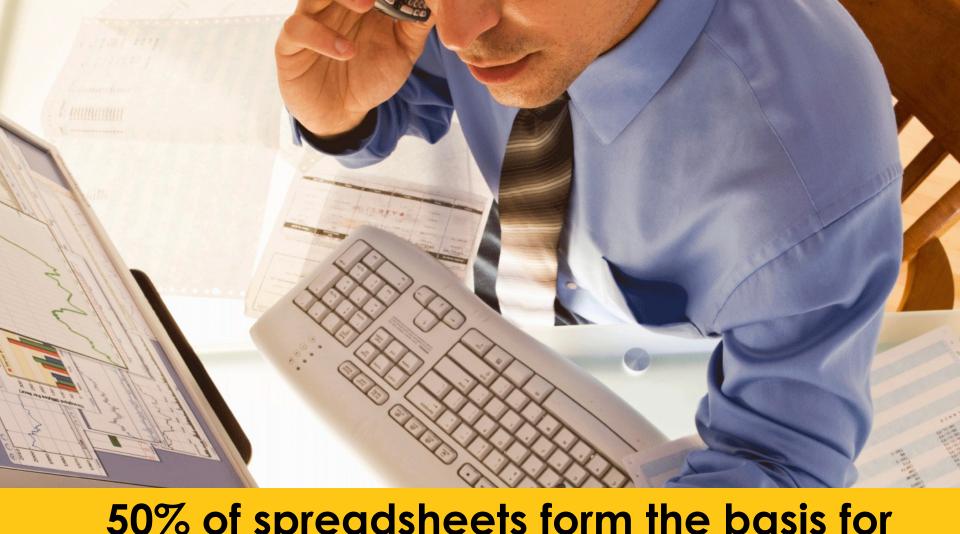


Spreadsheets: The dark matter of IT Felienne Hermans (@felienne)

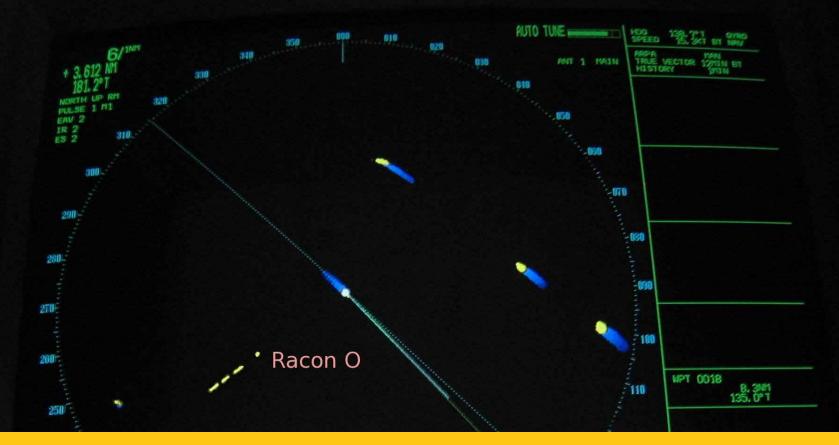




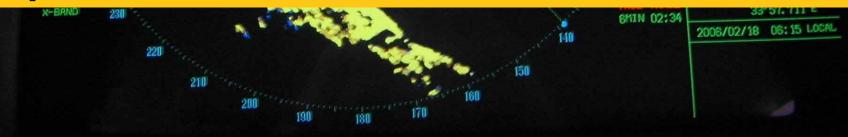


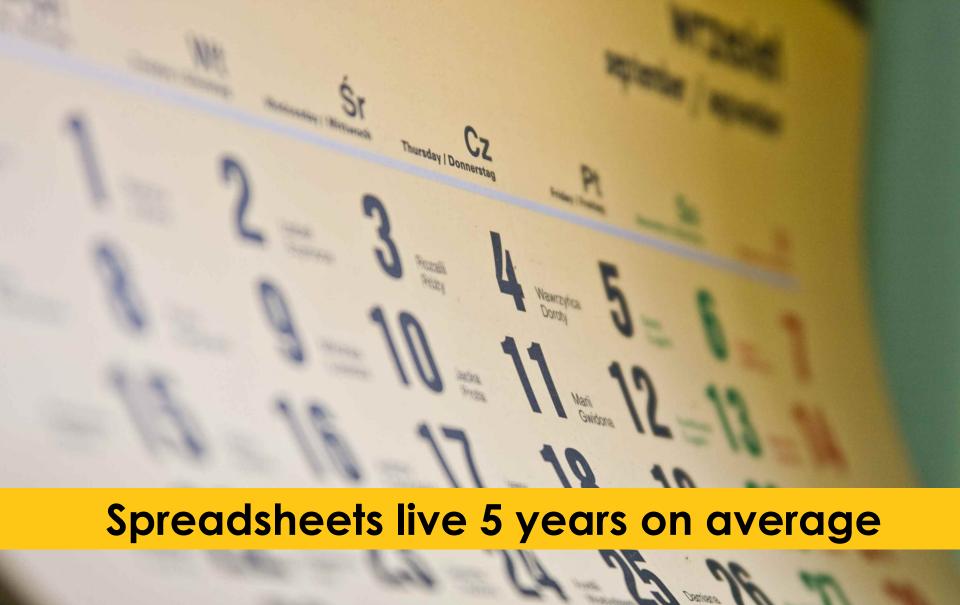
50% of spreadsheets form the basis for decisions



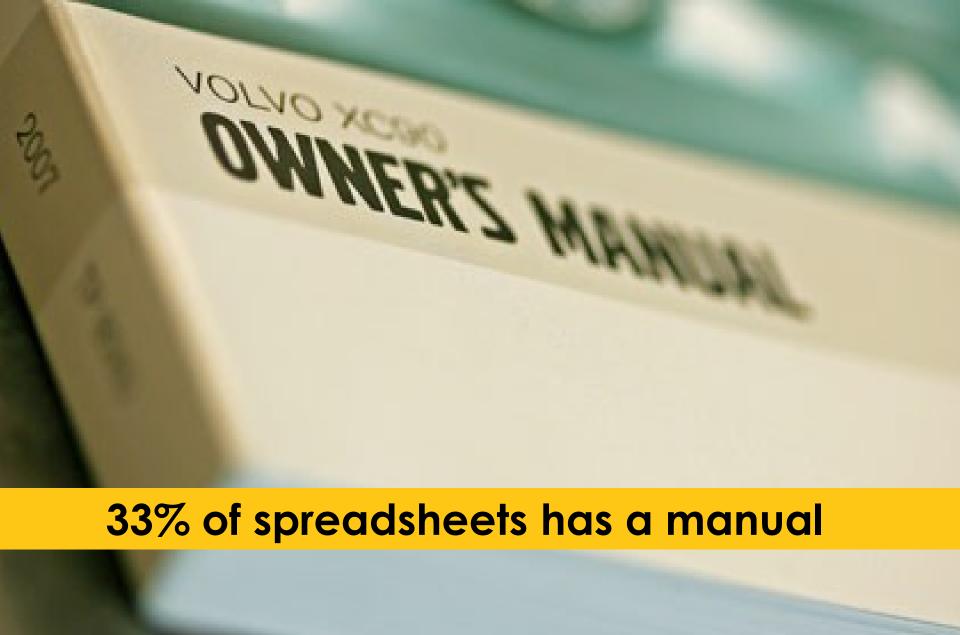


Spreadsheets exist 'under the radar'















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









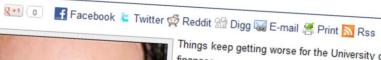
By Paul Kelso

University of Toledo loses \$2.4M in projected

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 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."

ord out off considering the budget this week and is expected to approve an amended version in June.

Loss 2.4 million dollars

Cause typo



upgrade to the men's 100m final following

By Paul Kelso

University of Toledo loses \$2.4M in projected

BY RYAN E. SMITH BLADE STAFF WRITER



Iniversity of Toledo's

ling reductions for next n internal budgeting erro on less to work with that

at led officials to found Tuesday, the vas to approve next tate informed UT that less than expected or vice president for

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sion in June

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) - 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

"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.

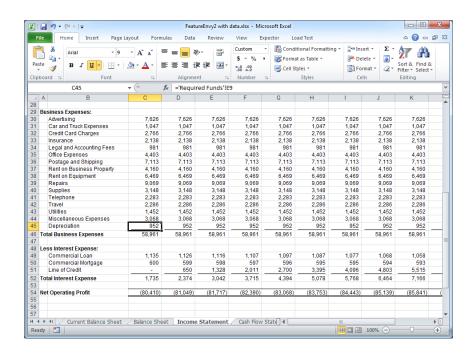
24 million dollars LOSS copy-paste error Cause





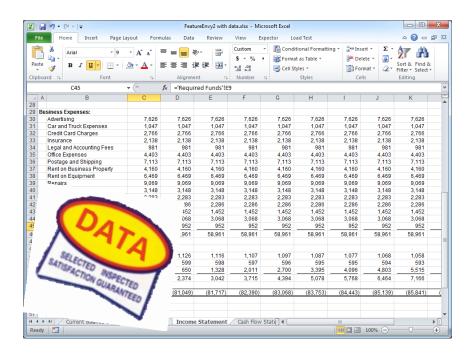
Spreadsheets are mislabeled!



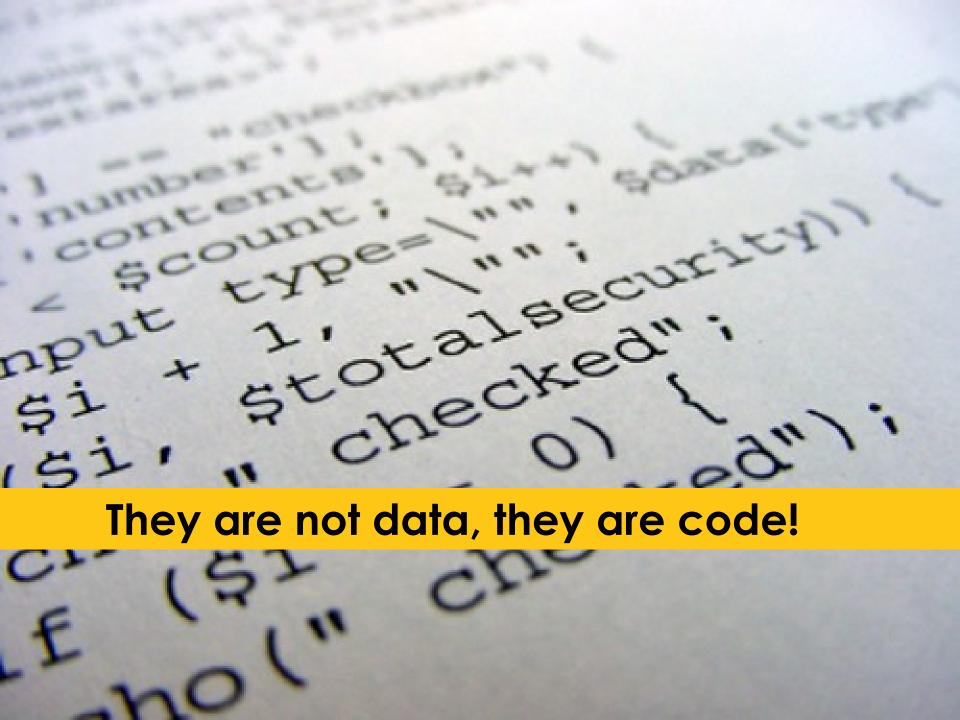


Spreadsheets are mislabeled!





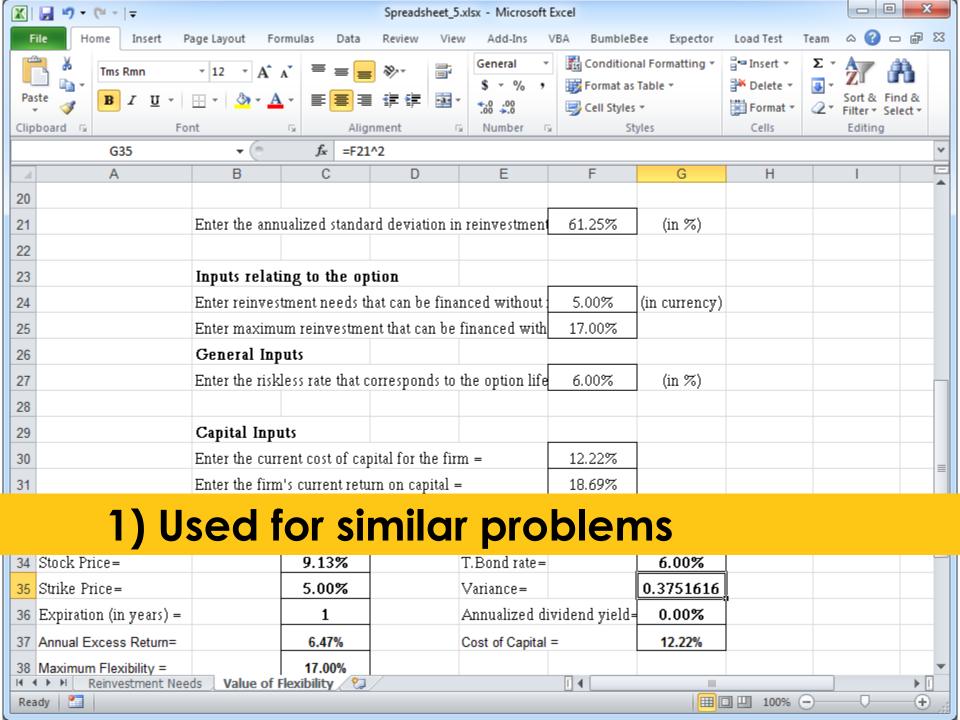
Spreadsheets are mislabeled!

