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1	Consolidated Statements of Shareholders' Equity										
3	[DOLLARS IN THOUSANDS]										
4											
5								Accumulated			
6		Commo	n Sharaa	Additiona	L Detained	Tragging	Comprohensive	Other			
8		Number	Par Value	Capita	I Fernings	Shares	Income (Loss)	Income (Loss)	Other	Total	
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	Pansions						9,558			9,558	
14	Unrealized loss on investment securities						(3,235)			(3,235)	
15	Other comprehensive income						6,937	6,937			
16	Comprehensive income						\$ 135,793			0.050	
1/	Stock options exercised	108,104	134	1,918	3				(3.485)	2,052	
19	Performance shares	20.397	26	686	5				(3,403)	712	
20	Procomp and Nexus acruisitions	●710,214	2,138	37,351		9,48				48,976	
21	Dividends declared an Ald A CLUV	71 n	d dr	nd v	/ISH		na	snre	ada	shee	72 TC
22	Treasury shares		9 .				.				,
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				136313		\$ 136,919			136,919	
26	Translation adjustment C IIC IIC	ne	пег			erei	lem	iej		(7,904)	
27	Pensions Uprealized loss on investment securities						1,507			1,507	
29	Other comprehensive loss						(6,793)	(6,793)		(330)	
30	Comprehensive income						\$ 130,126				
31	Stock options exercised	273,238	343	5,444	1					5,787	
32	Unearned compensation	247,635	308	5,583	3				(3,915)	1,976	
34	Dividends declared and paid	15,335	15	334	(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)) C 000	\$ (12,658) \$	(7,949)	\$ 936,066	
30	Net income Translation adjustment				66,893		\$ 66,893			(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 Stock options exercised	176 305	221	1860	1		s 19,105			5 081	
45	Unearned compensation	110,555	221	4,000	·				1,412	1,412	
46	Dividends declared and paid				(45,774))				(45,774)	
47	Treasury shares					(12,780)			(12,780)	
48	Balance December 31, 2001	710 600	\$ 00.245	\$ 102.200	\$ 905.100	\$ 129.724		\$ (60 AA6) \$	16 5271	\$ 003.110	
50		112,003	J 50,245	a 103,390	a 000,102	J (20,724		ə (00,440) ə	(0,557)	a 203,110	
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1	Consolidated Statements of Shareholders' Equity	D	C	U	L	1	9		1	J	
2	[DOLLARS IN THOUSANDS]										
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7		Commo	n Shares	Additiona	l Retained	Treasury	Comprehensive	Comprehensive			
8		Number	Par Value	Capita	I Earnings	Shares	Income (Loss)	Income (Loss)	Other	Total	
9	Balance, January 1, 1999	69,494,483	\$ 86,868	\$ 43,281	1 \$ 604,227	\$ (21,902))	\$ (12,802) \$	(549)	\$ 699,123	
10											
11	Net income				128,856		\$ 128,856			128,856	
12	I ranslation adjustment						9,558			9,558	
1/	Pensions Unrealized loss on investment securities						(3 235)			(3 235)	
15	Other comprehensive income						6.937	6.937		(3,233)	
16	Comprehensive income						\$ 135,793				
17	Stock options exercised	108,104	134	1,918	3					2,052	
18	Unearned compensation	149,799	188	3,933	3				(3,485)	636	
19	Performance shares	20,397	26	500			`			/12	
20	Dividends declared an Aid Control of the Control of	0/10,214	2,130	57,55		9,40				40,570	
22	Treasury shares	74111		ICI V				spre			T
23											
24	Balance, December 31, 1999	71,482,997	\$ 89,354	\$ 87,169	9 \$ 691,415	\$ (13,644)		\$ (5,865) \$	(4,034)	\$ 844,395	
