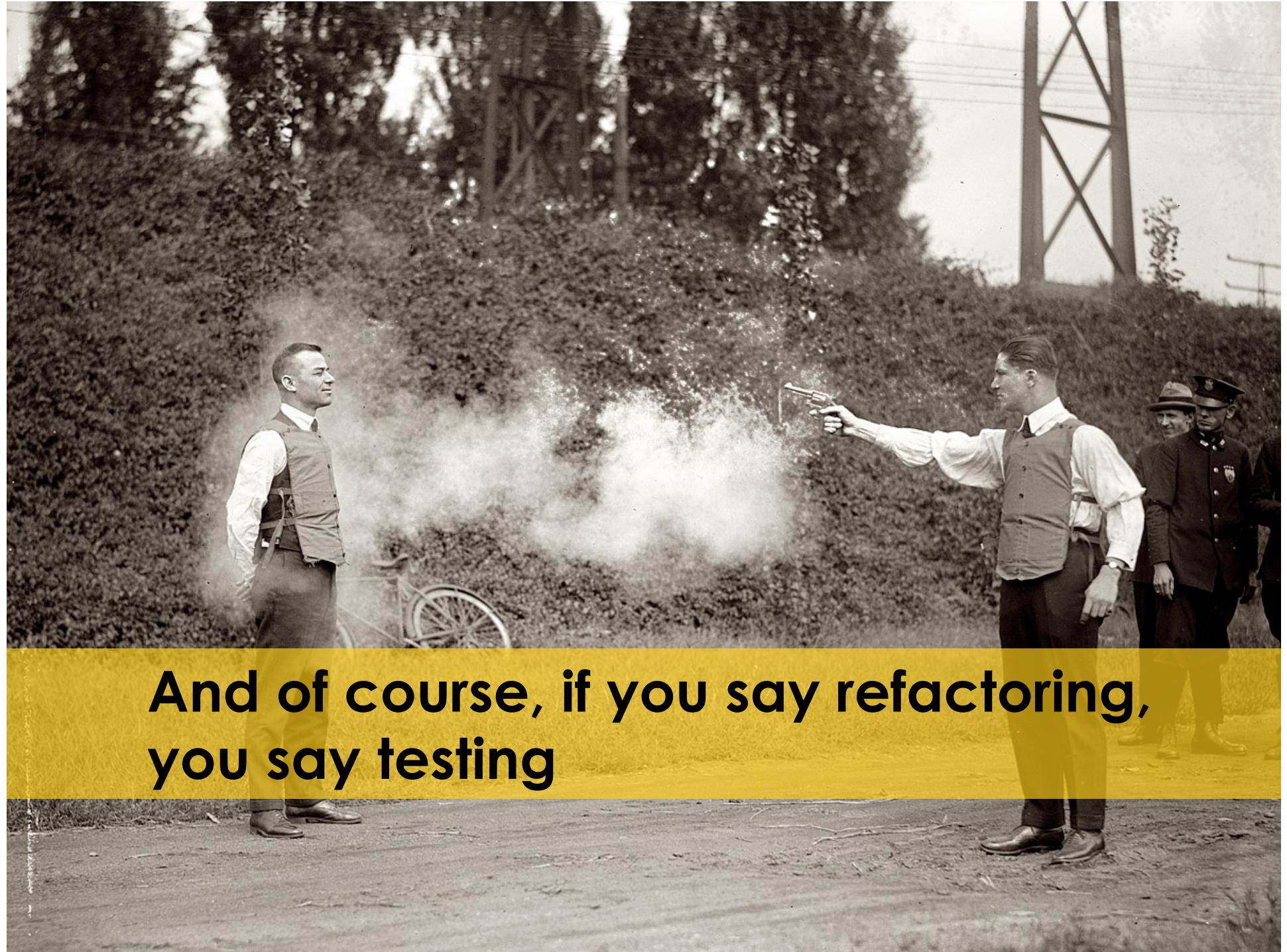
REFACTORING

IMPROVING THE DESIGN OF EXISTING CODE

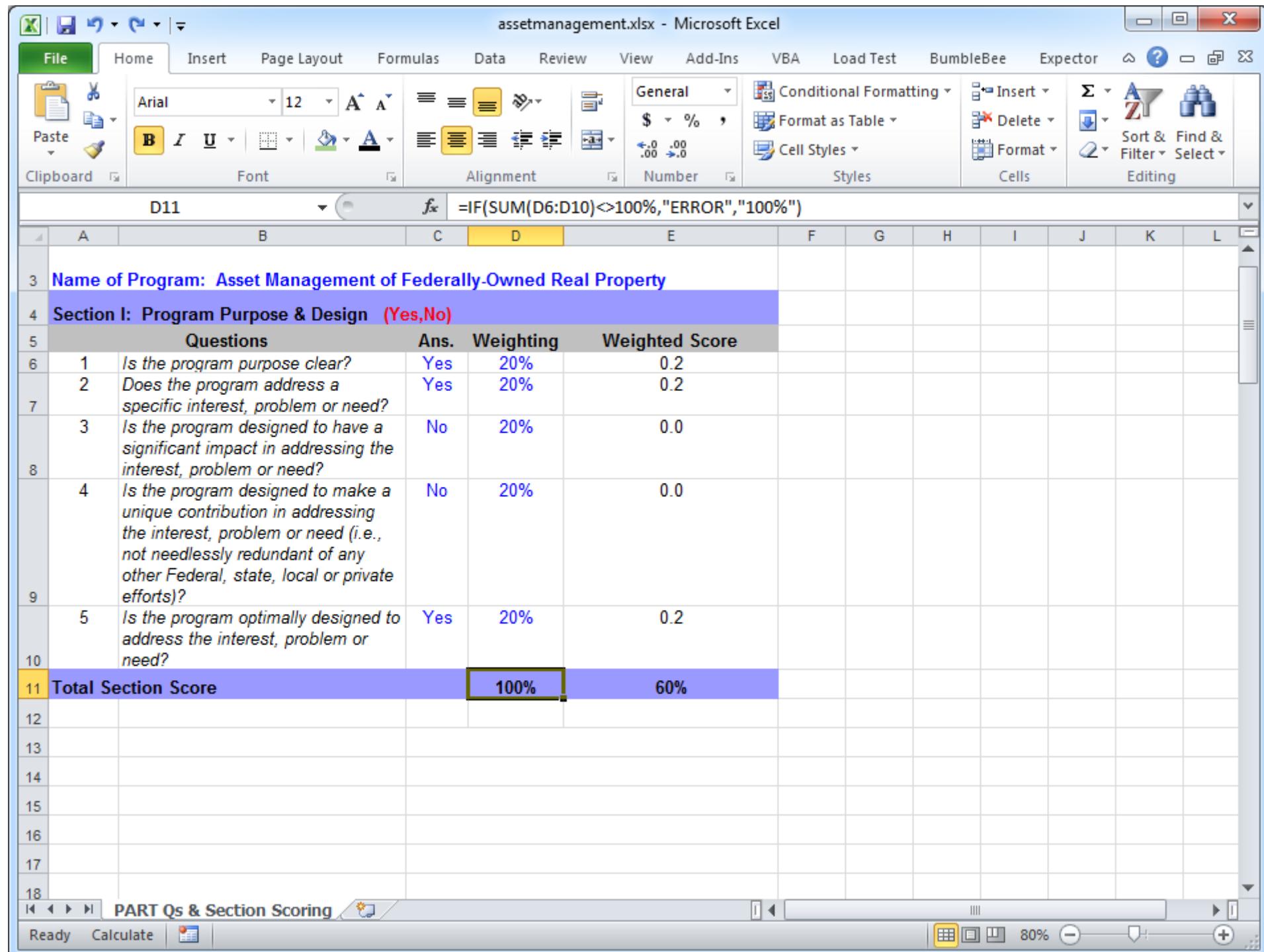
MARTIN FOWLER

With contributions by Kent Beck, Brian Beckman,
Mike Cohn, & Ron Jeffries • Foreword by Ward Cunningham

**And of course, if you say refactoring,
you say ...**



**And of course, if you say refactoring,
you say testing**



assetmanagement.xlsx - Microsoft Excel

D11 =IF(SUM(D6:D10)<>100%, "ERROR", "100%")

Questions		Ans.	Weighting	Weighted Score
1	<i>Is the program purpose clear?</i>	Yes	20%	0.2
2	<i>Does the program address a specific interest, problem or need?</i>	Yes	20%	0.2
3	<i>Is the program designed to have a significant impact in addressing the interest, problem or need?</i>	No	20%	0.0
4	<i>Is the program designed to make a unique contribution in addressing the interest, problem or need (i.e., not needlessly redundant of any other Federal, state, local or private efforts)?</i>	No	20%	0.0
5	<i>Is the program optimally designed to address the interest, problem or need?</i>	Yes	20%	0.2
11	Total Section Score	100%	60%	

These test formulas can be exploited

Hardware.xlsx - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS Expector POWER QUERY POWERPIVOT TEAM Felienne... ? □ X

Paste **Calibri** 11 A A General Conditional Formatting
Font Alignment Number Styles Cells Editing

B1 : X ✓ fx =IF(COUNTIF(B3:B5,"Error")>0,"Error","OK")

	A	B	C	D	E	F	G	H	I
1	All Checks	Error							
2									
3	RegisterExport	OK							
4	ProductInfo	Error							
5	TurnoverPerProduct	OK							
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16	TurnoverPerProduct	Categories	AllChecks	+					

READY

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FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS Expector POWER QUERY POWERPIVOT TEAM Felienne... ? □ X

Clipboard Paste Font Alignment Number Styles Cells Editing

B1 : $=IF(COUNTIF(B3:B5,"Error")>0,"Error","OK")$

A	B	C	D	E	F	G	H	I
1 All Checks	Error							
2								
3 RegisterExport	OK							
4 ProductInfo	Error							
5 TurnoverPerProduct	OK							
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

TurnoverPerProduct Categories AllChecks

READY

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FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS Expector POWER QUERY POWERPIVOT TEAM Felienne...