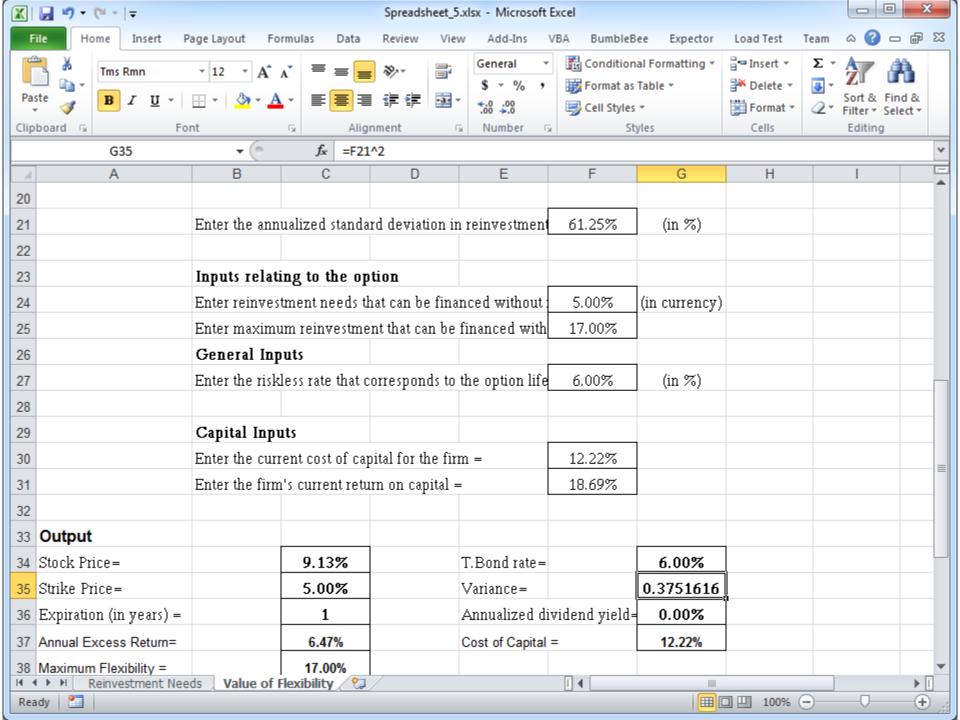


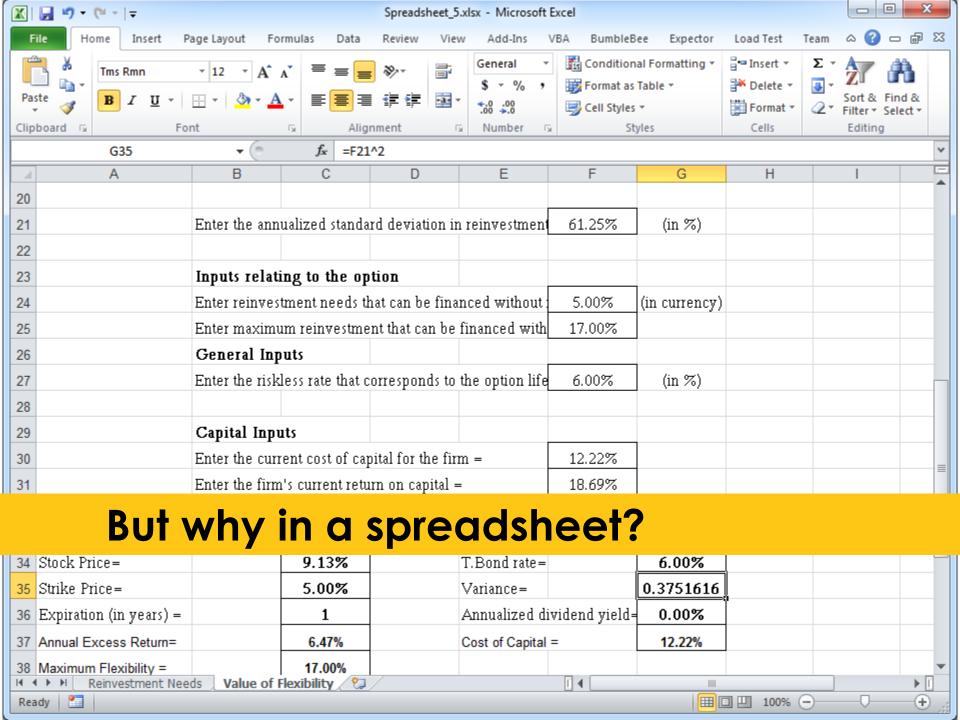


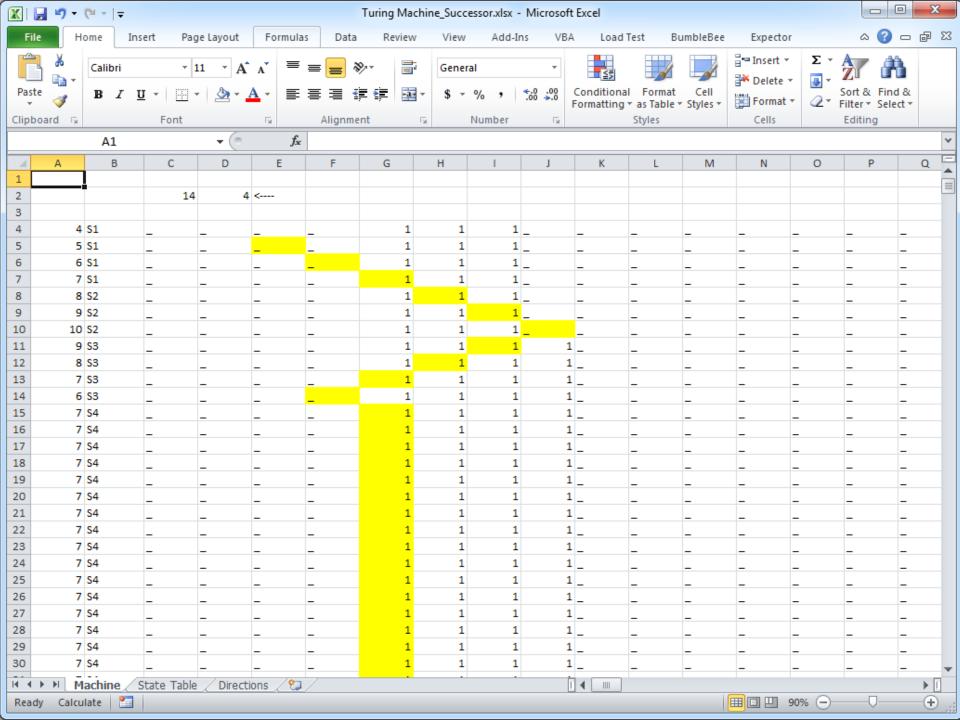
Spreadsheets are code

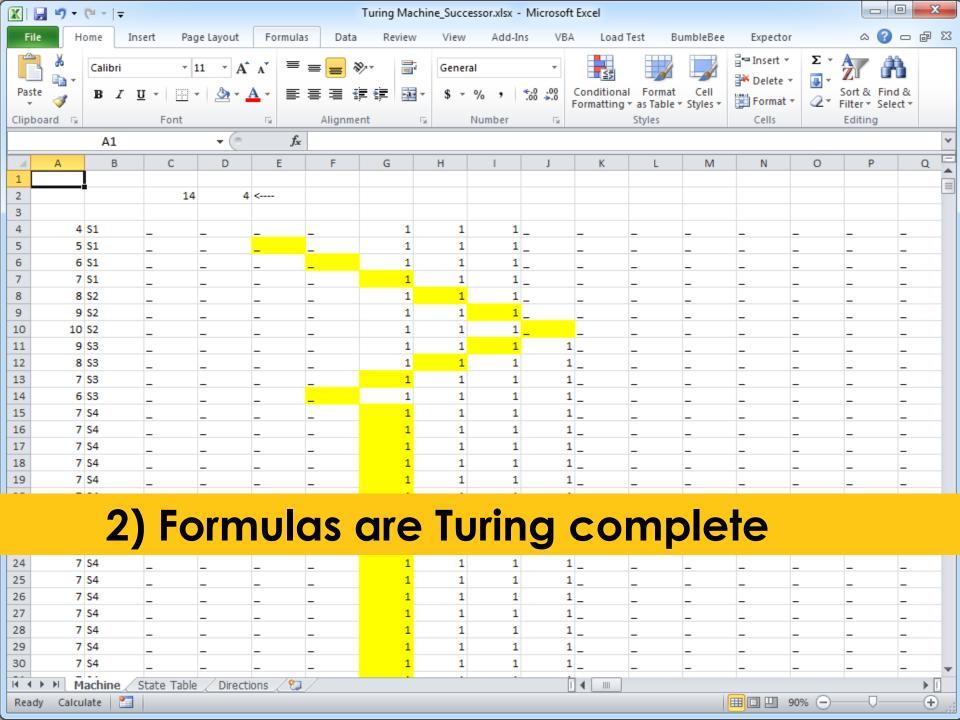


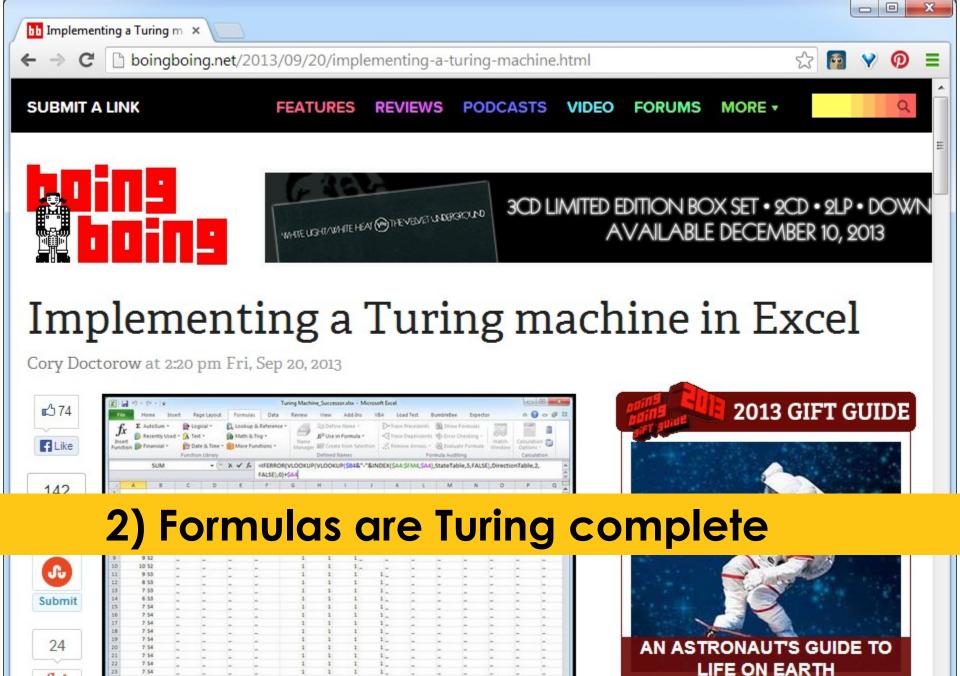




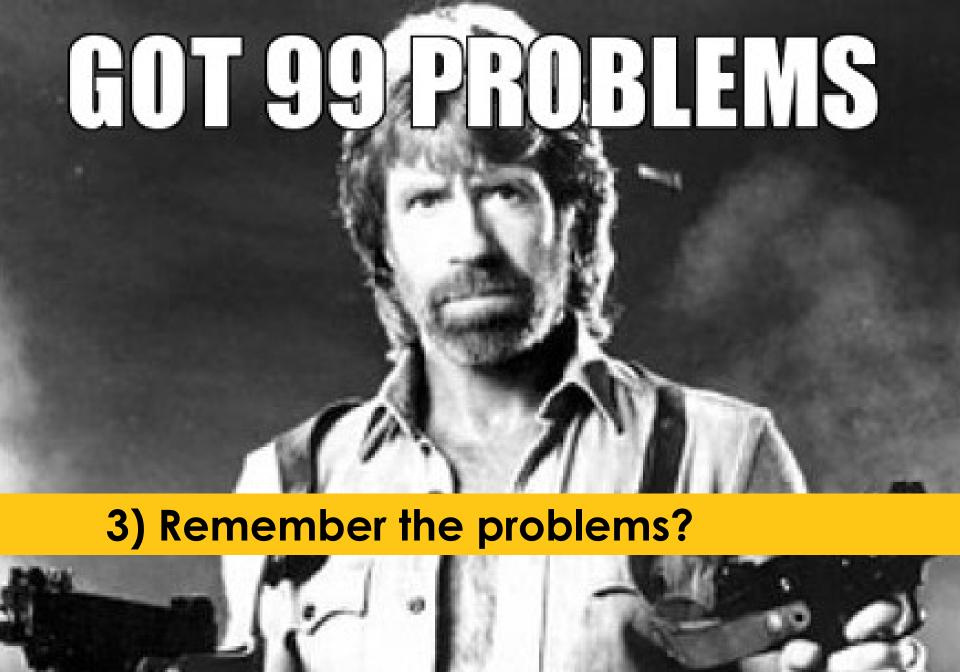


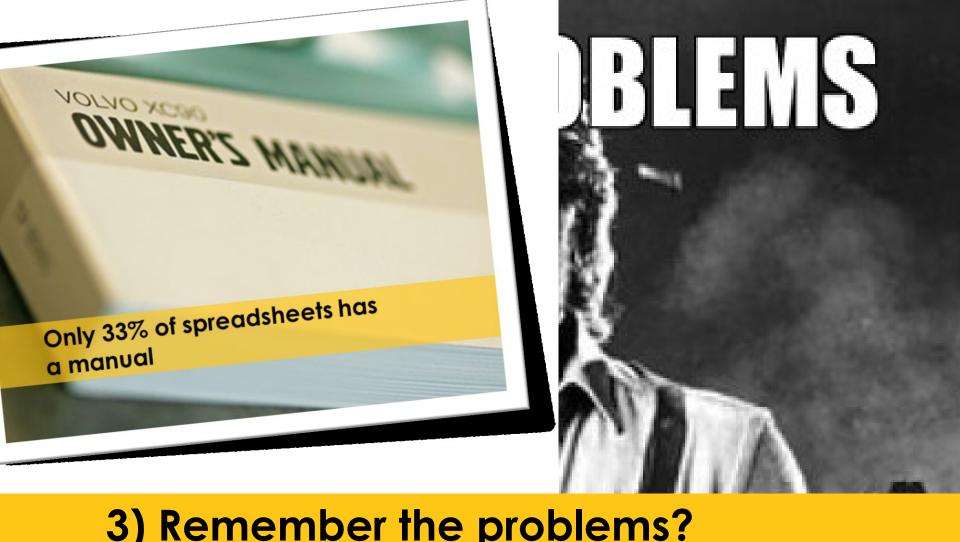






g+1





3) Remember the problems?

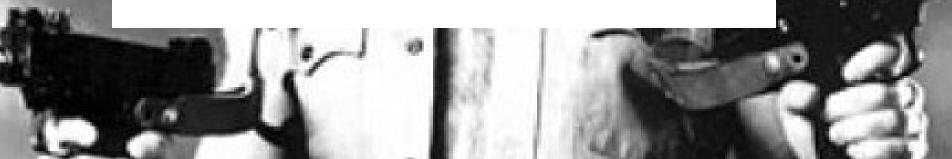






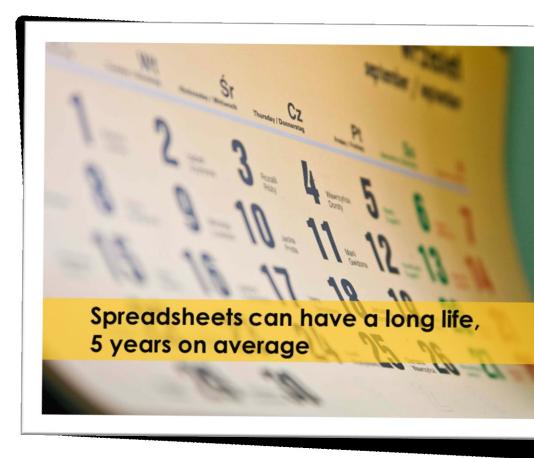


3) Remember the problems?

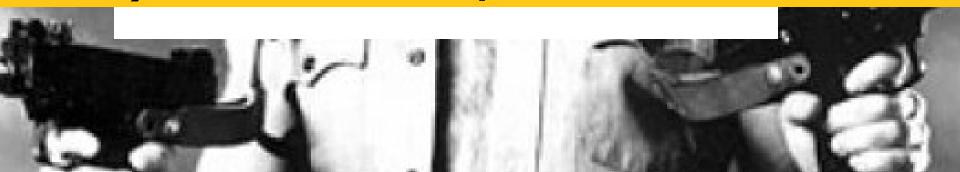






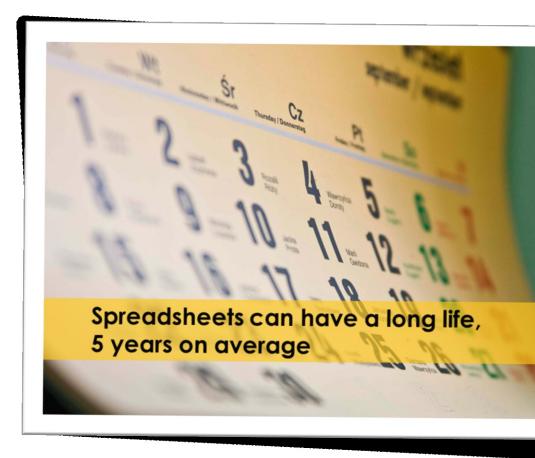


3) Remember the problems?