25	Net income FOIO	no	Hor	\mathbf{n}	n c ¹³ fli		io h			136,919	
20					יוס נע	2121	ICIII	ICJ		(7,904)	
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	1				10.045	5,787	
32	Unearned compensation	247,635	308	5,583	5				(3,915)	1,976	
34	Dividends declared and paid	15,555	15	334	(44 271)					(44 271)	
35	Treasury shares				(11,211)	(2.300))			(2,300)	
36											
37	Balance, December 31, 2000	536,208	\$ 90,024	\$ 98,530	\$ 784,063	5 (1,944)		\$ (12,658) \$	(7,949)	\$ 936,066	
38	Net income				66,893		\$ 66,893			66,893	
39	Translation adjustment					-	(47,373)			(47,373)	
40	Unrealized gain on investment securities						(1,020)			(1,020)	
42	Other comprehensive loss						(47788)	(47.86		•	•
43	Comprehensive income			nD	STUC	len	\$ 1 105	Delf		nive	rsitv
44	Stock options exercised	176,395	221	4,860	2100					5,08	
45	Unearned compensation				(45.33.0				1,412	1,412	
46	Dividends declared and paid				(45,774)	(10 700)	\ \			(45,774)	
47	ineasury sildles					(12,700	/			(12,700)	
49	Balance, December 31, 2001	712,603	\$ 90,245	\$ 103,390	\$ 805,182	\$ (28,724))	\$ (60,446) \$	(6,537)	\$ 903,110	
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1	Consolidated Statements of Shareholders' Equity										
2	[DOLLARS IN THOUSANDS]										
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7		Commo	n Shares	Additional	I Retained	Treasury	Comprehensive	Comprehensive			
8	Poloneo January 1, 1999	Number	Par Value	Capital	Earnings	Shares	Income (Loss)	Income (Loss)	Uther (540)	1 otal	
10	Dalance, January 1, 1999	05,454,405	φ 00,000	ψ 45,201	φ 004,227	φ (21,302	/	φ (12,002) φ	(545) \$	055,125	
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)	0.007		(3,235)	
15	Other comprehensive income						6,937 © 135.703	6,937			
17	Stock options exercised	108 104	134	1 918	3		ψ 155,155			2 052	
18	Unearned compensation	149,799	188	3,933	3				(3,485)	636	
19	Performance shares	20,397	26	686	5					712	
20	Procomp and Nexus acruisitions	●710,214	2,138	37,351	•	• 9,48				48,976	
21	Dividends declared an A d	ZIN			7516		nd	sbre	dds	nee	TS
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				1367		\$ 136,919			136,919	
26	Translation adjustmen	ne	Ter			yrei		1e I		(7,904)	
27	Pensions						1,507	,		1,507	
28	Other comprehensive loss						(396)	(6 793)		(396)	
30	Comprehensive income						\$ 130 126	(0,733)			
31	Stock options exercised	273,238	\$343	5,444	ł		+ 100,120			5,787	
32	Unearned compensation	247,635	308	5,583	3				(3,915)	1,976	
33	Performance shares	15,335	19	334	1					353	
34	Dividends declared and paid				(44,271)	(0.200)				(44,271)	
35	Treasury snares					(2,300))			(2,300)	
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	(47.0		1,213	
42	Comprehensive income			hn	64116	lon	(4 788)				rcity/
43	Stock options exercised	176 395	21	4 860	JIUC	ICH		DCII			JIY
45	Unearned compensation			.,					1,412	1,412	
46	Dividends declared and paid				(45,774)					(45,774)	
47	Treasury shares					(12,780))			(12,780)	
48	Palanaa Daaambar 21, 2004	740 600	¢ 00.245	¢ 402.200	¢ 005 400	¢ (30.734)		¢ (CD 44C) ¢	16 5271 #	002 440	
49	Dalance, December 31, 2001	/12,603		3 103,390	a 805,182	ə (28,724	1	⊅ (60,446) \$	(6,537) \$	903,110	
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Analyzing and visualizing spreadsheets