Clipboard Calibri 11 General \$ % , Conditional Formatting

Font Alignment Number Styles Cells Editing

B1

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

1 All checks?

2

3 **Code** **Name** **Selling Price** **Purchasing Price** **Margin** **Percentage** **Selling Price** **Purchasing Price**

4 B241 Wooden Table € 450.00 € 312.00 € 138.00 44.2% OK OK

5 B809 Bench € 250.00 € 205.00 € 45.00 22.0% OK OK

6 C514 Chair (Black, Wood) € 50.00 € 42.00 € 8.00 19.0% OK OK

7 C515 Chair (Blue, Wood) € 50.00 € 41.00 € 9.00 22.0% OK OK

8 C516 Chair (Black, Metal) € 80.00 € 60.00 € 20.00 33.3% OK OK

9 G117 Bird House € 10.00 € 8.00 € 2.00 25.0% OK OK

10 H970 Fountain € 300.00 € 230.00 € 70.00 30.4% OK OK

11 X102 Stone Table € 120.00 € 150.00 -€ 30.00 -20.0% OK OK

12 X103 Iron Table € 150.00 € 200.00 -€ 50.00 -25.0% OK OK

13

14

15

16 RegisterExport 140%

Hardware.xlsx - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS Expector POWER QUERY POWERPIVOT TEAM Felienne... ▾

Initialize Tests Highlight Tested Cells

Run Tests Highlight Non-Tested Cells

Color Tests

A2 : $=\text{NOT}(\text{ProductInfo}!C4<0)$

	A	B	C	D	E	F	G	H	I	J
1	TRUE	RegisterEx B1			RegisterExport!B1					
2	TRUE	ProductInfo G4			ProductInfo!G4					
3	TRUE	ProductInfo H4			ProductInfo!H4					
4	TRUE	ProductInfo I4			ProductInfo!I4					
5	TRUE	ProductInfo J4			ProductInfo!J4					
6	TRUE	ProductInfo G5			ProductInfo!G5					
7	TRUE	ProductInfo H5			ProductInfo!H5					
8	TRUE	ProductInfo I5			ProductInfo!I5					
9	TRUE	ProductInfo J5			ProductInfo!J5					
10	TRUE	ProductInfo G6			ProductInfo!G6					
11	TRUE	ProductInfo H6			ProductInfo!H6					
12	TRUE	ProductInfo I6			ProductInfo!I6					
13	TRUE	ProductInfo J6			ProductInfo!J6					
14	TRUE	ProductInfo G7			ProductInfo!G7					
15	TRUE	ProductInfo H7			ProductInfo!H7					
16	TRUE	ProductInfo I7			ProductInfo!I7					

TurnoverPerProduct Categories Expector-Tests

READY

140%

Hardware.xlsx - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS Expector POWER QUERY POWERPIVOT TEAM Felienne...

Initialize Tests Highlight Tested Cells
Run Tests Highlight Non-Tested Cells
Color Tests

D2 : fx ProductInfo!G4

	A	B	C	D	E	F	G	H	I	J
1	TRUE	RegisterEx	B1	RegisterExport!B1						
2	TRUE	ProductInfo	G4	ProductInfo!G4						
3	TRUE	ProductInfo	H4	ProductInfo!H4						
4	TRUE	ProductInfo	I4	ProductInfo!I4						
5	TRUE	ProductInfo	J4	ProductInfo!J4						
6	TRUE	ProductInfo	G5	ProductInfo!G5						
7	TRUE	ProductInfo	H5	ProductInfo!H5						
8	TRUE	ProductInfo	I5	ProductInfo!I5						
9	TRUE	ProductInfo	J5	ProductInfo!J5						
10	TRUE	ProductInfo	G6	ProductInfo!G6						
11	TRUE	ProductInfo	H6	ProductInfo!H6						
12	TRUE	ProductInfo	I6	ProductInfo!I6						
13	TRUE	ProductInfo	J6	ProductInfo!J6						
14	TRUE	ProductInfo	G7	ProductInfo!G7						
15	TRUE	ProductInfo	H7	ProductInfo!H7						
16	TRUE	ProductInfo	I7	ProductInfo!I7						

TurnoverPerProduct Categories Expector-Tests

READY 140%

Hardware.xlsx - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS Expector POWER QUERY POWERPIVOT TEAM Felienne...

Initialize Tests Highlight Tested Cells
Run Tests Highlight Non-Tested Cells
Color Tests

E11 : =C11-D11

	C	D	E	F	G	H	I	J	K
1									
2									
3	Selling Price	Purchasing Price	Margin	Percentage	Selling Price	Purchase Pr	Margin	OK	Percentage OK?
4	€ 450.00	€ 312.00	€ 138.00	44.2%	OK	OK	OK	OK	OK
5	€ 250.00	€ 205.00	€ 45.00	22.0%	OK	OK	OK	OK	OK
6	€ 50.00	€ 42.00	€ 8.00	19.0%	OK	OK	OK	OK	OK
7	€ 50.00	€ 41.00	€ 9.00	22.0%	OK	OK	OK	OK	OK
8	€ 80.00	€ 60.00	€ 20.00	33.3%	OK	OK	OK	OK	OK
9	€ 10.00	€ 8.00	€ 2.00	25.0%	OK	OK	OK	OK	OK
10	€ 300.00	€ 230.00	€ 70.00	30.4%	OK	OK	OK	OK	OK
11	€ 120.00	€ 150.00	-€ 30.00	-20.0%	OK	OK	Error	Error	Error
12	€ 150.00	€ 200.00	-€ 50.00	-25.0%	OK	OK	Error	Error	Error
13									
14									
15									
16									

ProductInfo TurnoverPerProduct Categories Expector ...