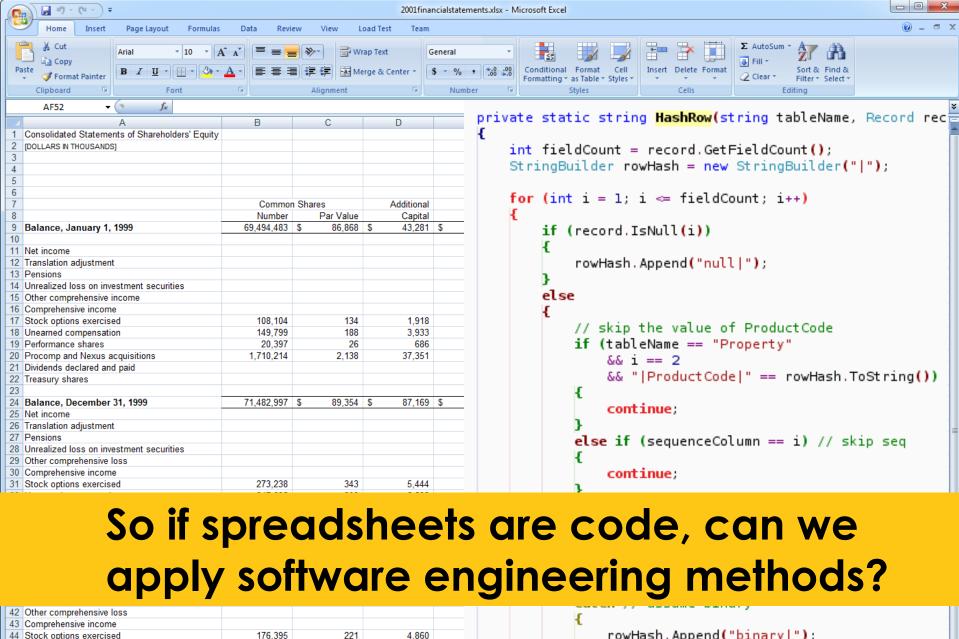




3) Spreadsheets suffer from 'software' problems







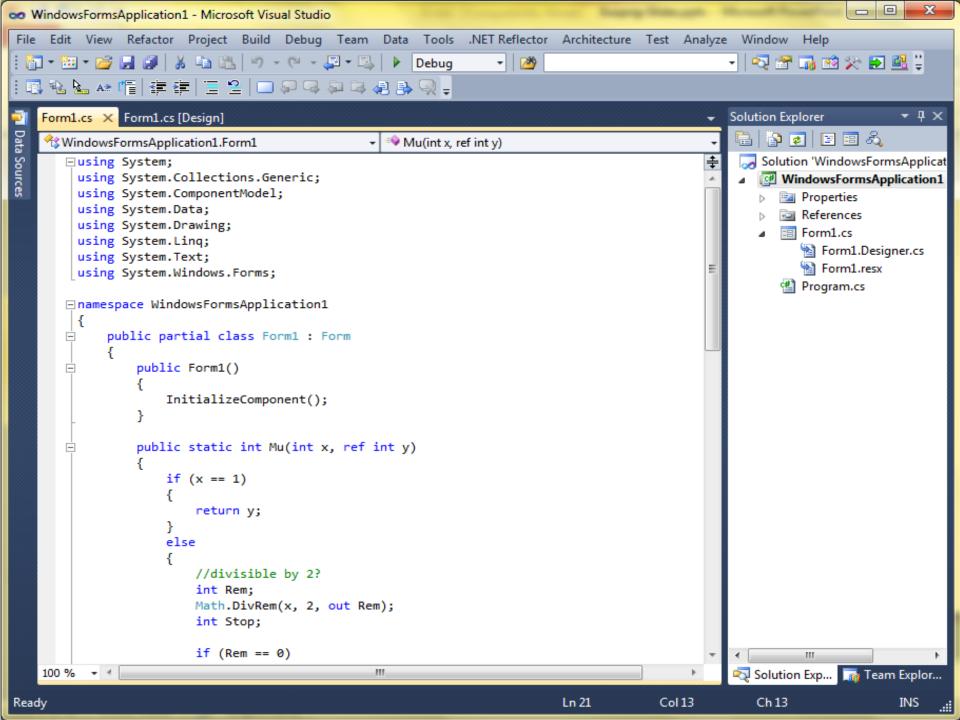
| 42 | Other comprehensive loss | 43 | Comprehensive income | 44 | Stock options exercised | 176,395 | 221 | 4,860 | 45 | Unearned compensation | 46 | Dividends declared and paid | Treasury shares | 48 | 48 | 48 | 49 | Balance, December 31, 2001 | 712,603 \$ | 90,245 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ | 103,390 \$ |

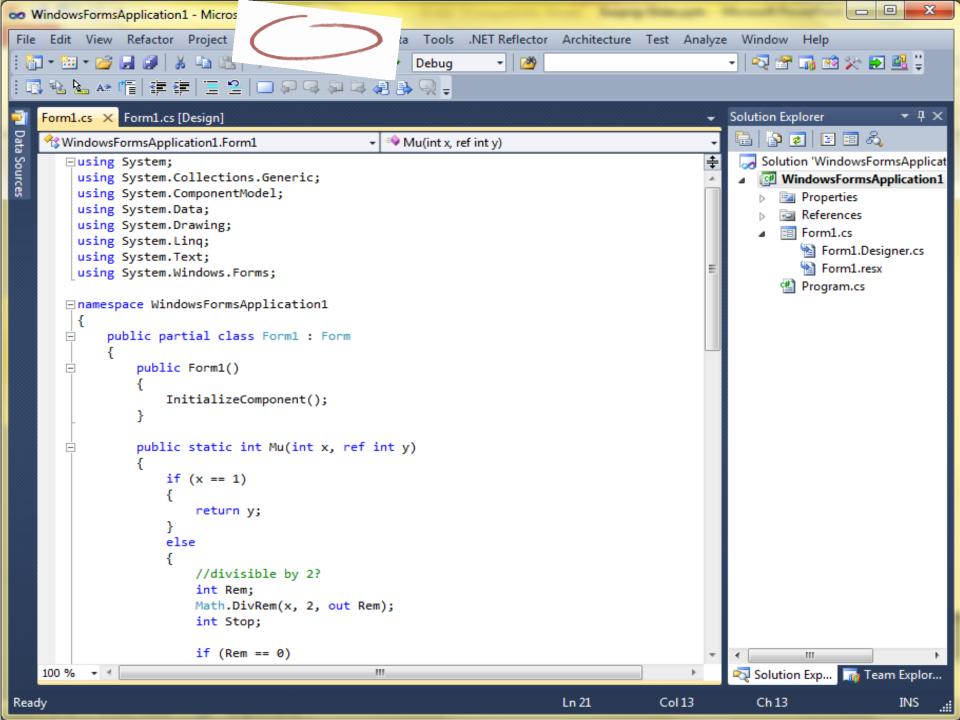
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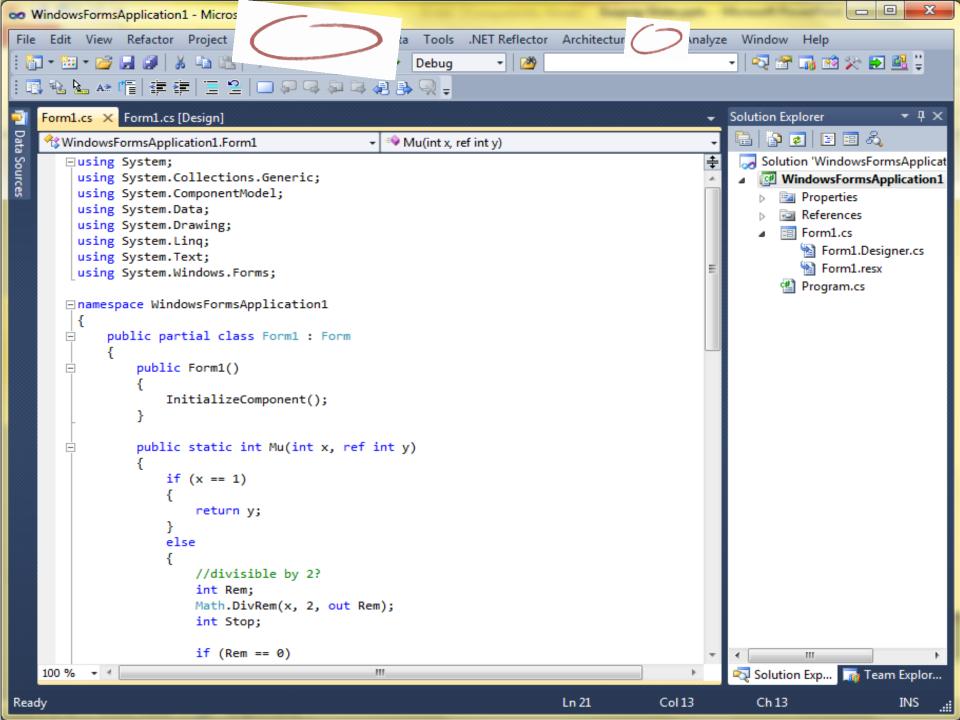
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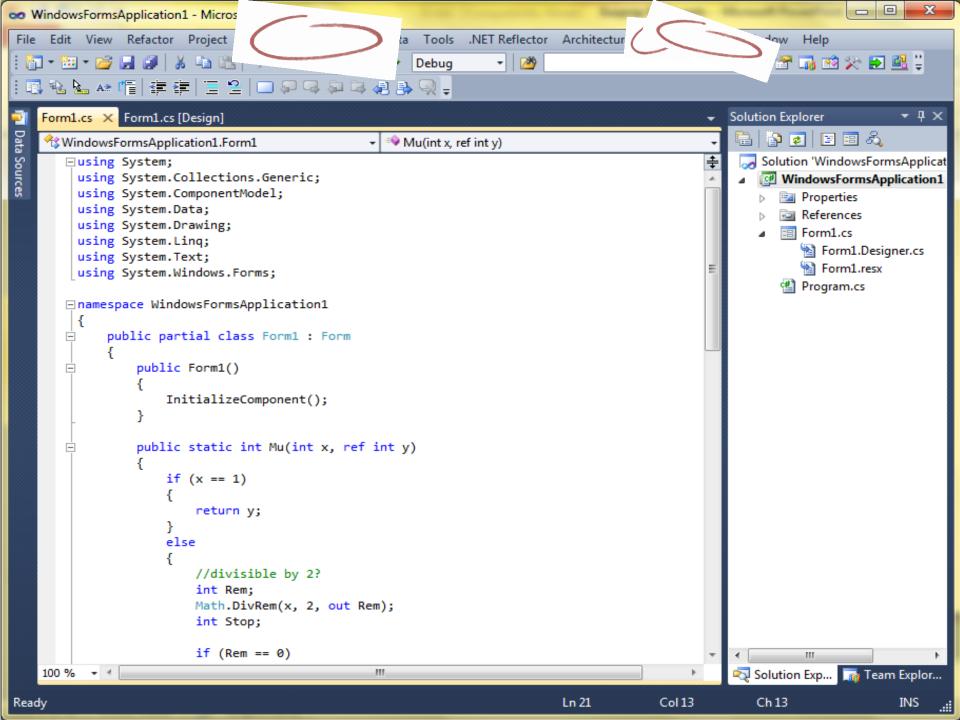










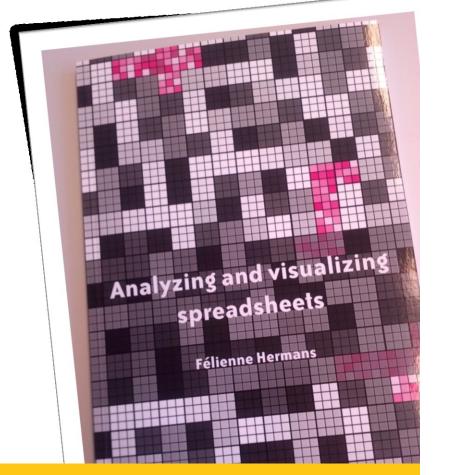


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13 Pensions 614 614 614 14 Unrealized loss on investment securities 6,325 6,337 6,937 15 Other comprehensive income 6,637 6,937 6,937 16 Comprehensive income 7			
14 Unrealized loss on investment securities			
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16 Comprehensive income			
18 Unearned compensation 149,799 188 3,933			
19 Performance shares 20,397 26 686			
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			
21 Dividends declared and paid (41,668) (41,668) (41,668) 22 Treasury shares (1,229) (1,229) 23 (1,229) 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 (7,904) 26 Translation adjustment (7,904) (7,904) 27 Pensions (396) (396) 28 Unrealized loss on investment securities (6,793) (6,793) 30 Comprehensive income (6,793) (6,793) 31 Stock options exercised 273,238 343 5,444 (3,915) 32 Unearned compensation 247,635 308 5,583 (3,915) 34 Translation adjustment (41,668) (41,668) 41,668) (41,668) 41,668) (41,668) 41,668) (41,668) 41,668) (1,229) 42,668 (1,229) (1,229) 5,767 (1,229) 6,767 (1,229) 7,865 (1,29) (1,29) 7,865 (1,29) (1,29) 8,844,395 (1,3644) (1,364) 9,844,395 (1,3644) (1,364) 9,844,395 (1,3644) (1,364) 9,844,395 (1,3644) (1,364) 9,844,395 (1,3644) (1,364) 9,844,395 (1,3644) (1,364) 9,844,395 (1,3644) (1,364) 9,844,395 (1,3644) (1,364) 9,844,395 (1,364) (1,364)			
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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 \$ 136,919 136,919 136,919 136,919 26 Translation adjustment (7,904) (7,904) (7,904) (7,904) 27 Pensions (396) (396) (396) (396) 29 Other comprehensive loss (6,793) (7,704) (7,704) (7,704) (7,704) (7,704) (7,704)			
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29 Other comprehensive loss (6,793) (6,793) 30 Comprehensive income \$ 130,126 31 Stock options exercised 273,238 343 5,444 32 Unearned compensation 247,635 308 5,583			
30 Comprehensive income \$ 130,126 31 Stock options exercised 273,238 343 5,444 32 Unearned compensation 247,635 308 5,583 (3,915) 1,976			
31 Stock options exercised 273,238 343 5,444 5,787 32 Unearned compensation 247,635 308 5,583 (3,915) 1,976			
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)			
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) 41 Unrealized gain on investment securities 1,213			
41 Officialized gain on investment securities 1,213 42 Other comprehensive loss (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 (45.774) (45.774)			
46 Dividends declared and paid (45,774) 47 Treasury shares (12,780) (12,780)			
48 (12,700)			
49 Balance, December 31, 2001 712,603 \$ 90,245 \$ 103,390 \$ 805,182 \$ (28,724) \$ (60,446) \$ (6,537) \$ 903,110			
50			



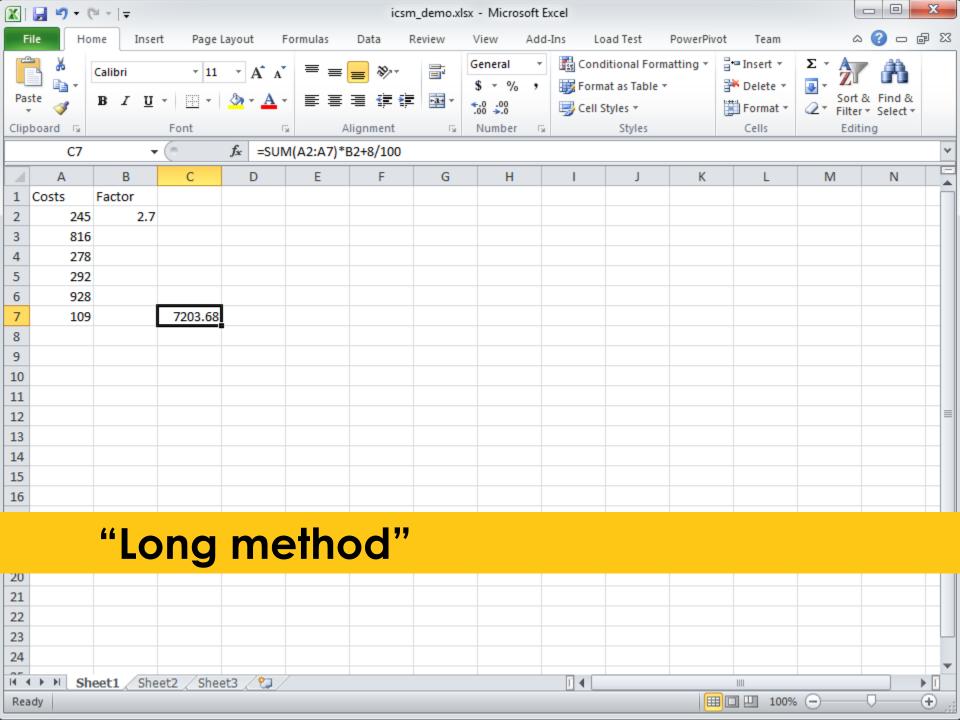
code, users can benefit from SE methods

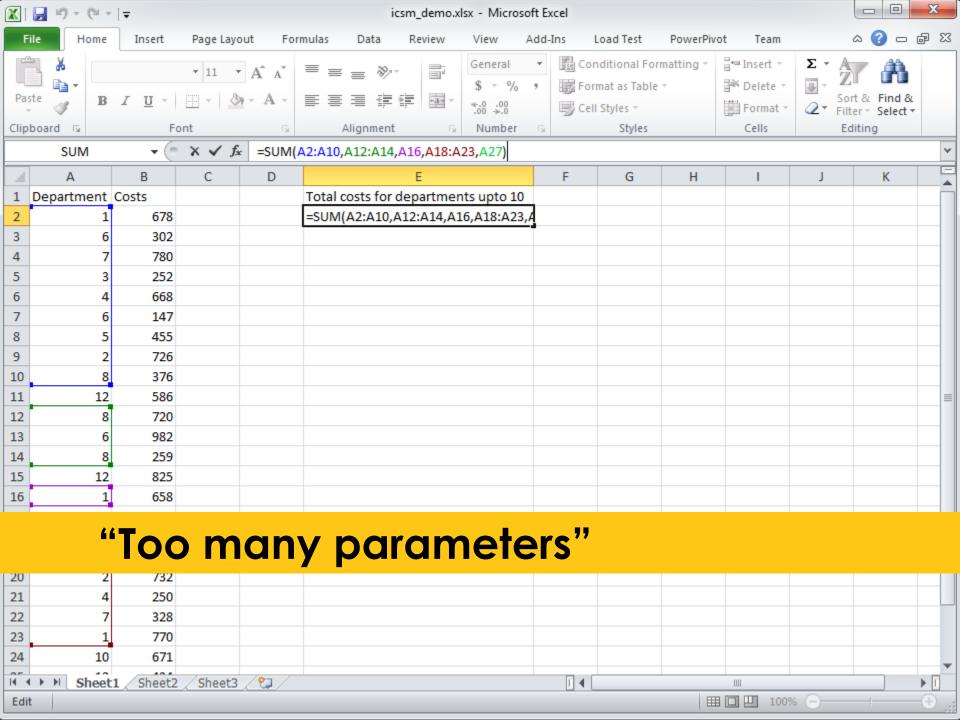
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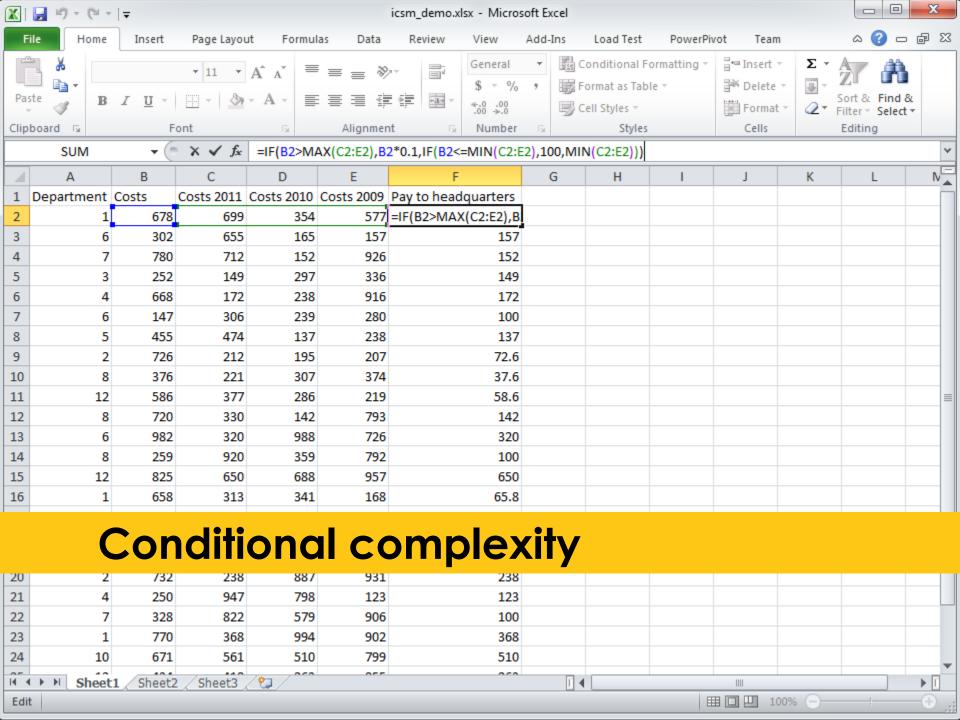