Félienne Hermans

Bridging the gap



Programmers

I started by studying what business does in practice



Turns out the gap is not that big



Users

Programmers

Users

Spreadsheets

Programmers



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

90% of all analysts in industry perform calculations in spreadsheets

50% of spreadsheets form the basis for decisions



Importance can grow over time

So, they are important, but also complex!

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5	Prospect	Status	Potentia Users	l Sales Contact	Potential Contract Size	Discoun t (needs CEO approval)	Recurring Rev per month	Potential Rev this Quarter	Potential Rev Next Quarter	Description	Lead 🗮 Generation	
- 7	SE Financial Institution	Closed	400	VP Sales	\$60,000	10%	\$4,000	\$54,000	\$12,000	Sales cycle 5 months	CEO contact	
8	Retail firm	Contract	100	Sales Assoc2	\$45,000		-	\$31,500	\$10,800	Finalizing details	email	
9	Software sales force	Contract	200	Sales Assoc1	\$50,000		-	\$35,000	\$12,000	Need C-level approval	Salescall	
10	Manufact firm sales force	Contract	400	VP Sales	\$60,000		-	\$42,000	\$14,400	Working out logistics	Conference con	
11	Law enforcement group	Contract	500	Sales Assoc1	\$65,000		-	\$45,500	\$15,600	Fast tracking though approval	Sales contact	
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21	Healthcare provider	Response	200	VP Gales VP Sales	\$50,000		-	\$1,000	\$2,450	Partner bringing us in	Partner	
22	News Media	Response	300	VP Sales	\$55,000		-	\$1,000	\$2,695	Looking for solution	Sales call	
23	Appliance Field Service	Response	400	Inside Sales	\$60,000		-	\$1,200	\$2,940	Looking at multiple solutions	Cold call	
24	Govinspection	Response	350	Sales Assoc2	\$57,500		-	\$1.150	\$2,818	Talking with IT manager	Conference con	
25	Insurance firm	Response	600	Inside Sales	\$70,000		-	\$1,400	\$3,430	Going in with integration partne	Partner	
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6	Prospect	Status	Potentia Users	l Sales Contact	Potential Contract Size	t (needs CEO approval)	Recurring Rev per month	Potential Rev this Quarter	Potential Rev Next Quarter	Description	Lead Eneration	
- 7	SE Financial Institution	Closed	400	VP Sales	\$60,000	10%	\$4,000	\$54,000	\$12,000	Sales cycle 5 months	CEO contact	
8	Retail firm	Contract	100	Sales Assoc2	\$45,000		-	\$31,500	T\$10,800	Finalizing details	email	
9	Software sales force	Contract	200	Sales Assoc1	\$50,000		-	\$35,000	\$12,000	Need C-level approval	Salescall	
10	Manufact firm sales force	Contract	400	VP Sales	\$60,000		-	\$42,000	\$14,400	Working out logistics	Conference con	
11	Law enforcement group	Contract	500	Sales Assoc1	\$65,000		-	\$45,500	\$15,600	Fast tracking though approval	Sales contact	
- 12	Conglomerate Mgmt tean	r Eval	200	VP Sales	\$50,000		-	\$15,000	\$22,750	Pilot in place	Sales contact	
	Pharma Sales		400	• VP Sales	\$60,000		-	\$1,000	\$27,300	Tesing integration 🛛 🔍	Cedeal	
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	Logistics & Moving	Proposal	350	Sales Associ	\$57,500		-	\$11,500	\$18,400	Going in with integration partne	Conference con	
	Law firm	Proposal	11	Dales Assoc2	\$50,000		-	\$10,000	\$15,000	Need solution to help IT group	Referral	
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21	Healthcare provider	Response	200	VP Gales	\$50,000		-	\$1,000	\$2,450	Partner bringing us in	Bartper	
22	News Media	Response	300	VP Sales	\$55,000		-	\$1 100	\$2,695	Looking for solution	Sales call	
23	Appliance Field Service	Besponse	400	Inside Sales	\$60,000		-	\$1,200	\$2,940	Looking at multiple solutions	Cold call	
24	Govinspection	Response	350	Sales Assoc2	\$57,500		-	\$1,150	\$2,818	Talking with IT manager	Conference con	
25	Insurance firm	Response	600	Inside Sales	\$70,000		-	\$1,400	\$3,430	Going in with integration partne	Partner	
26	Pagional Airlina	Doctorio	500	locido Soloc	\$65,000		-	\$1300	\$3 185	In opriu stagos of looking	Cold coll	
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Only 33% of spreadsheets has a manual

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Complex spreadsheets without documentation can lead to serious errors