READY 140%

Hardware.xlsx - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS Expector POWER QUERY POWERPIVOT TEAM Felienne...

Initialize Tests Highlight Tested Cells
Run Tests Highlight Non-Tested Cells
Color Tests

A1 :

	C	D	E	F	G	H	I	J	K
1									
2									
3	Selling Price	Purchasing Price	Margin	Percentage	Selling Price	Purchase Pr	Margin OK	Percentage OK?	
4	€ 450.00	€ 312.00	€ 138.00	44.2%	OK	OK	OK	OK	
5	€ 250.00	€ 205.00	€ 45.00	22.0%	OK	OK	OK	OK	
6	€ 50.00	€ 42.00	€ 8.00	19.0%	OK	OK	OK	OK	
7	€ 50.00	€ 41.00	€ 9.00	22.0%	OK	OK	OK	OK	
8	€ 80.00	€ 60.00	€ 20.00	33.3%	OK	OK	OK	OK	
9	€ 10.00	€ 8.00	€ 2.00	25.0%	OK	OK	OK	OK	
10	€ 300.00	€ 230.00	€ 70.00	30.4%	OK	OK	OK	OK	
11	€ 120.00	€ 150.00	-€ 30.00	-20.0%	OK	OK	Error	Error	
12	€ 150.00	€ 200.00	-€ 50.00	-25.0%	OK	OK	Error	Error	
13									
14									
15									
16									

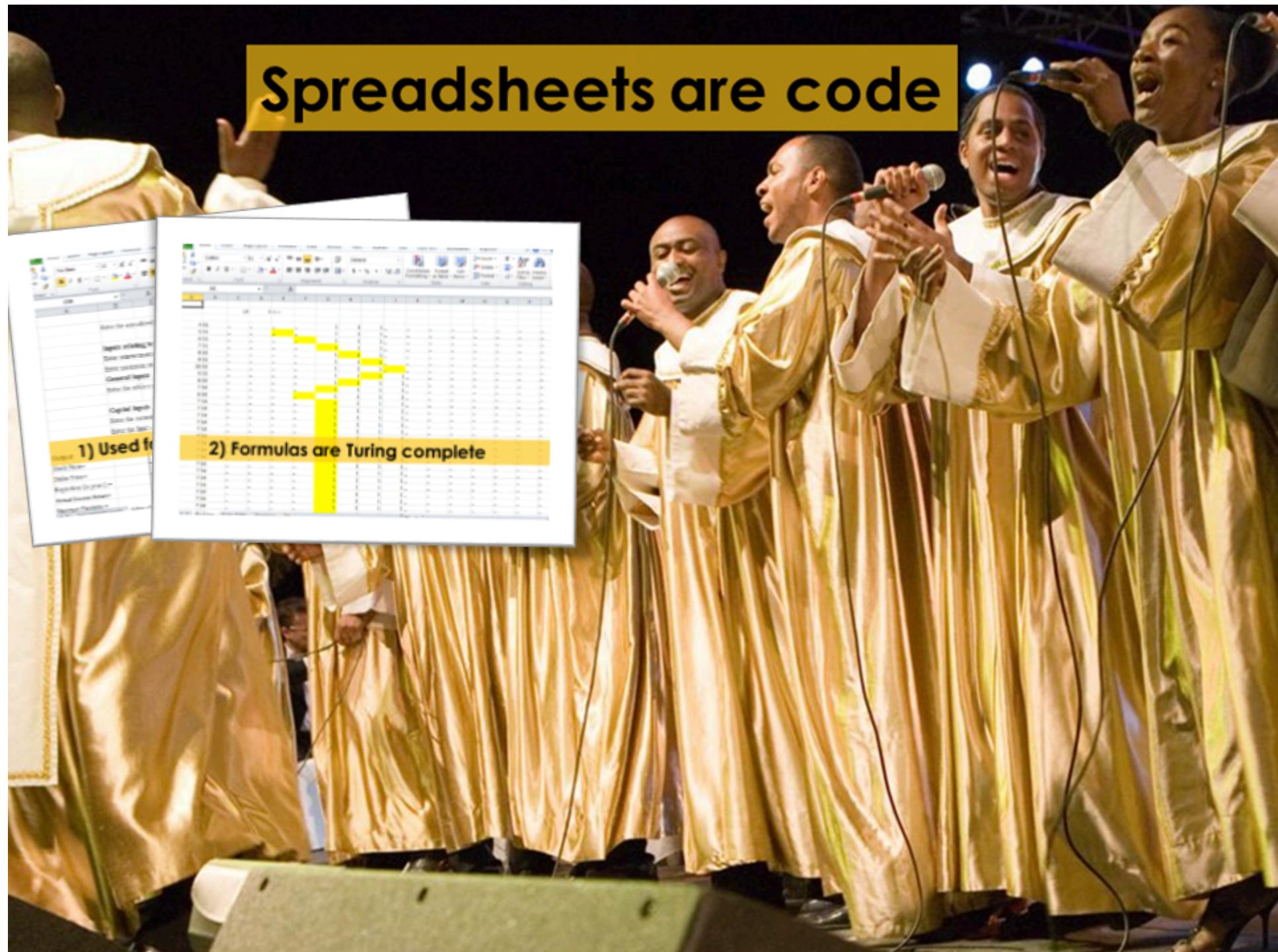
ProductInfo TurnoverPerProduct Categories Expector ...