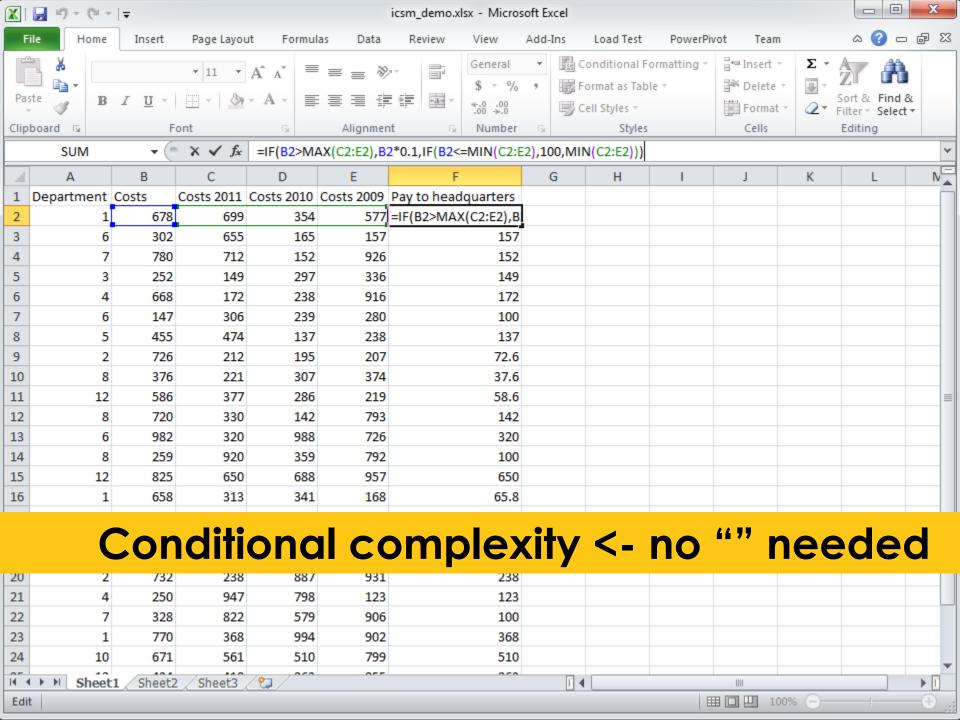


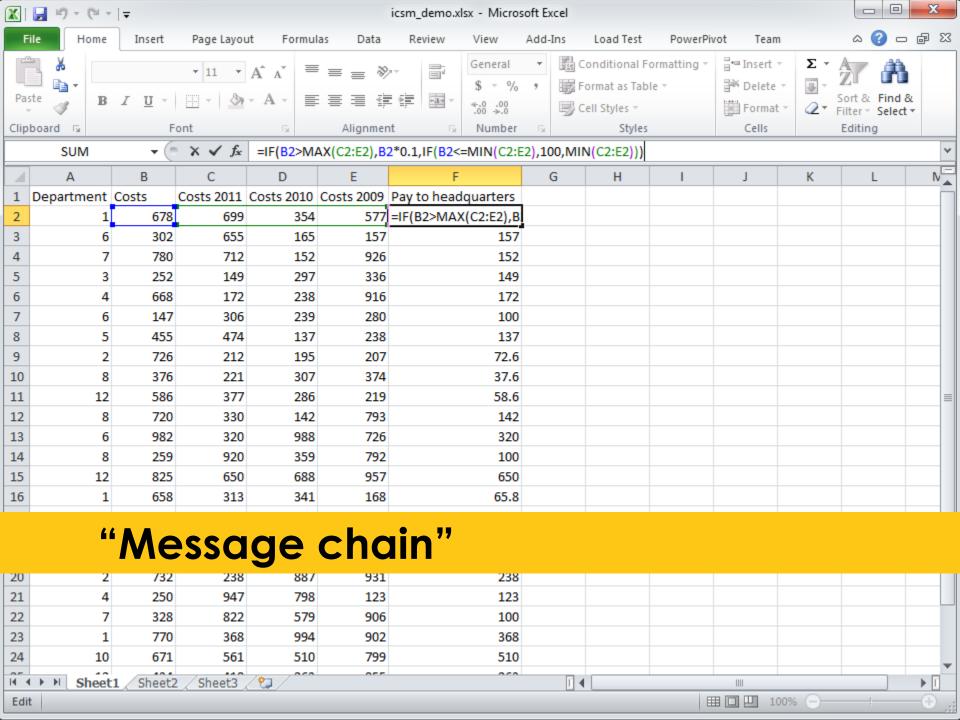
In my dissertatic for spreadsheet formulas