The European Spreadsheet Risk Interest Group (Eusprig.org) collects horror stories





AstraZeneca reaffirms outlook a mistaken release CRecommend Be the first of your friends to recommend this. LONDON - Britain's second largest drugmaker AstraZeneca (AZN.L) was forced to reiterate Mon Jan 9, 2012 9:08am GMT and mid-term financial forecasts on Monday inadvertently releasing confidential company The Anglo-Swedish firm, which is struggling to keep pace information to analysts. peers, described the released details as "out of date pla which it said did not represent its forecast for the full ye "The most recent update of the company's financial future periods. issued on 20 December 2011," It said. THES QUIDES AND REPORTS FROM L

The Celegraph Friday 01 June 2012 LONDON2012 000

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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 awimaning have received an unexpected upgrade to the men's 100m final following an embarransing ticketing mistake.



Cross wake up happy





Sense of taekwondo injustice starts outpouring of national empathy

Jaco Millerine Much ado about Wenlock as Olympic torch visits Games birthplace

> **Jurganie Mapper** Best of British food? Locog are taking the tea and biscuit.

By Paul Kelso

Print Data article

The Telegraph Friday 01 June 2012



AstraZeneca reaffirms outlook a tokon release Print Email link Respond to editor Post comment

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Friday, January 6, 2006 Nevada Daily Mail

By Ralph Pokorny

Computers and computer programs are great when they work right; however, when Nevada Daily Mail some thing goes wrong and you do not catch it, you can be in big trouble. That is what city finance director Ron Chandler says happened to the 2006 city budget that was distributed to city council members and posted on the city's Web site for the The budget was created on a Microsoft Excel spreadsheet that was a copy of the same Jan. 3 council meeting.

spreadsheet that was used for the 2005 budget, which worked without complication in 2005. The system apparently worked correctly until sometime in late December when, Chandler says, it developed a problem, causing the 2006 budget to show a \$5 million deficit in the water and sewer fund. This error was in the copy of the budget that the city council members were provided and was posted on the city's Web site for the Jan. 3 city council meeting. The error was not present in the budget that was posted on Dec. 14. The difference between the two budgets led the council to postpone voting on the budget until it could be clarified.



The Telegraph Friday 01 June 2012



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Budget discrepancies attributed to computer error

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The budget was created on a Microsoft Excel spreadsheet that was a copy of the same Jan. 3 council meeting. spreadsheet that was used for the 2005 budget, which worked without complication in 2005. The system apparently worked correctly until sometime in late December when, Chandler says, it developed a problem, causing the 2006 budget to show a \$5 million deficit in the water and sewer fund. This error was in the copy of the budget that the city council members were provided and was posted on the city's Web site for the Jan. 3 city

5 million budget deficit

budget until it could be clarified.



The Telegraph Friday 01 June 2012

University of Toledo loses \$2.4M in projected

BY RYAN E. SMITH BLADE STAFF WRITER

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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 erro that means they will have \$2.4 million less to work with that 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

"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. The budget as originally proposed had funding for a number of new initiatives, including \$800,000 for a plan to hire 1/

full-time faculty and \$120,000 for a minority faculty hiring assistance plan. Those items are part of UTs strategic pla and will not be sacrificed even with the budget shortfall, officials

Budget discrepancies attributed to c Friday, January 6, 2006 Nevada Daily Mail

tokon release

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By Ralph Pokorny

Nevada Daily Mail

Computers and computer programs are great when some thing goes wrong and you do not catch it, you

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The budget was created on a Microsoft Excel sp spreadsheet that was used for the 2005 budget, 2005. The system apparently worked correctly Chandler says, it developed a problem, causing deficit in the water and sewer fund. This error council members were provided and was post council meeting. The error was not present in The difference between the two budgets led t budget until it could be clarified.



University of Toledo loses \$2.4M in projected

BY RYAN E SMITH BLADE STAFE WRITER

Chir Celegraph. Friday 01 June 2012

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NEWS FROM REUTERS TransAlta Says Clerical Snafu Costs It

\$24 Million

Tuesday, June 3, 2003 19:06 EDT

Hide advertisement

By Cameron French TORONTO (Reuters) - TransAita 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

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

executive Steve Snyder said in a conference call. The important thing is to learn from it, which

cut and paste error

As New York ISO rules did not allow for a reversal of the bids, the contracts went

ahead.