READY 140%

A photograph of a gospel choir performing on stage. The choir members are wearing shiny, metallic gold robes over white shirts. They are singing into microphones, their mouths open in harmony. The background is dark, making the gold robes stand out. The lighting is dramatic, highlighting the performers.

Spreadsheets are code





Spreadsheets are code

Spreadsheets are code



Spreadsheets are code

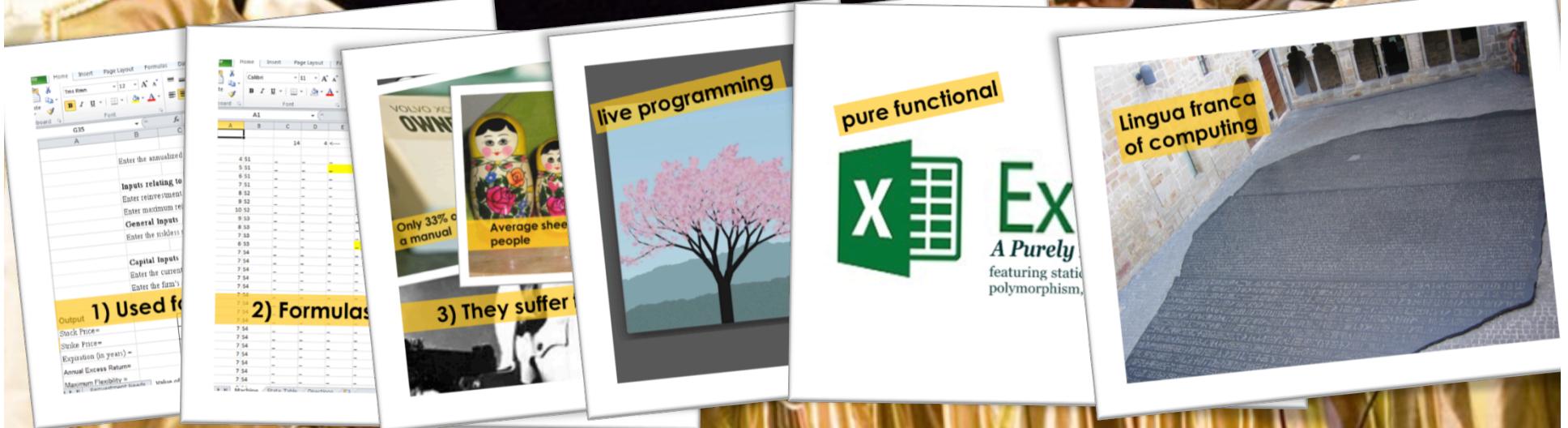
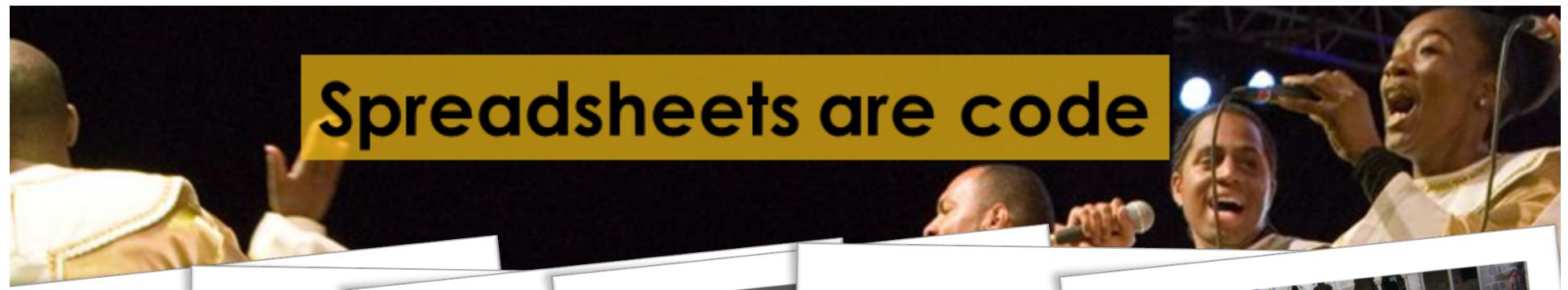