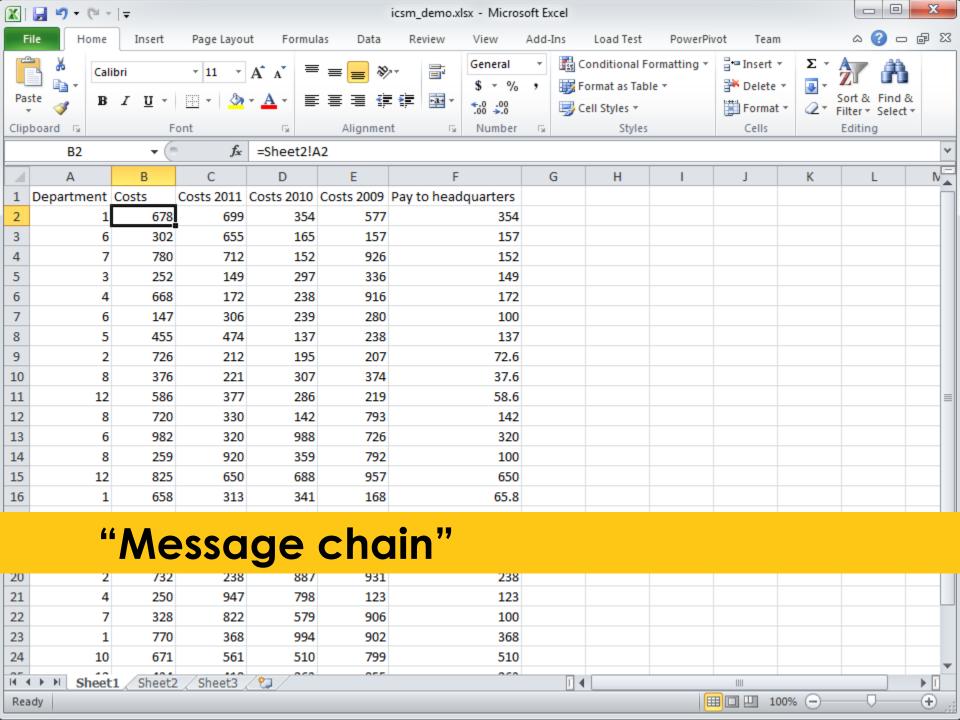


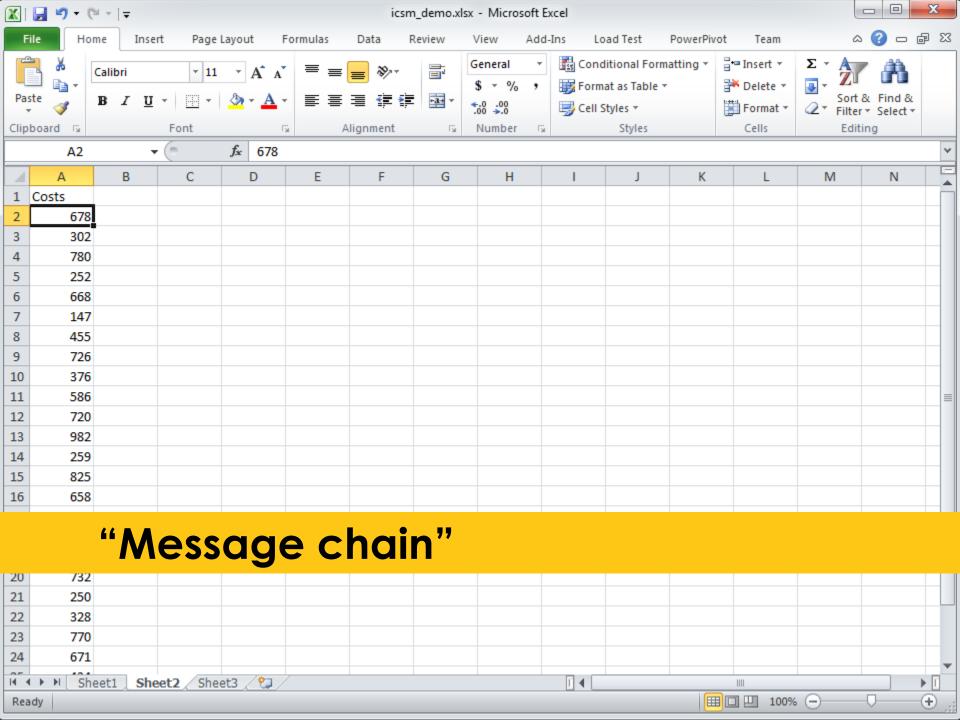


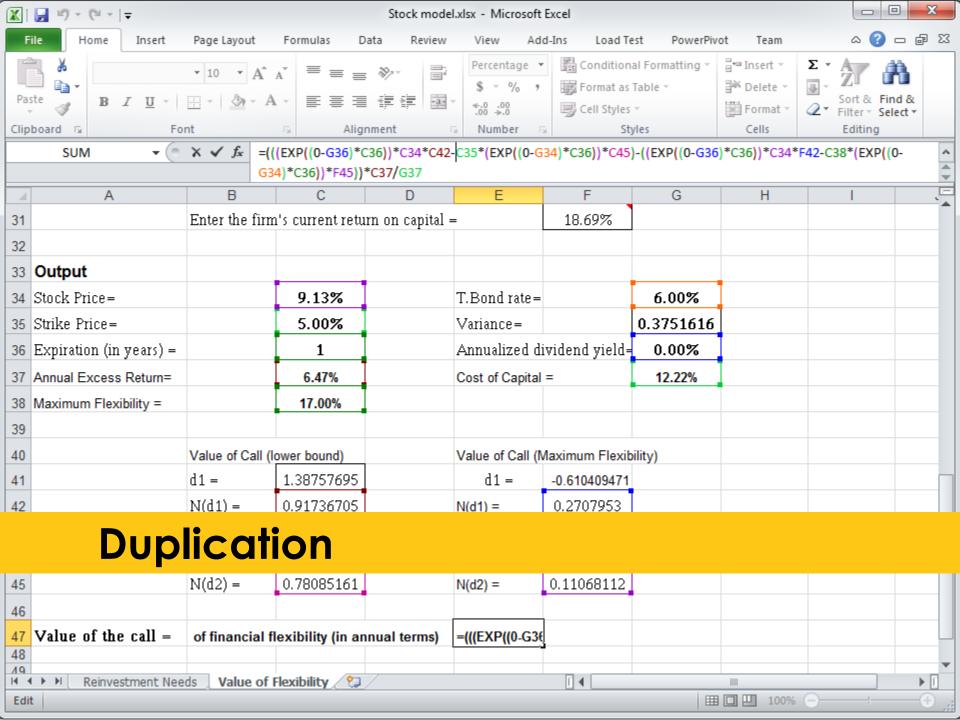


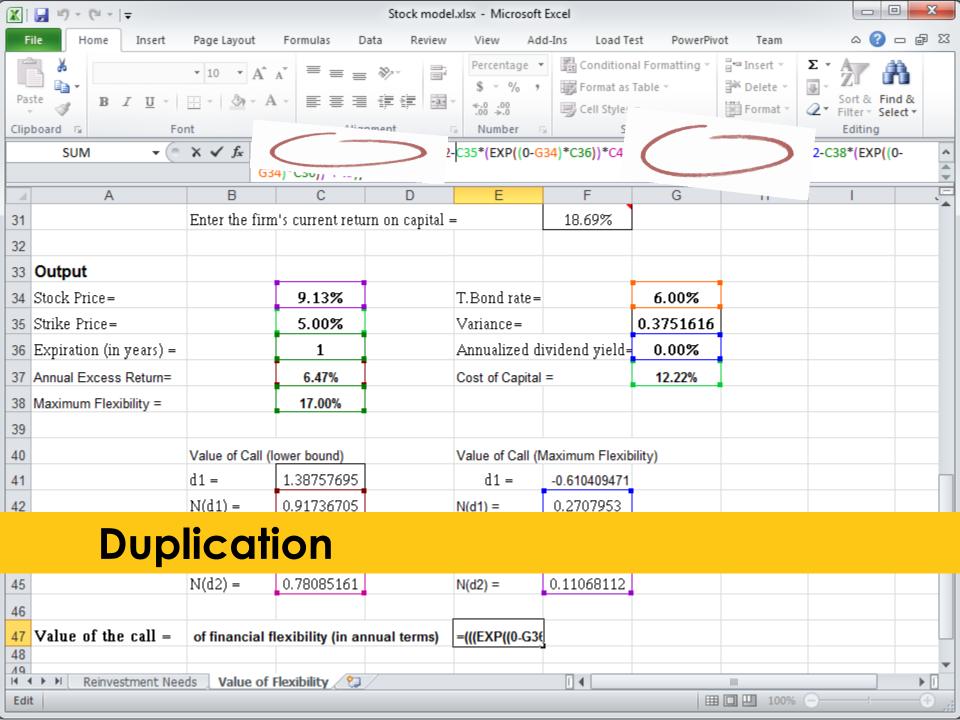


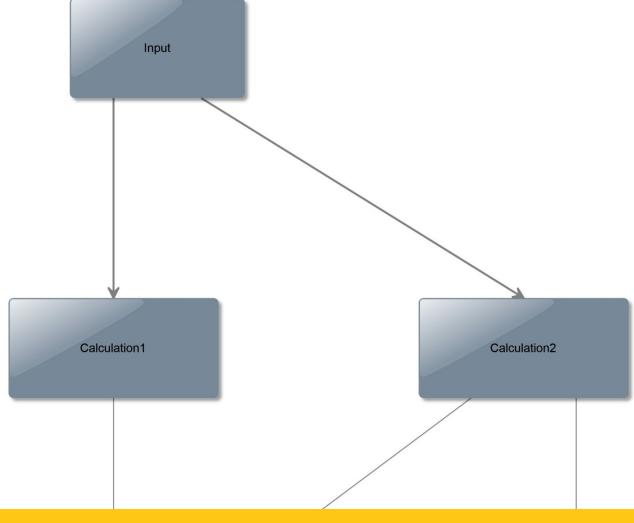








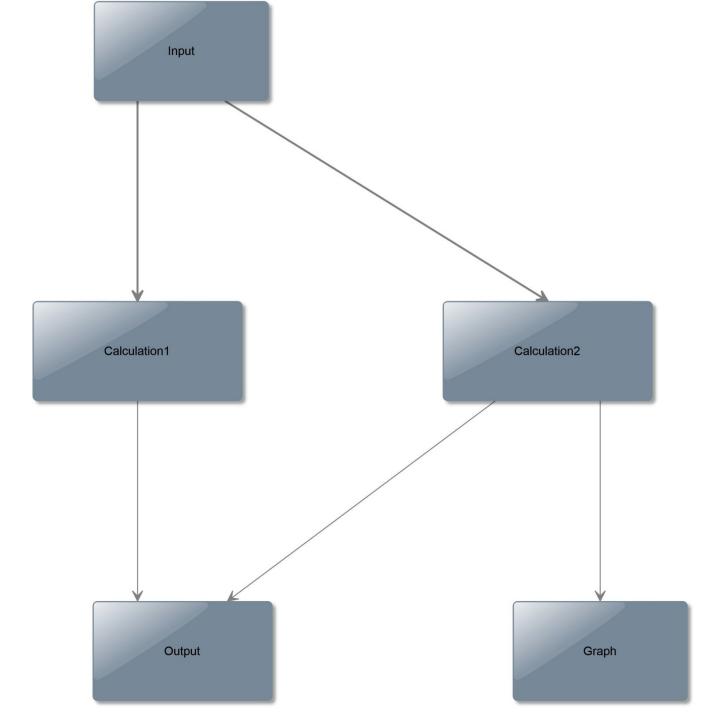


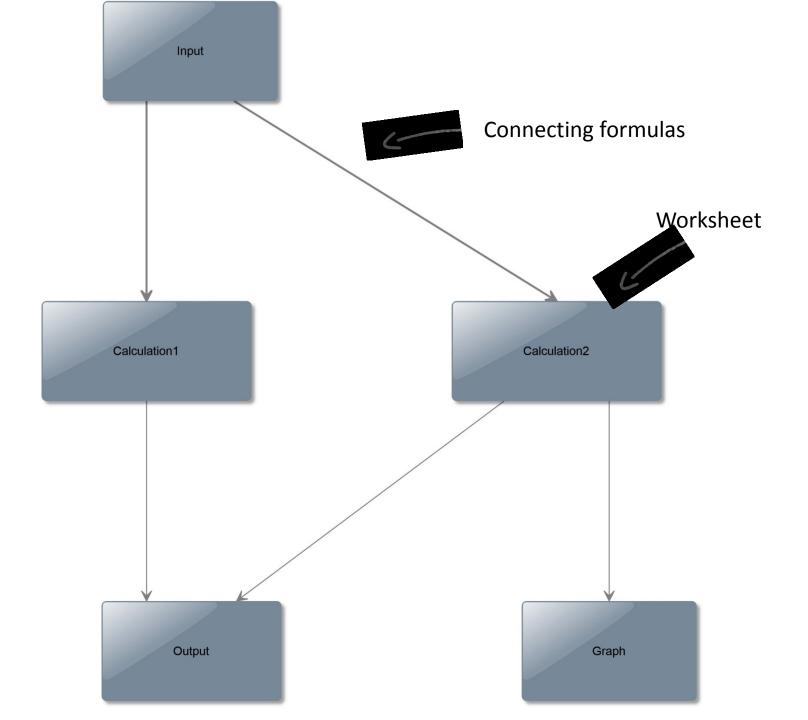


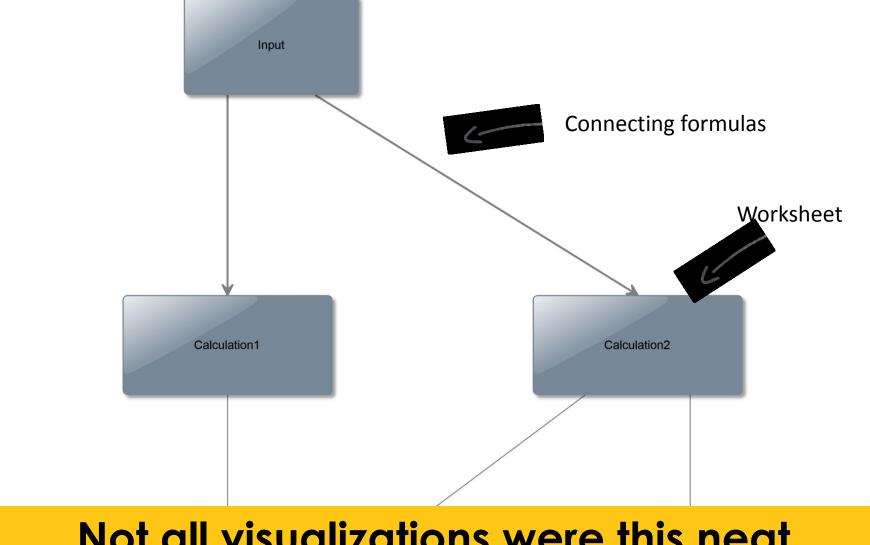
And these smells do not only occur at the formula level

Output

Graph

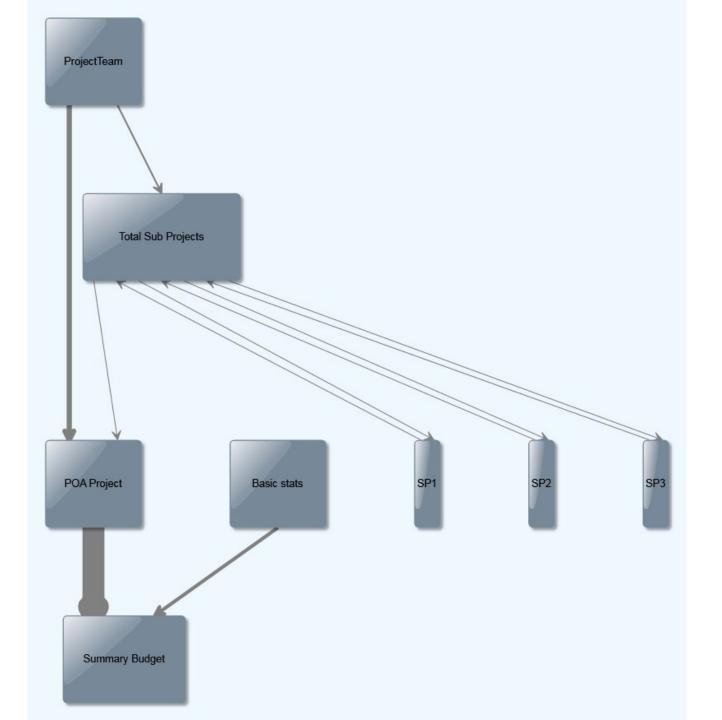


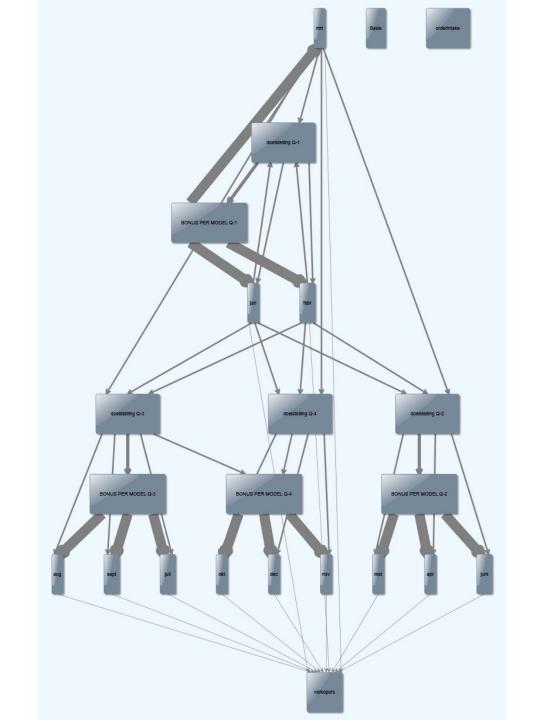


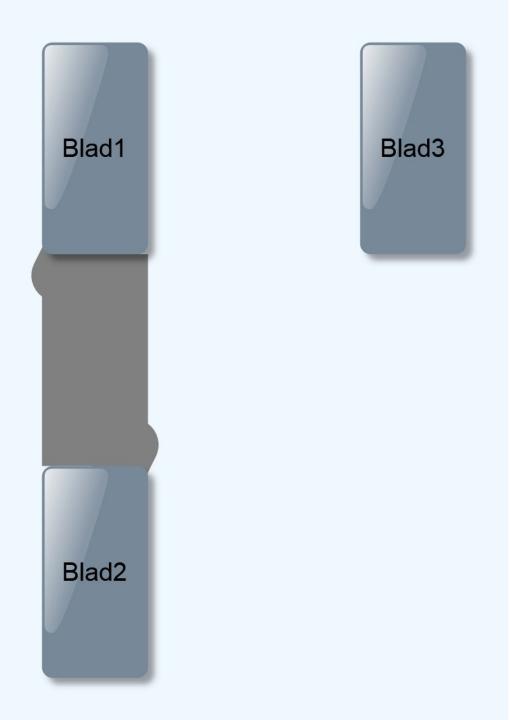


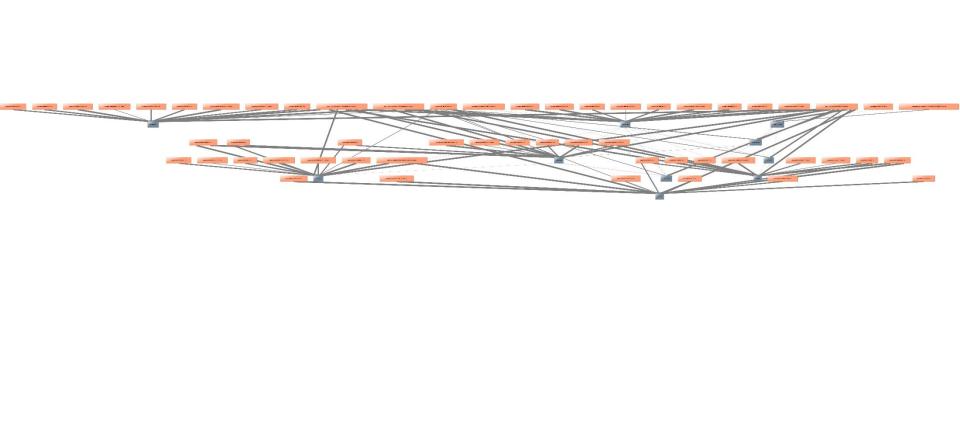
Not all visualizations were this neat

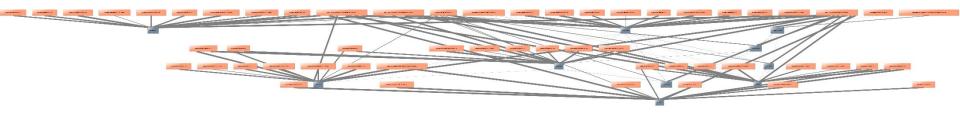








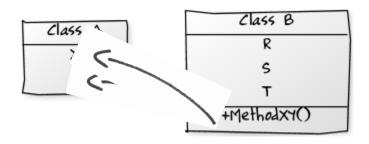




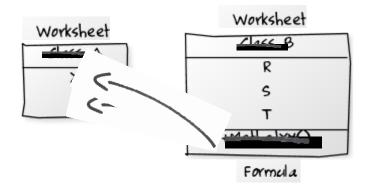
We can conclude: Smells occur at the structure level too

Class A X Y

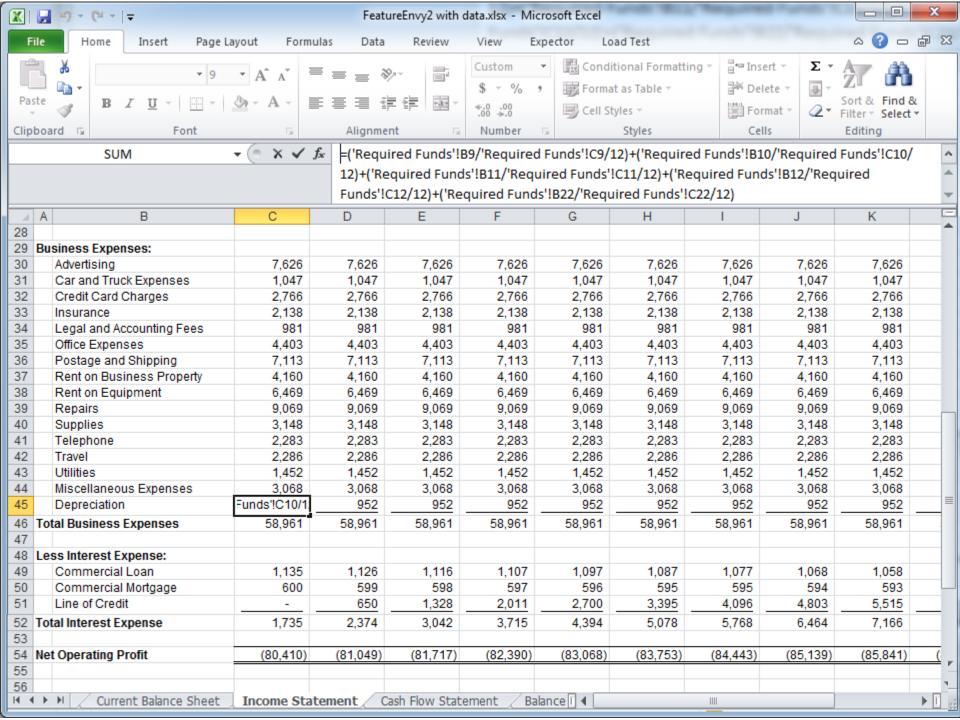
Class B
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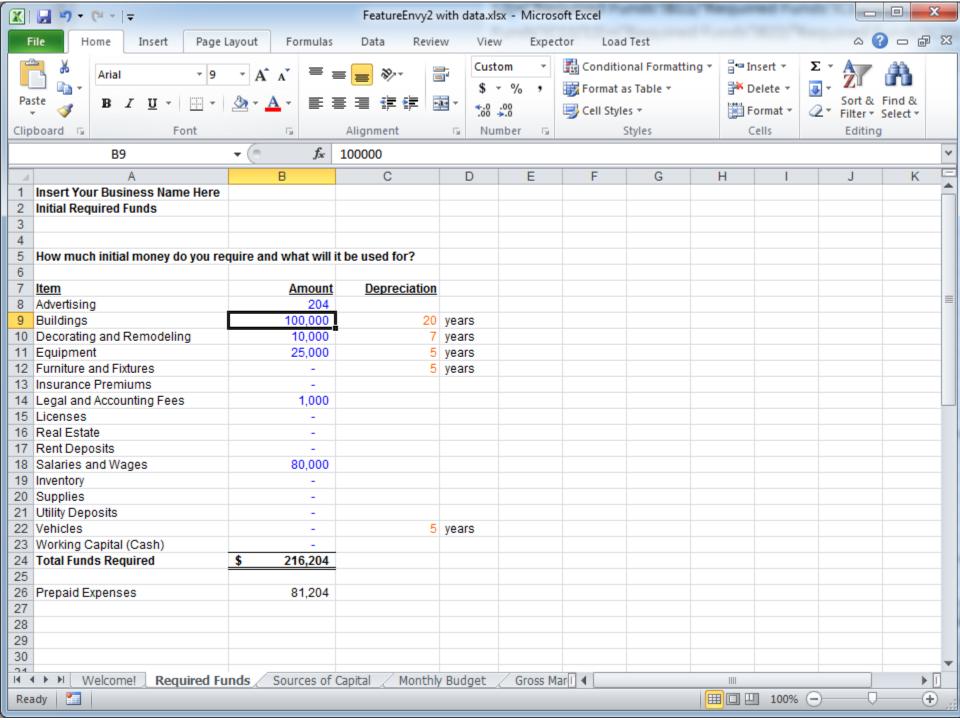