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 erro that means they will have \$2.4 million less to work with that

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.

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AstraZeneca reaffirms outlook a Chr Celegraph Friday 01 June 2012 University of Toledo loses \$2.4M in projected tokon release Print Email link Respond to editor Post co BY RYAN E SMITH BLADE STAFE WRITER Share: 🖪 🥲 📲 🍰 🚳 😫 🖾 NEWS FROM REUTERS Financial Services Authority TransAlta Says Clerical lo's FINAL NOTICE. next \$24 Million Credit Suisse International and Credit Suisse Securities (Europe) Limited (the "UK operations d erro Tuesday, June 3, 2003 19:06 EDT that By Cameron French To: of Credit Suisse") TORONTO (Reuters) - TransAlta Corp. said on Tue One Cabot Square, London E14 4QL take a \$24 million charge to earnings after a biddin landed it more U.S. power transmission hedging co OÉ: TAKE NOTICE: The Financial Services Authority of 25 The North Colonnade, Canary Dated 13 August 2008 Wharf, London E14 5HS ("the FSA") gives you final notice about a requirement to pay higher prices than it wanted to pay. TransAlta, Canada's top investor-owned power gen erroneous bid to the New York Independent Syster transmission congestion contracts. The ISO mana a financial penalty. system and the contracts hedge the cost of transn 1.1. The FSA gave the UK operations of Credit Suisse a Decision Notice dated 1 August 2008 which notified them that pursuant to section 206 of the Financial Services and Markets Act But the company's computer spreadsheet containe 2000 ("the Act"), the FSA had decided to impose a financial penalty of £5.6 million on the UK operations of Credit Suisse in respect of a breach of Principles 2 and 3 of the FSA's contracts, it said. Principles for Business which occurred between 30 September 2007 and 19 February 2008 "It was literally a cut-and-paste error in an Excel se when we did our final sorting and ranking bids prior executive Steve Snyder said in a conference call. 1.2. The UK operations of Credit Suisse have confirmed that they will not be referring the matter "I am clearly disappointed over this event. The impo to the Financial Services and Markets Tribunal. 1.3. Accordingly, for the reasons set out below and having agreed with the UK operations of Credit Suisse the facts and matters relied on, the FSA imposes a financial penalty on the UK we've done " As New York ISO rules did not allow for a reversal operations of Credit Suisse in the amount of £5.6 million. ahead.



We researched spreadsheets for the past 4 years at Delft University

We interviewed spreadsheet professionals

We analyzed spreadsheets



Financial professionals spend 2 days a week working with Excel

Spreadsheets can have a long life, 5 years on average

Marii Gwidone

Thursday | Donnersty

Average sheet is used by 12 different people
There is a gap! Between importance and treatment.

We try to bridge this gap with methods from software engineering.