Spreadsheets are code



Spreadsheets are code





PerfectXL for validating spreadsheets

Internal structure check

Check for 18 types of risk

Scan for formulas and constants

Share and review results

PerfectXL.com detects smells in formulas

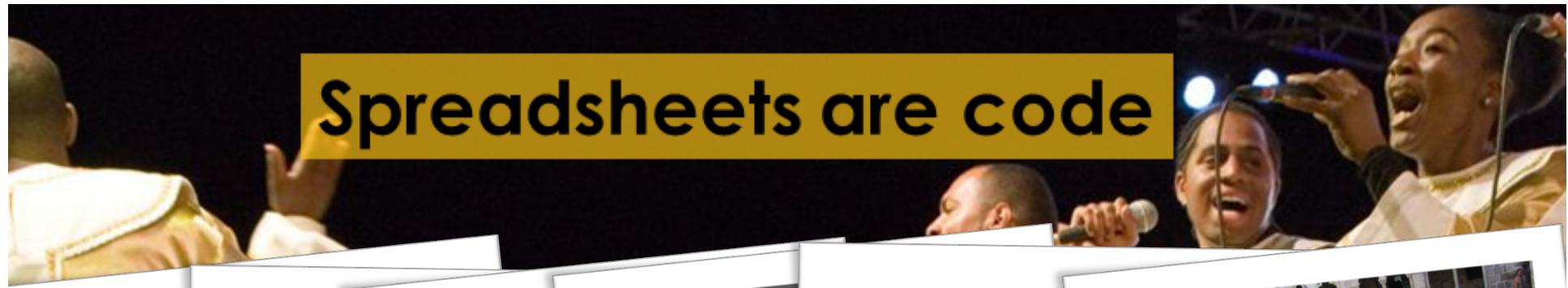
Validation #1 Validation #2 Validation #3 Validation #4

PerfectXL visualises references and external sources, discovers the relation between input, calculations and output and it checks the correctness of formulas and functions.

PerfectXL detects up to 18 types of risk in spreadsheets. From incorrectly applied VLOOKUPs and fixed numbers.

A good validation requires quick and easy insight into the used formulas and constants of the spreadsheet. What's more, the PFR-report functionality allows you to easily share your findings with a colleague.

The PFR-report functionality allows you to easily share your findings with a colleague. With special Excel reports you can even follow the advice in the report.



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The FGR export function allows you to easily share findings with a colleague. With special Excel reports you can even follow the advice given by PerfectXL.

PerfectXL visualises references and external sources, discovers the relation between input, calculations and output and it checks the validity of VLOOKUPs and fixed numbers.