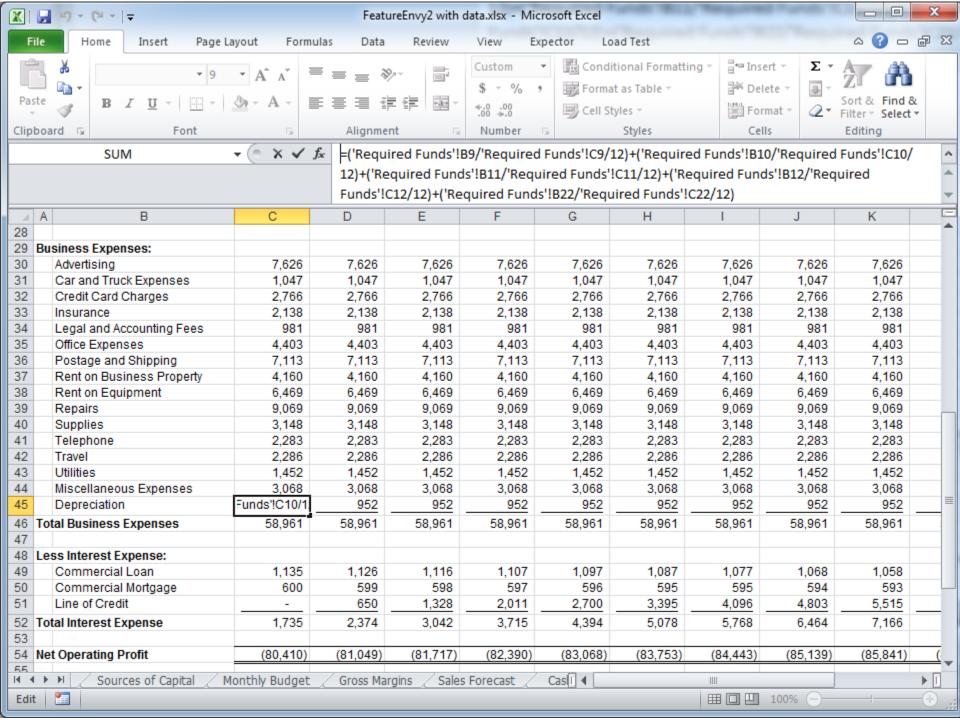
This is the 'feature envy' smell

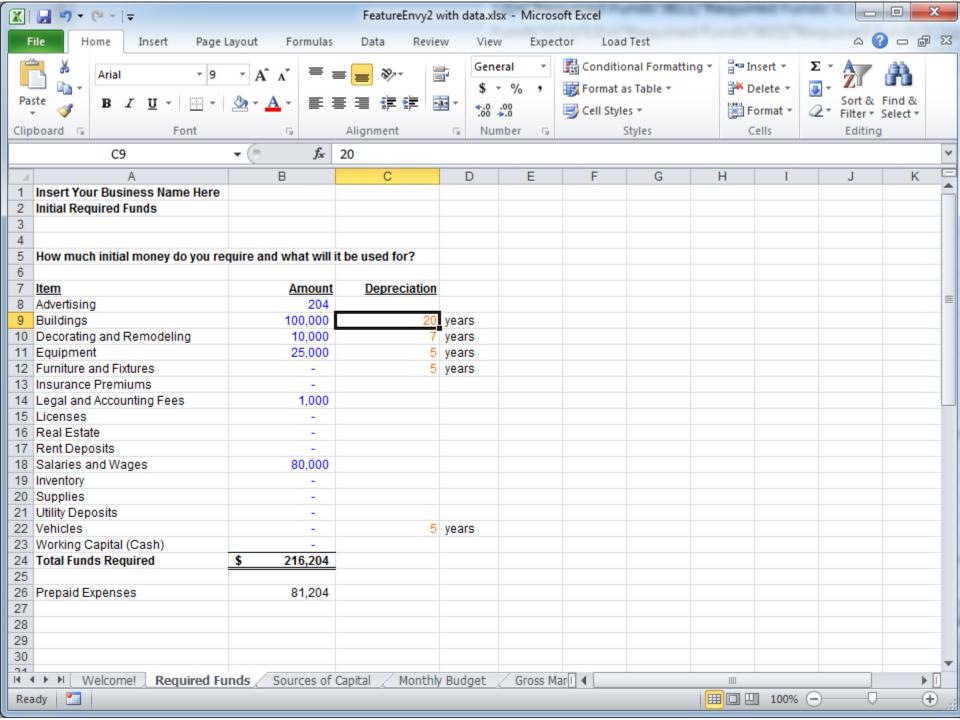


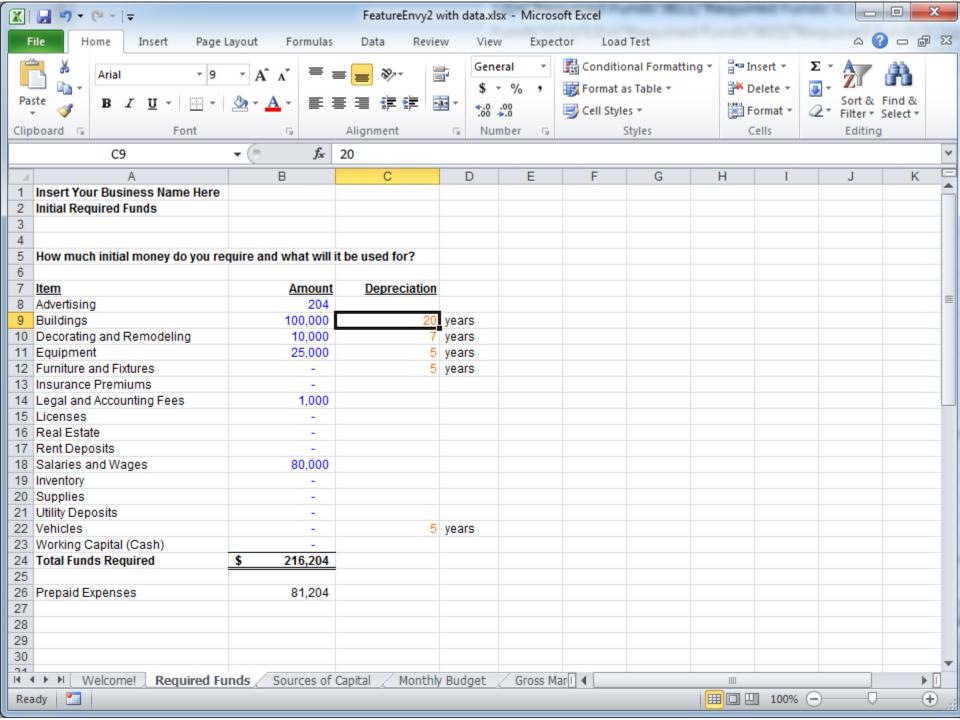
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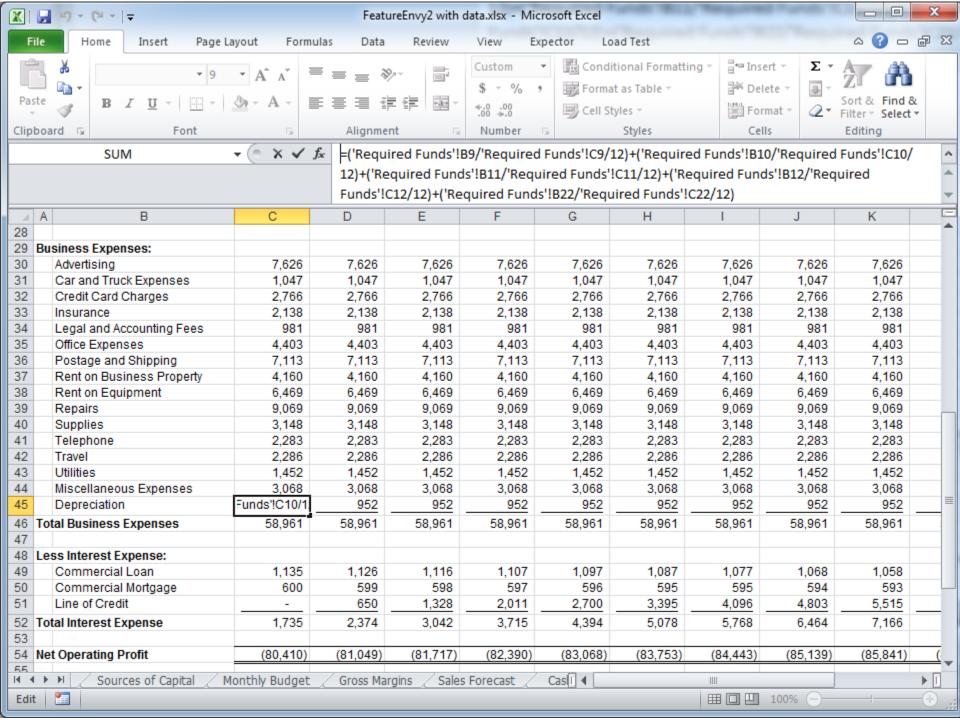