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1	Consolidated Statements of Shareholders' Equity										
2	[DOLLARS IN THOUSANDS]										
3											
4								Accumulated			
6								Other			
7		Commo	n Shares	Additiona	I Retained	Treasury	Comprehensive	Comprehensive			
8		Number	Par Value	Capita	I Earnings	Shares	Income (Loss)	Income (Loss)	Other	Total	
9	Balance, January 1, 1999	69,494,483	\$ 86,868	\$ 43,28	1 \$ 604,227	\$ (21,902))	\$ (12,802)	\$ (549)	\$ 699,123	
10											
11	Net income				128,856		\$ 128,856			128,856	
12	Pensions						9,550			9,556	
14	Unrealized loss on investment securities						(3 235)			(3 235)	
15	Other comprehensive income						6,937	6,937		(0,200)	
16	Comprehensive income						\$ 135,793				
17	Stock options exercised	108,104	134	1,91	3					2,052	
18	Unearned compensation	149,799	188	3,93	3				(3,485)	636	
19	Performance shares	20,397	26	680	6	0.407				712	
20	Procomp and Nexus acquisitions	1,710,214	2,138	37,35	(41 669)	9,487				48,976	
22	Treasury shares				(41,000)	(1 229)				(1 229)	
23						(1,220)				(1,220)	
24	Balance, December 31, 1999	71,482,997	\$ 89,354	\$ 87,16	9 \$ 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)	
21	Pensions						1,507			1,507	
29	Other comprehensive loss						(6 793)	(6 793)		(550)	
30	Comprehensive income						\$ 130,126	(0,100)			
31	Stock options exercised	273,238	343	5,444	4					5,787	
32	Unearned compensation	247,635	308	5,583	3				(3,915)	1,976	
33	Performance shares	15,335					0			353	
34	Dividends declared an PLO OC	JCS.	erro	JIS.	101		C			(44,2/1)	
	Treasuly shares					(2,300)				(2,300)	
37	Balance, December 31_2000	53@	\$ 90.024	\$ 98,53	0 \$ 784.063	\$ (15.944)		\$ (12.658)	\$ (7.949)	\$ 936.066	
38	Net income		10		66,893	(11,211)	\$ 66,893	(12,123)	(1,1,2,0)	66,893	
	Translation adjustmen		NC.				(47,373))		(47,373)	
40	Pensions						(1,628)			(1,628)	
41	Unrealized gain on investment securities						1,213	117 700		1,213	
42	Other comprehensive loss						(47,788) © 10,105	(47,788)			
43	Stock ontions exercised	176 395	221	1 86	1		JUS			5 081	
45	Unearned compensation	110,335	221	4,000	·				1 412	1 412	
46	Dividends declared and paid				(45,774)				., / 12	(45,774)	
47	Treasury shares					(12,780)				(12,780)	
48											
49	Balance, December 31, 2001	712,603	\$ 90,245	\$ 103,39	\$ 805,182	\$ (28,724)		\$ (60,446)	\$ (6,537)	\$ 903,110	
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1	Consolidated Statements of Shareholders' Equity											
2	[DOLLARS IN THOUSANDS]											
3												
4								Accumulated				
6								Other				
7		Commo	n Shares	Additiona	I Retained	Treasurv	Comprehensive	Comprehensive				
8		Number	Par Value	Capita	I Earnings	Shares	Income (Loss)	Income (Loss)	Other	Total		
9	Balance, January 1, 1999	69,494,483	\$ 86,868	\$ 43,281	1 \$ 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						(2.225)			(2.225)		
14	Other comprehensive income						6 937	6 937		(3,233)		
16	Comprehensive income						\$ 135,793	0,007				
17	Stock options exercised	108,104	134	1,918	3					2,052		
18	Unearned compensation	149,799	188	3,933	3				(3,485)	636		
19	Performance shares	20,397	26	686	6					712		
20	Procomp and Nexus acquisitions	1,710,214	2,138	37,351	1	9,487				48,976		
21	Dividends declared and paid				(41,668)	(1.000)	\			(41,668)		
22	Treasury shares					(1,229))			(1,229)		
23	Balance, December 31, 1999	71 482 997	\$ 89.354	\$ 87 169	9 \$ 691.415	\$ (13.644))	\$ (5.865)	\$ (4.034)	\$ 844.395		
25	Net income	, ,	• •••,•••	• •••,•••	136,919	• (10,011	\$ 136,919	¢ (0,000)	(1,001)	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 Stock aptions avaraised	272 222	3/3	E 444	1		\$ 130,126			5 797		
32	Unearned compensation	247 635	308	5 583	3				(3.915)	1 976		
33	Performance shares	15,335	19	334	1				(0,013)	353		
34	Dividends declared ar N		err	ors	ION		6			(44,271)		
	Treasury shares			,		(2,300)				(2,300)		
36												
37	Balance, December 31_2000	53620	90,024	\$ 0,530	\$ 784,063	\$ (15,944)		\$ (12,658)	\$ (7,949)	\$ 936,066		
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10	Pensions						(47,373)			(47,373)		
41	Unrealized gain on investment securities						1,213			1,020)		
42	Other comprehensive loss						(47,788)	(47,788)		1,210		
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)	(40,700)				(45,774)		
41	Treasury snares					(12,780))			(12,780)		
49	Balance, December 31, 2001	712,603	\$ 90,245	\$ 103.390	\$ 805,182	\$ (28,724))	\$ (60,446)	\$ (6.537)	\$ 903,110		
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We performed 27 interviews

We asked them: What annoys you?