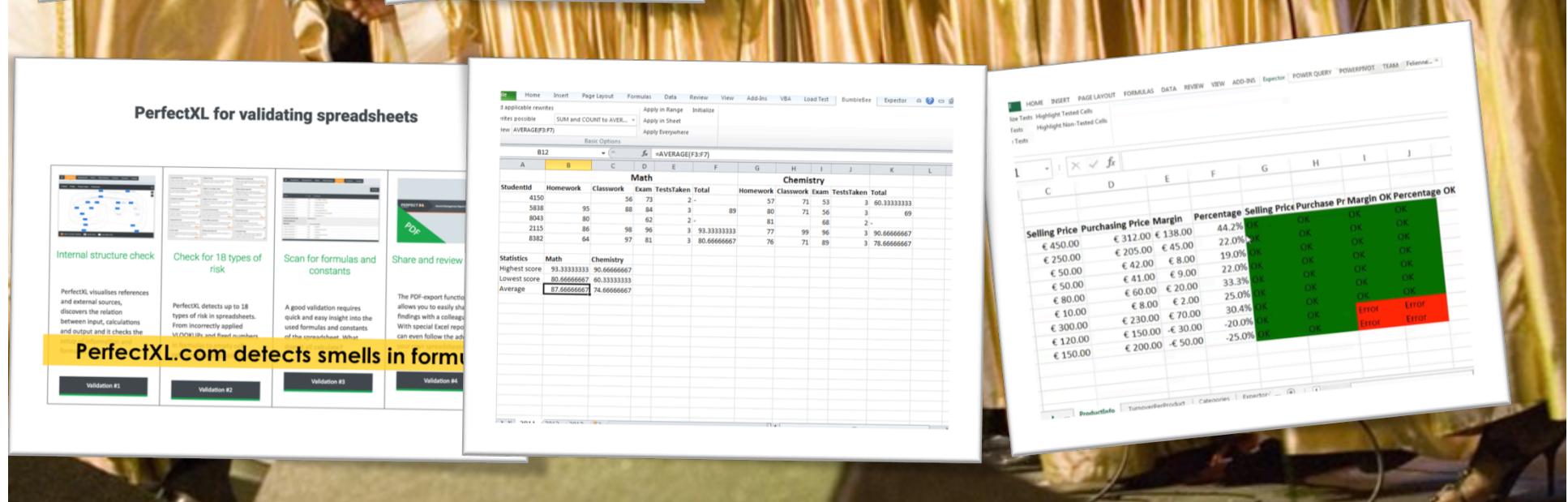
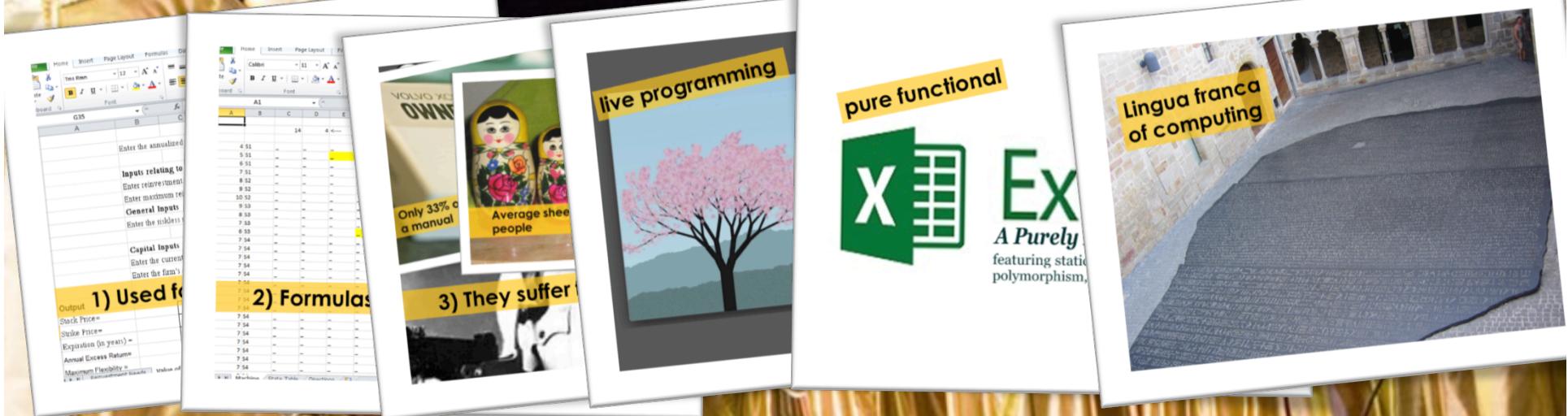
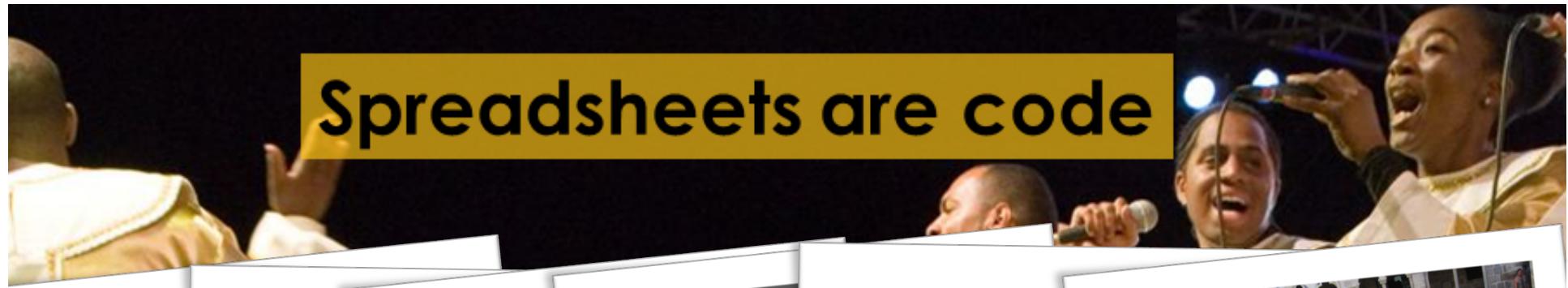
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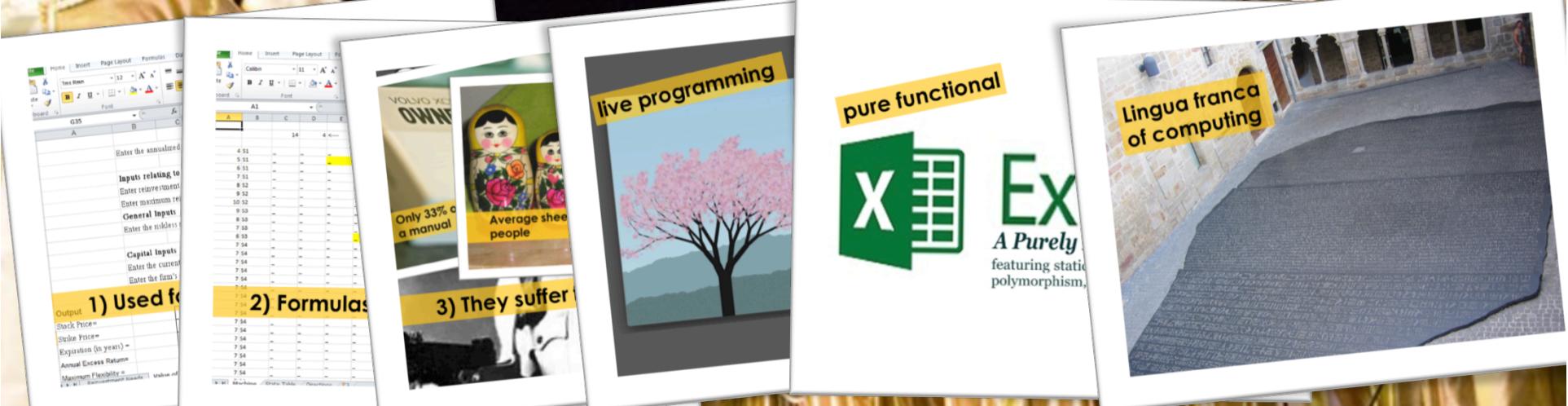
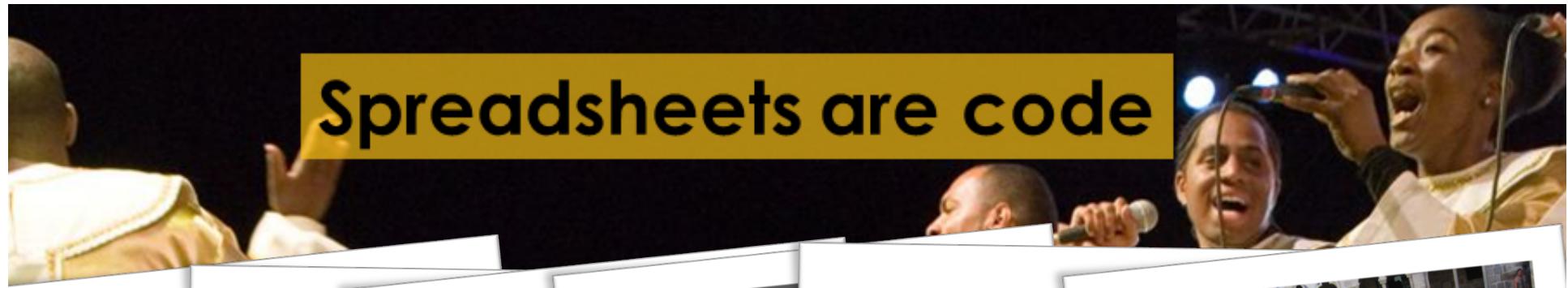
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Statistics Math Chemistry