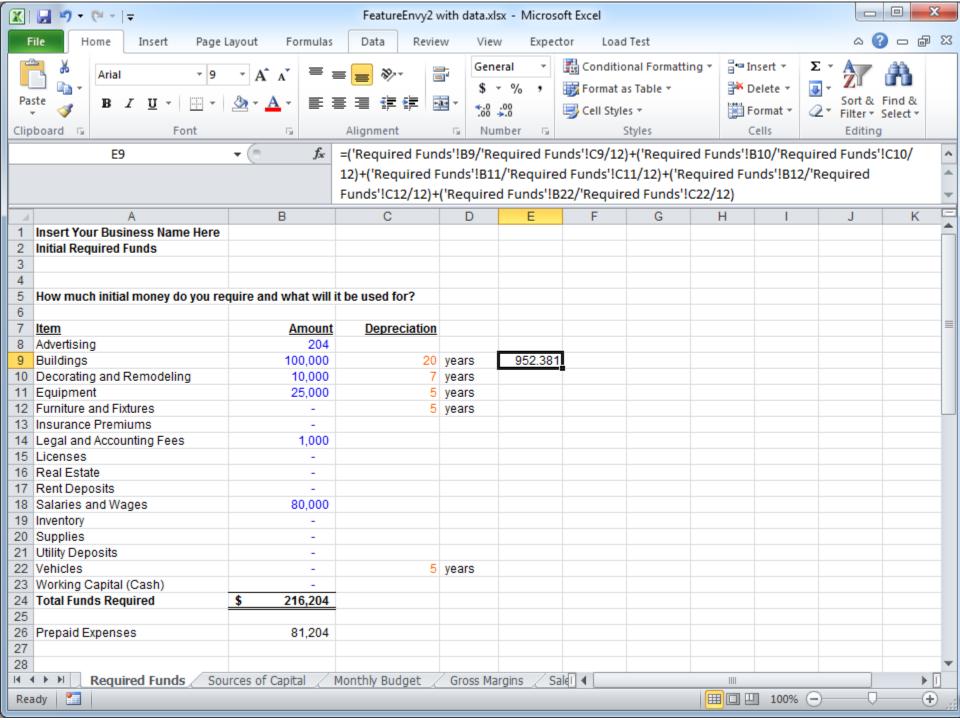


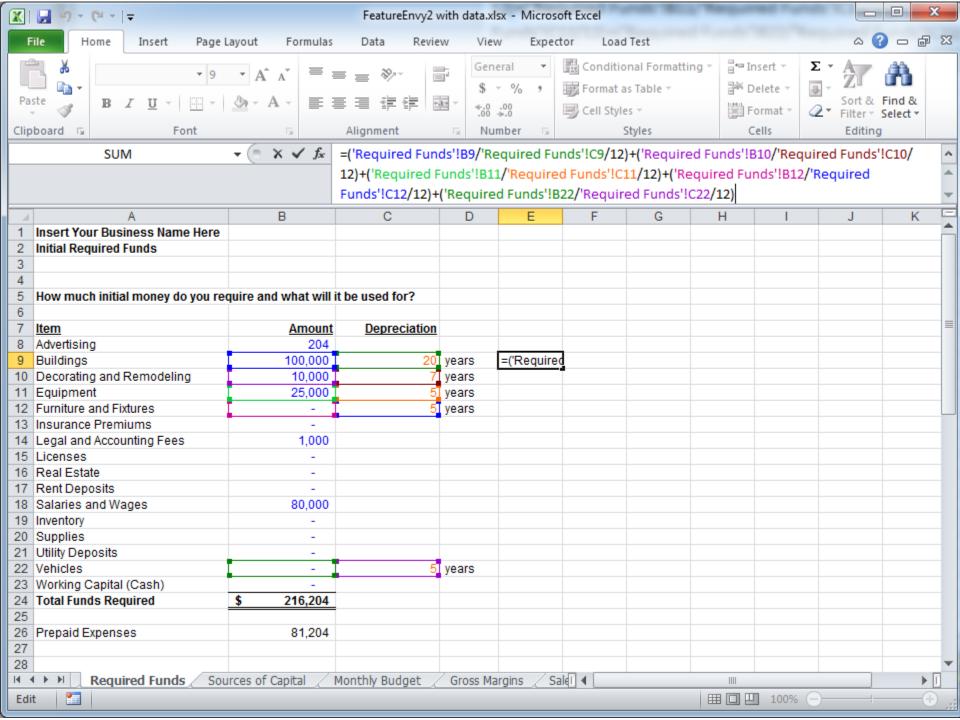


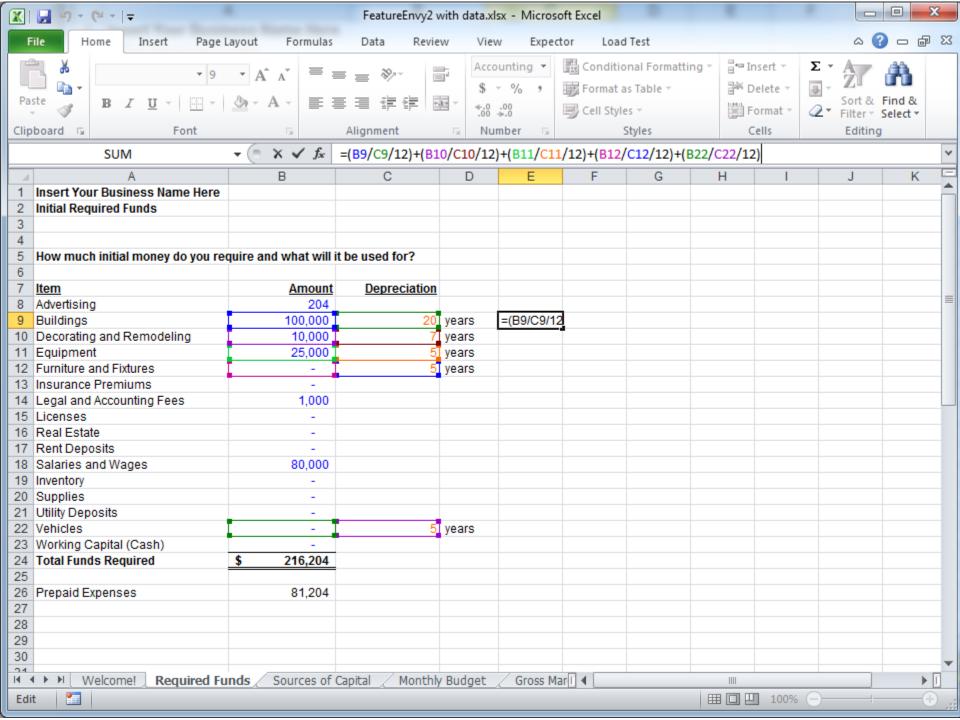


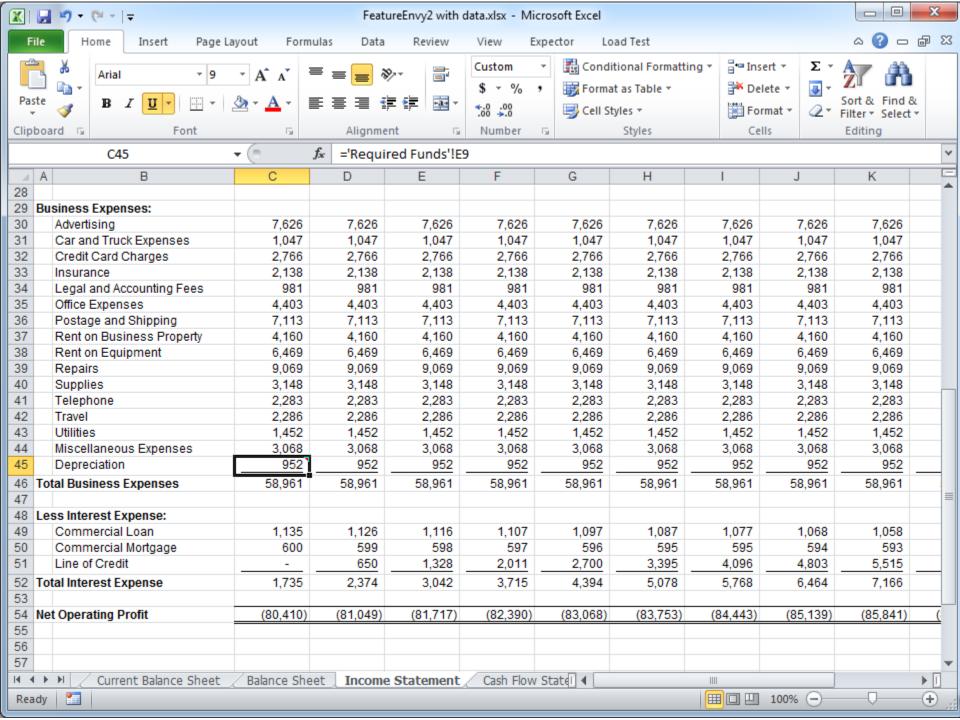






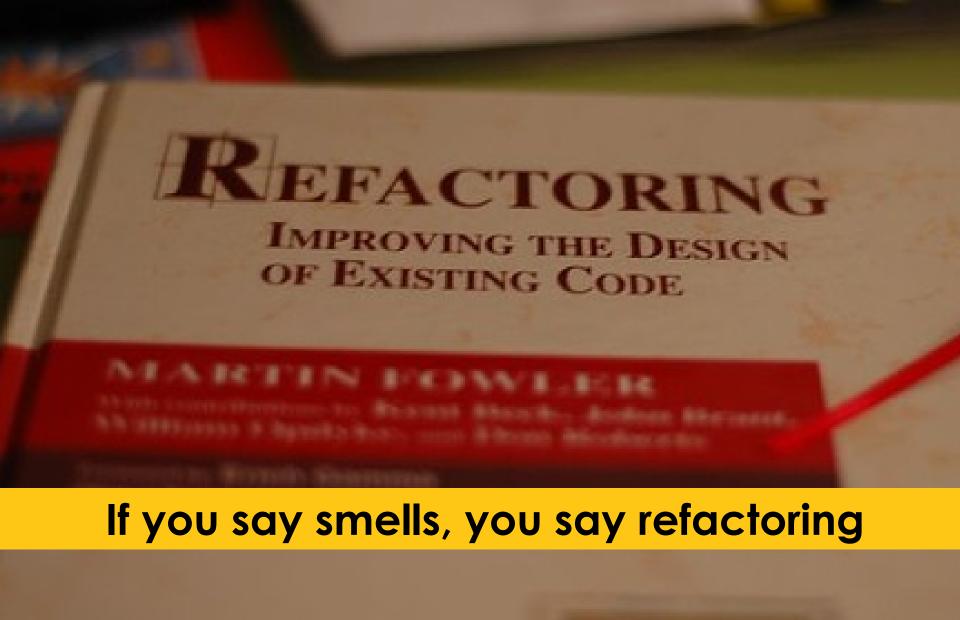




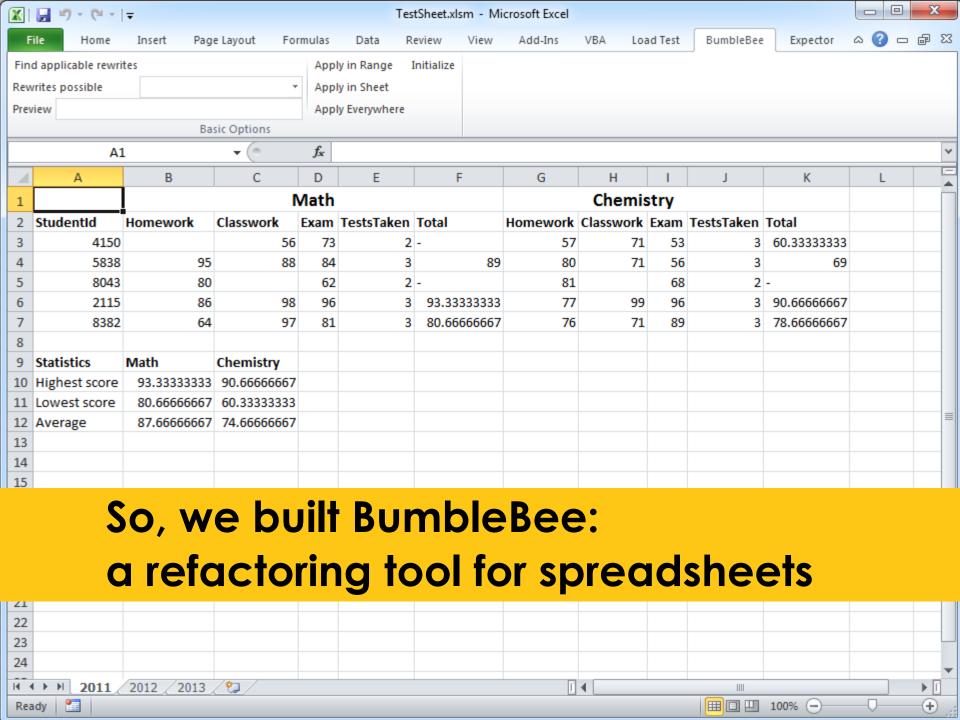


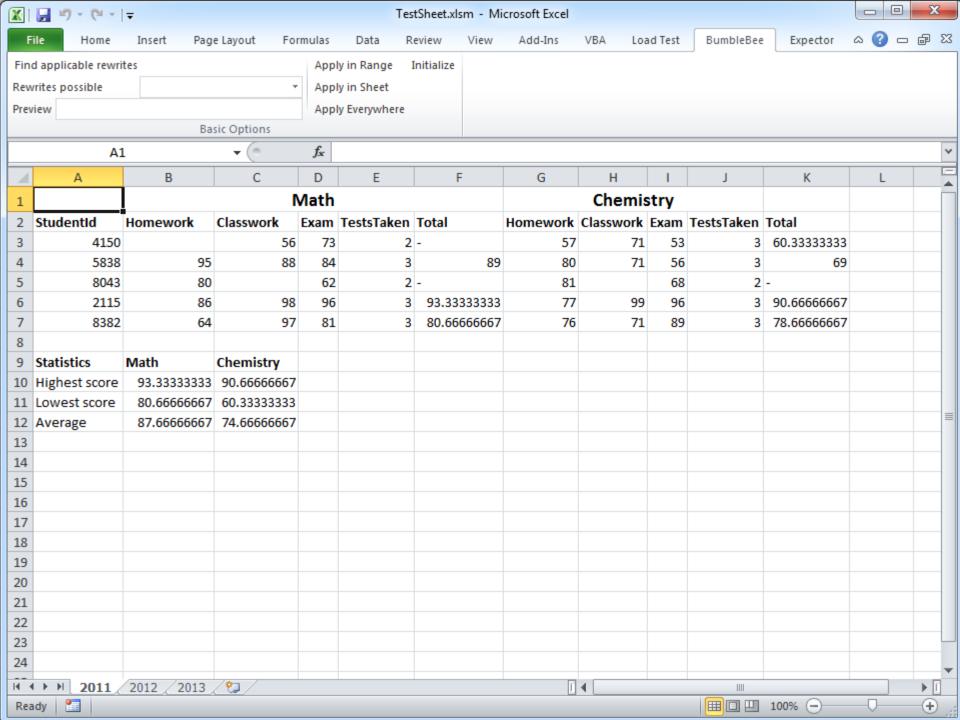


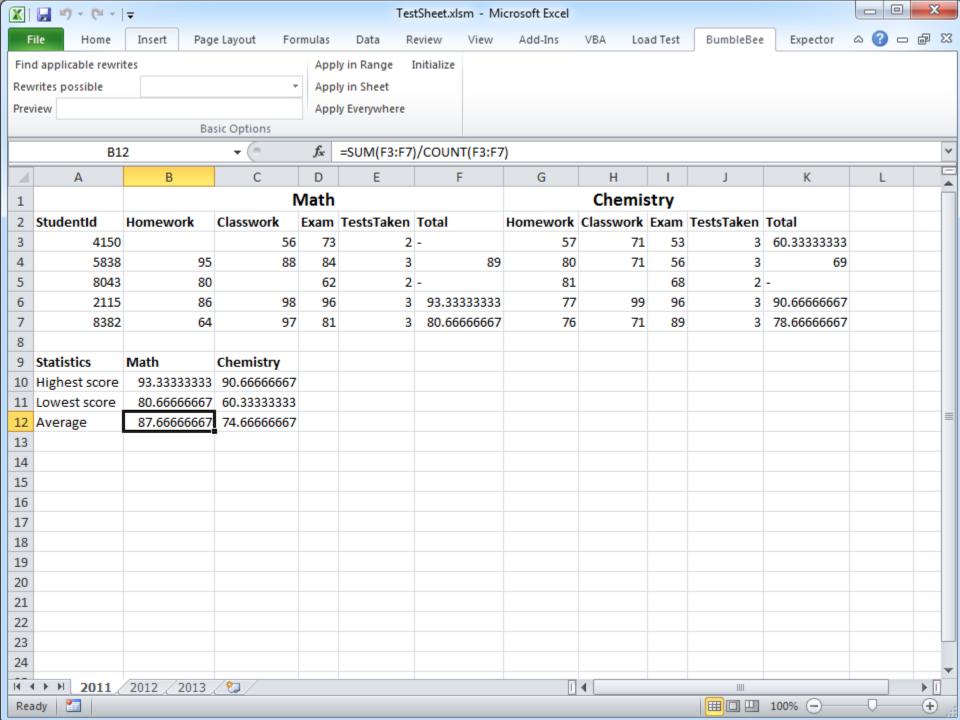
If you say smells, you say...