And what makes you happy?



We found that problems occur when spreadsheets are transferred



We found that problems occur when spreadsheets are transferred



We found that problems occur when spreadsheets are transferred

This led us to the idea of *formula* smells



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PerfectXL analysis plan for Spreadsheet_5.xlsx



Containing fixed numbers

 $\label{eq:Value of Flexibility!C41 with formula (LN(C34/C35)+(G34-G36+(G35/2))*C36)/(((G35)^{(0.5)})*(C36^{0.5})) \\ Value of Flexibility!F41 with formula (LN(C34/C38)+(G34-G36+(G35/2))*C36)/(((G35)^{(0.5)})*(C36^{(0.5)})) \\ Value of Flexibility!C44 with formula C41-((G35^{0.5})*(C36^{(0.5)})) \\ Value of Flexibility!F44 with formula F41-((G35^{0.5})*(C36^{(0.5)})) \\ Value of Flexibility!F44 with formula F41-((G35^{0.5})) \\ Value of Flexibility!F44 with formula F41-((G35^{(0.5)})) \\ Value of Flexibility!F41 with form$

Many different operations

Value of Flexibility!C41 with formula (LN(C34/C35)+(G34-G36+(G35/2))*C36)/(((G35)^(0.5))*(C36^0.5)) Consider simplifying this formula Value of Flexibility!F41 with formula (LN(C34/C38)+(G34-G36+(G35/2))*C36)/(((G35)^(0.5))*(C36^0.5)) Consider simplifying this formula Value of Flexibility!E47 with formula (((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 (EXP((0-G36)*C36)) occurs multiple times in this formula, consider placing it in a separate cell

We built a tool that finds smells in spreadsheets

If you say smells, you say ...

REFACTORING IMPROVING THE DESIGN OF EXISTING CODE

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If you say smells, you say refactorings

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37	Annual Excess Return=		6.47%		Cost of Capital	=	12.22%			
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41		d1 =	1.38757695		d1 =	-0.610409471				
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So, we built BumbleBee: a refactoring tool for spreadsheets

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8	3	Is the program designed to have a significant impact in addressing the interest, problem or need?	No	20%	0.0									
9	4	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)?	No	20%	0.0									
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By applying SE methods, we try to prevent bridging problems in the future














We found that problems occur when spreadsheets are transferred





PerfectXL analysis plan for Spreadsheet_5.xlsx

Containing fixed numbers

Value of Flexibility:(C41 with formula (LN(C34-C35)+(G34-G36+(G35/20)*C36)((G35/20)*(C36'0.5)) Value of Flexibility:(C41 with formula (LN(C34-C35)+(G34-G36+(G35/20)*C36)(((G35)/(0.5))*(C36'0.5)) Value of Flexibility:(C44 with formula C41-((G35'0.5)*(C36'(0.5))) Value of Flexibility:(F44 with formula F41-((G35'0.5)*(C36'(0.5)))

Many different operations

Value of Flexibility/C41 with Stematia (LN(C34-C35)+(G34-O36+(G35-2))*C36) (((G35))*(C36)(C36'O-5)) Consider simplifying this formula (LN(C34-C35)+(G34-O36+(G35-2))*C36) (((G35))*(C36'O-5)) Value of Flexibility/E41 with formula (LN(C34-C35)+(G34-O36+(G35'2))*C36) (((G35))*(C35))*(C36'O-5)) Consider simplifying this formula (UEXP((0-O36)*C36))*C36)*C36))*C36)*C36)*C36)*C36*(C42-C35*(EXP)(0-O36)*C36))*C45)-((EXP((0-O36)*C36))*C36)*C36))*C36*F42-C38 (EXP((0-O36)*C36))*C37'(G7) (EXP((0-O36)*C36)) occurs multiple times in this formula, consider placing it is a separate cell

We built a tool that finds smells in spreadsheets