StudentId	Homework	Classwork	Exam	TestsTaken	Total	Homework	Classwork	Exam	TestsTaken	Total
4150	56	73	2	-	57	71	53	3	60	333333333
5838	95	88	84	3	89	80	71	56	3	69
8043	80	62	62	2	-	81	68	68	2	-
2115	86	98	96	3	93.333333333	77	99	96	3	90.666666667
8382	64	97	81	3	80.666666667	76	71	89	3	78.666666667





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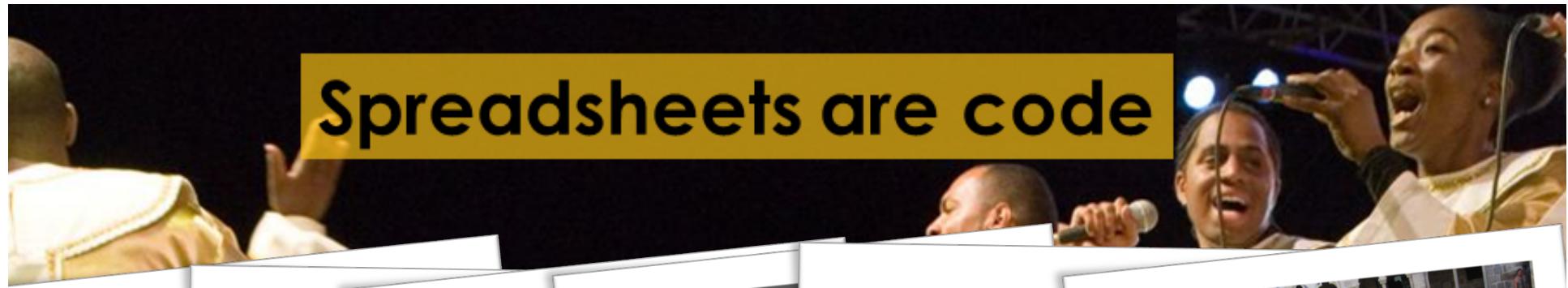
More info?

- www.felienne.com
- www.perfectxl.com

Want to connect?

- @felienne / mail@felienne.com

	Selling Price	Purchasing Price	Margin	Percentage	Selling Price	Purchase Pr	Margin OK	Percentage OK
€ 450.00	€ 312.00	€ 138.00	44.2%	OK	OK	OK	OK	OK
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€ 50.00	€ 42.00	€ 8.00	19.0%	OK	OK	OK	OK	OK
€ 41.00	€ 9.00	€ 32.00	22.0%	OK	OK	OK	OK	OK
€ 60.00	€ 20.00	€ 40.00	33.3%	OK	OK	OK	OK	OK
€ 10.00	€ 8.00	€ 2.00	25.0%	OK	OK	OK	OK	OK
€ 300.00	€ 230.00	€ 70.00	30.4%	OK	OK	OK	OK	OK
		€ 30.00	-20.0%	OK	OK	OK	OK	OK
			25.0%	OK	OK	OK	OK	OK



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More info?

- www.felienne.com
- www.spreadsheetlab.org
- www.perfectxl.com

Want to connect?

- [@felienne / mail@felienne.com](mailto:@felienne)



Spreadsheets are code

1) Used for

2) Formulas

3) They suffer

live programming

pure functional

Lingua franca
of computing

More info?

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- www.spreadsheetlab.org

Want to connect?

- [@felienne / \[mail@felienne.com\]\(mailto:mail@felienne.com\)](mailto:@felienne)