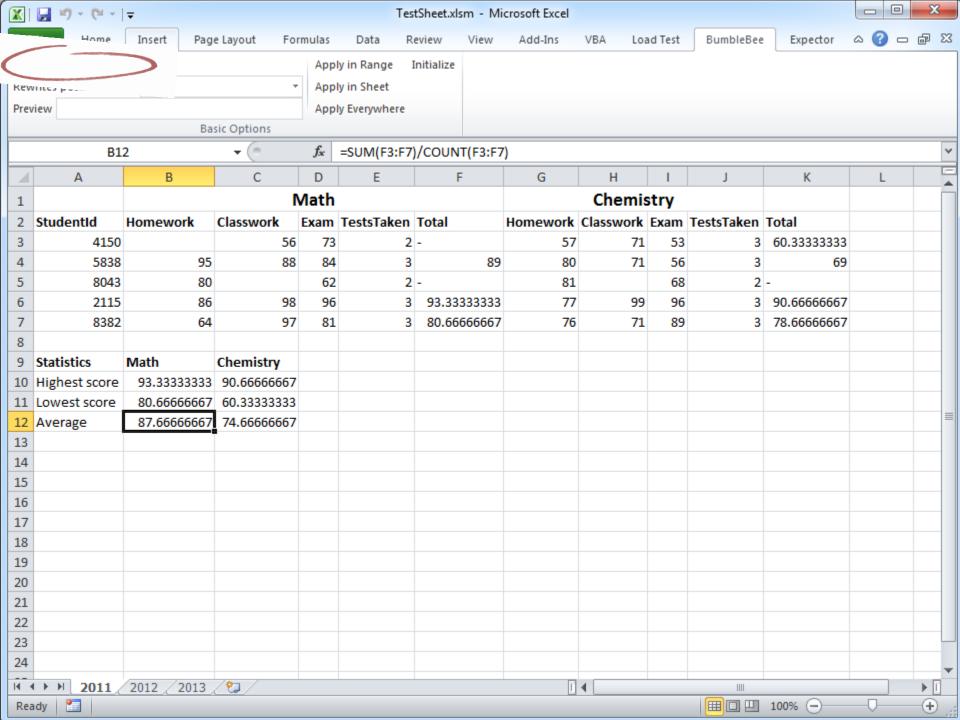


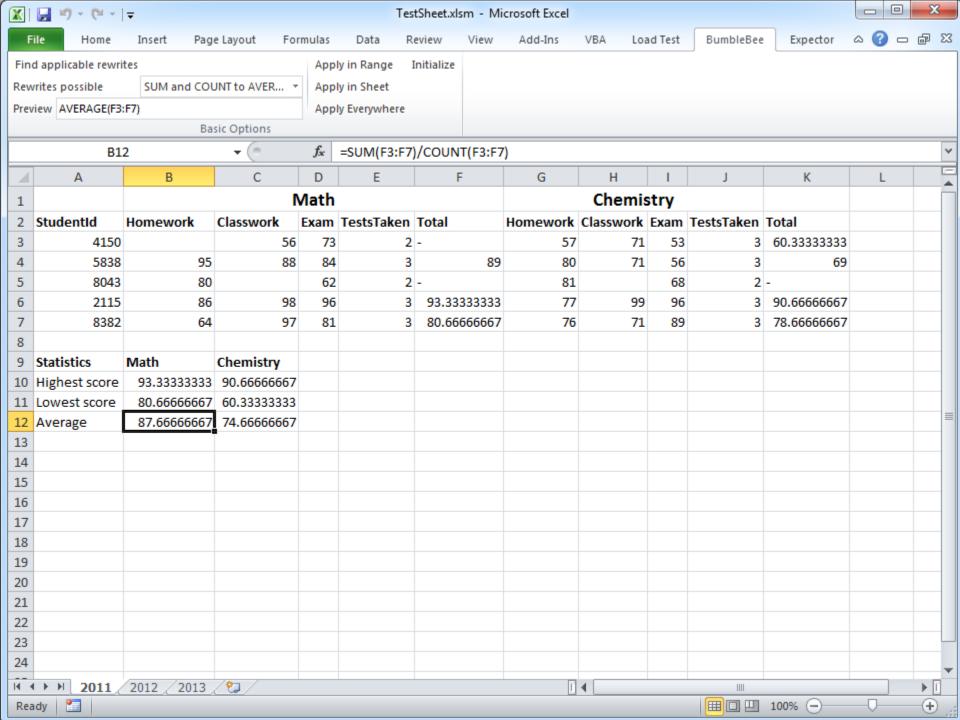


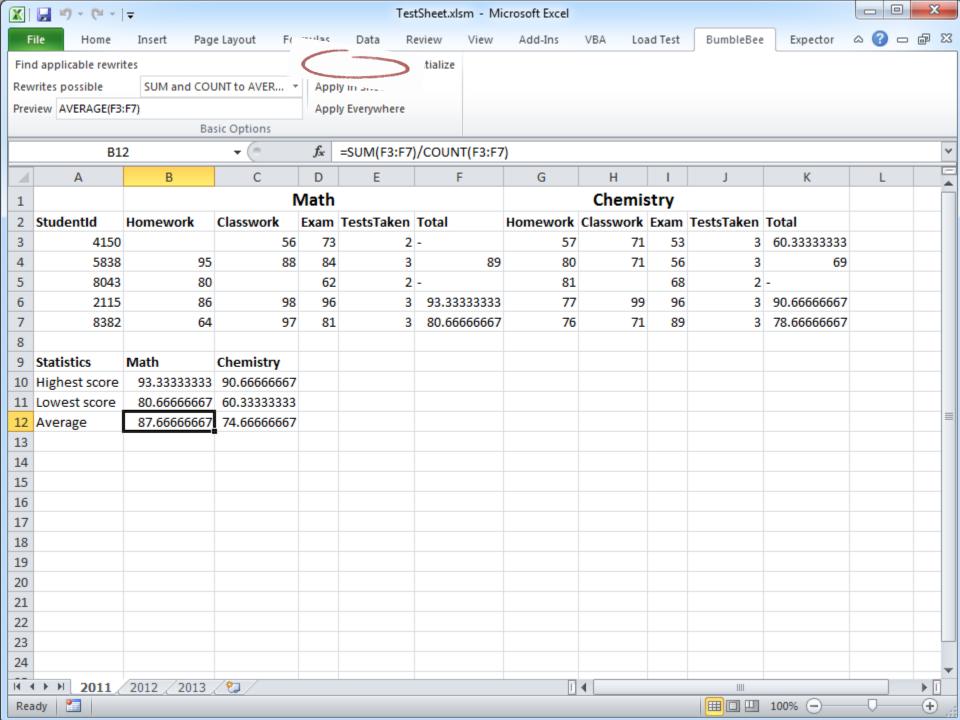


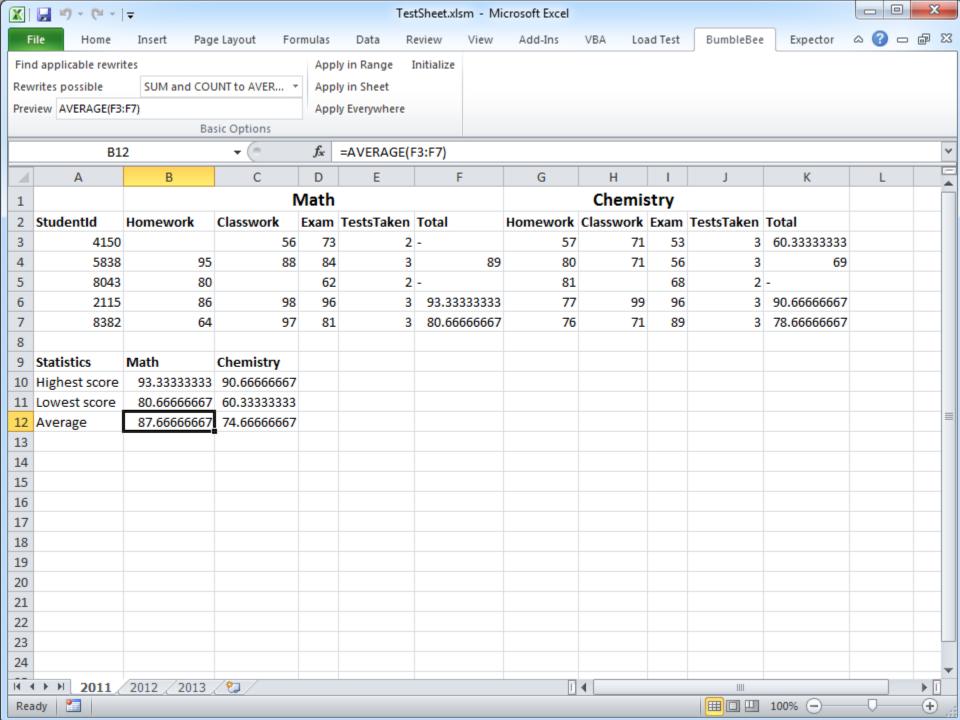


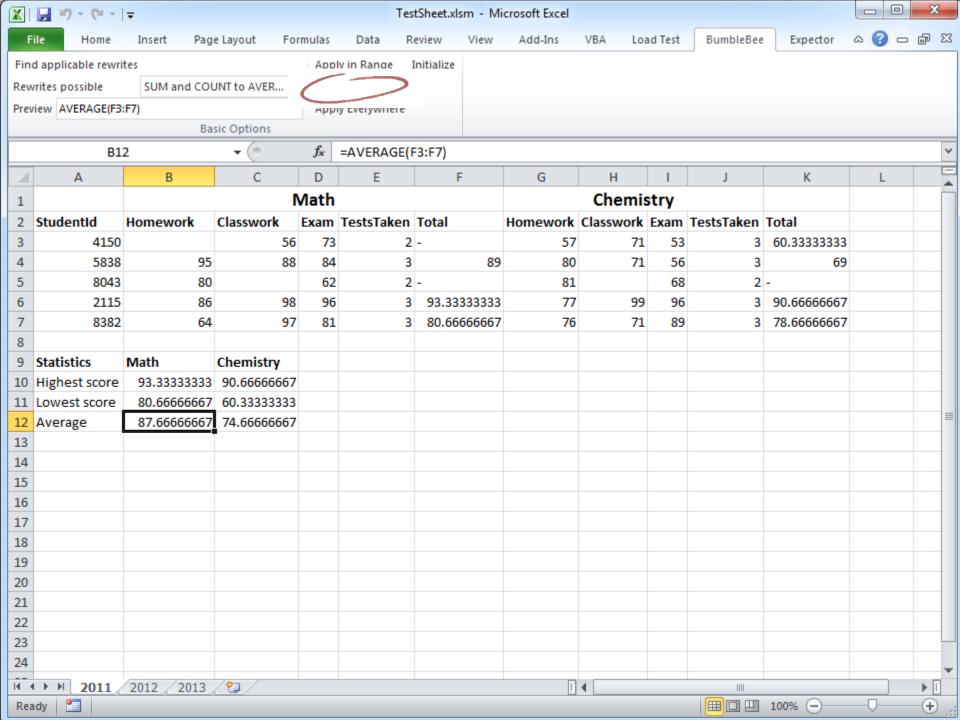


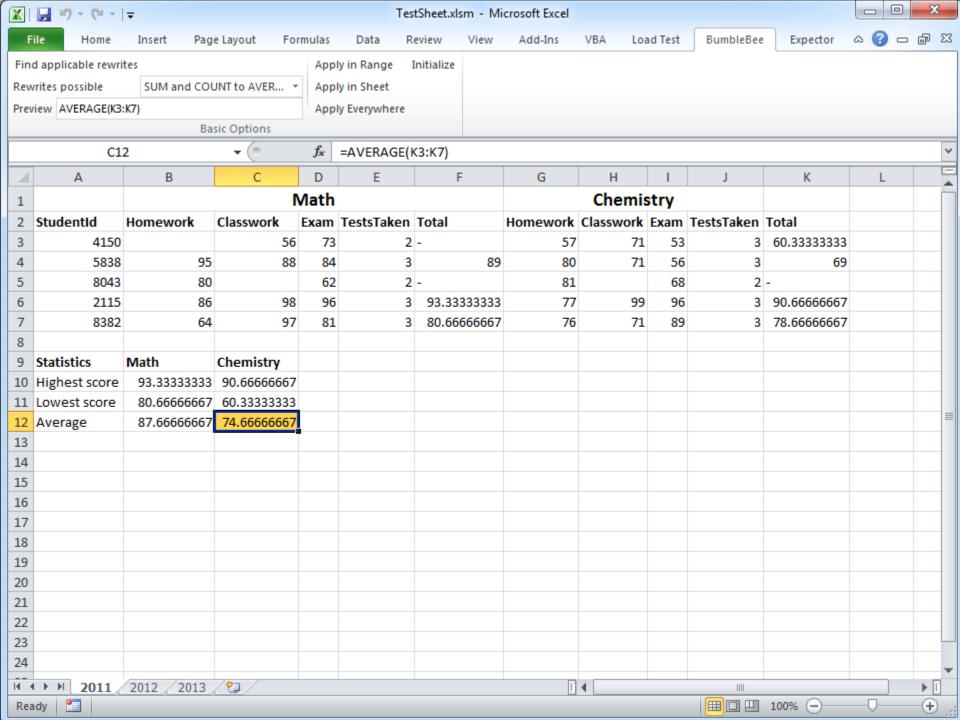


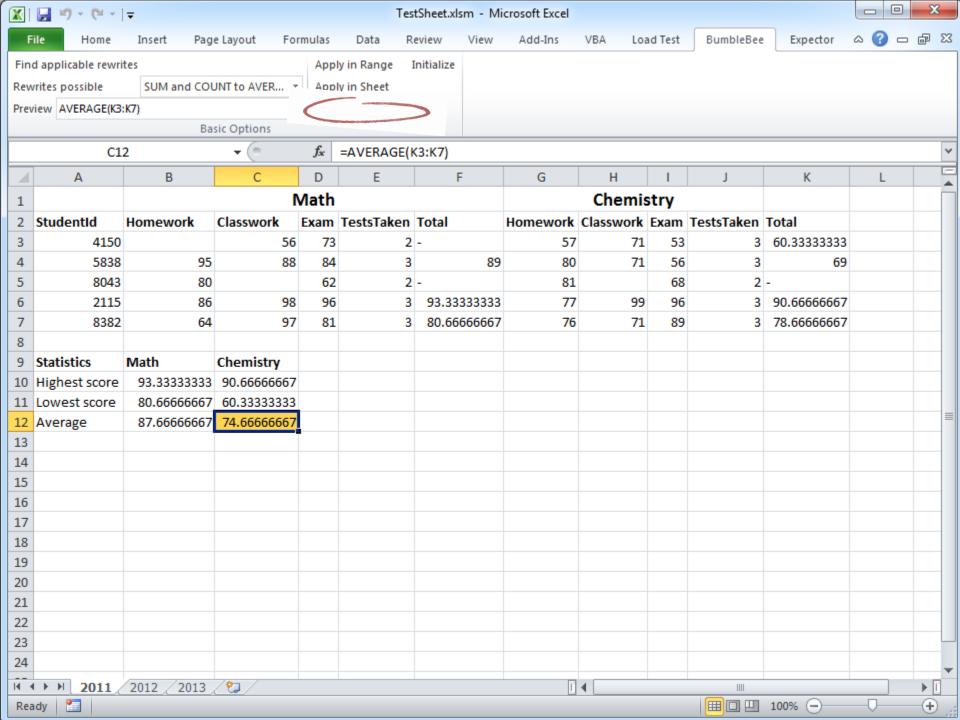


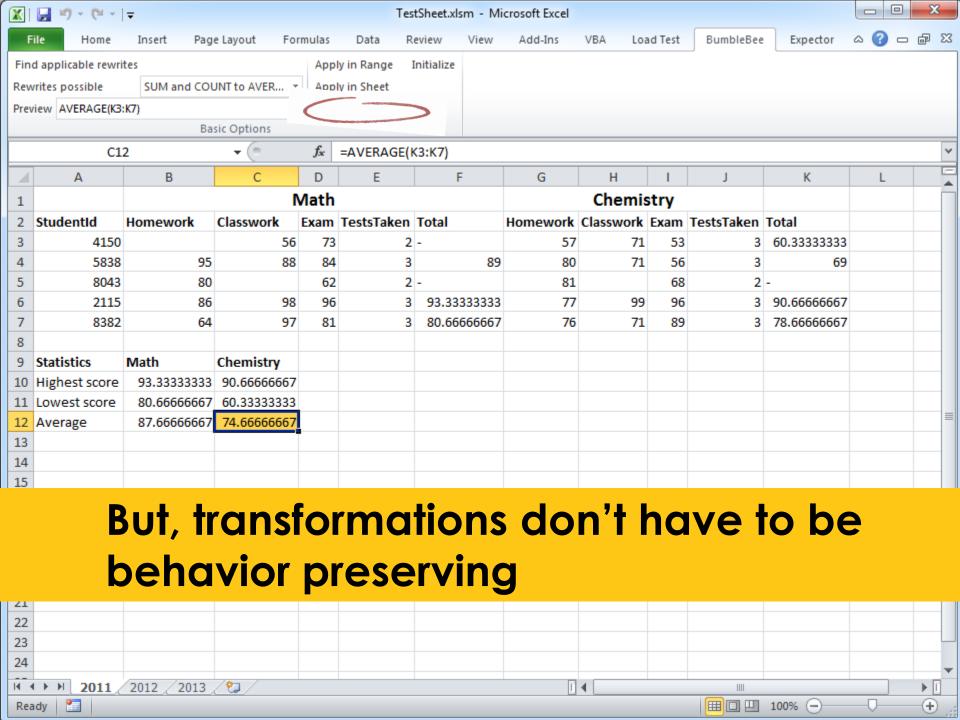


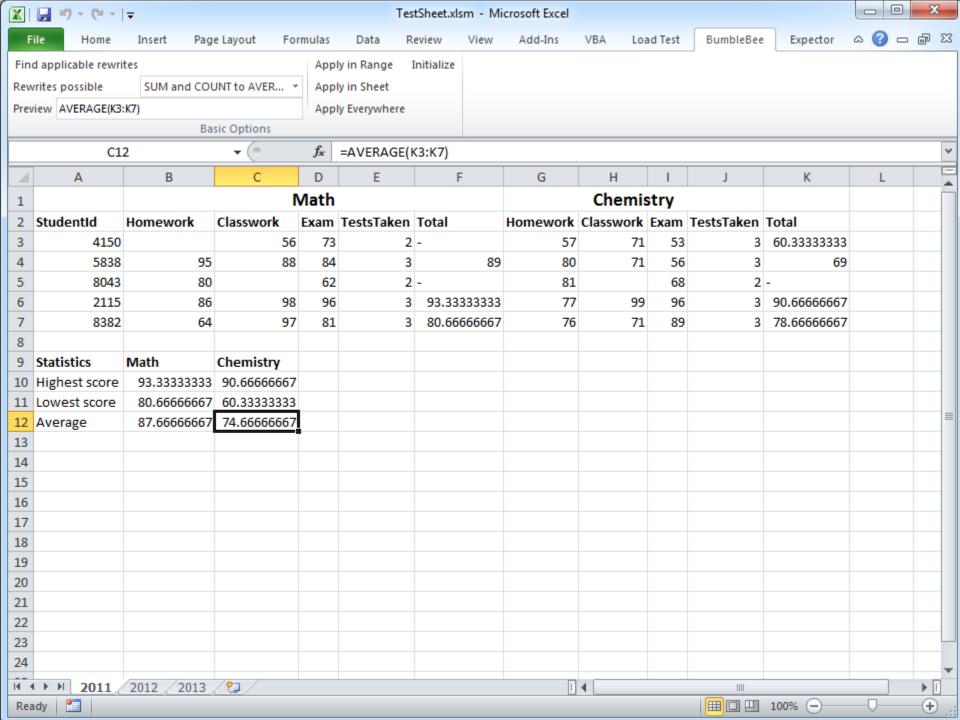


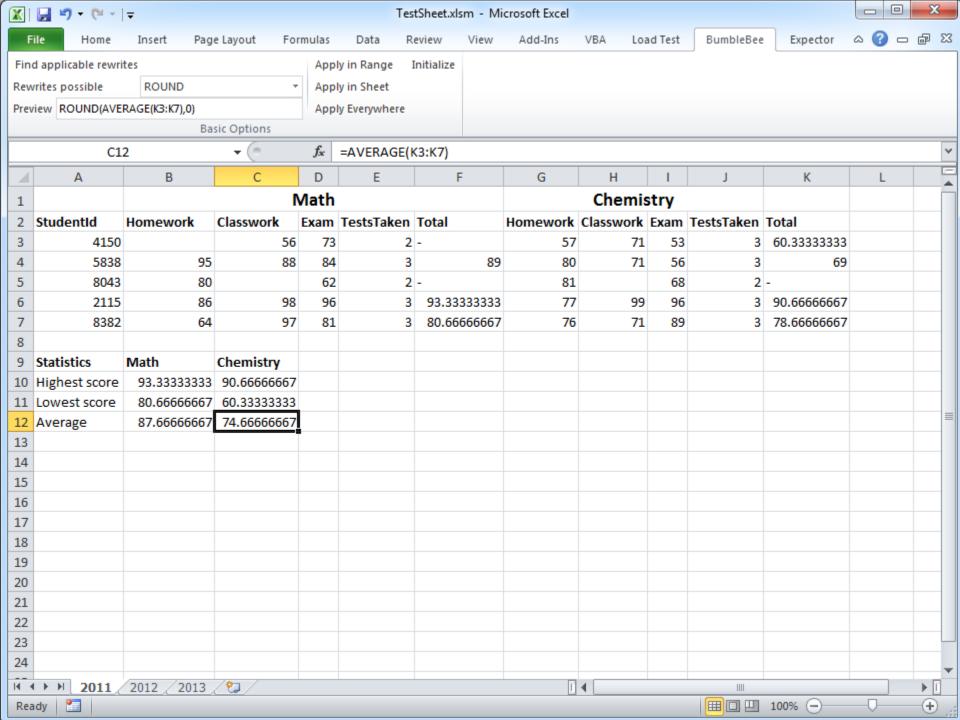


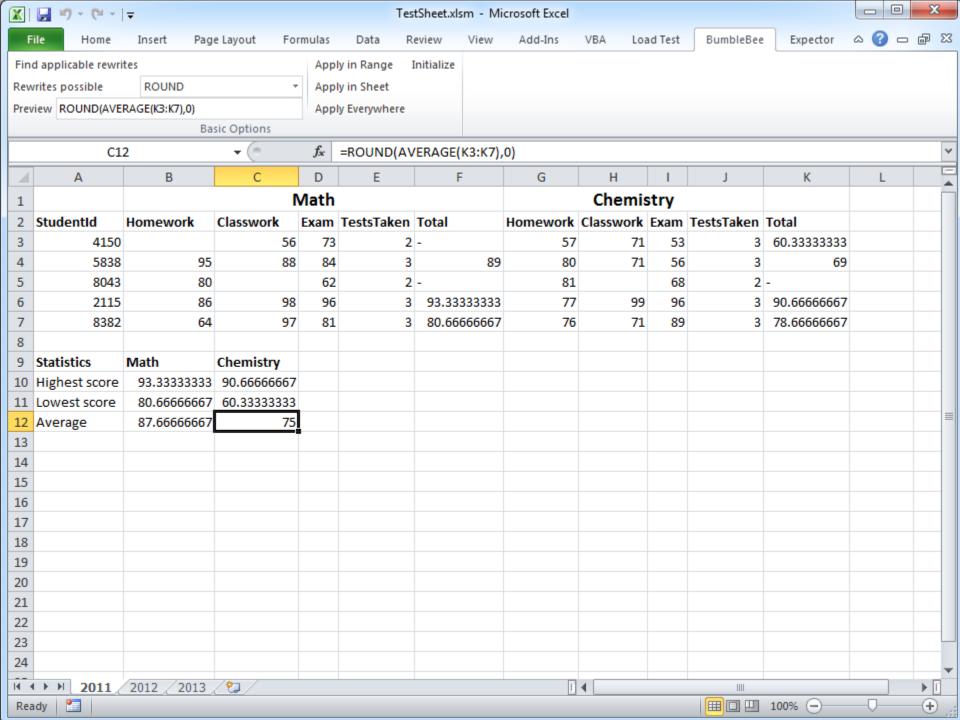


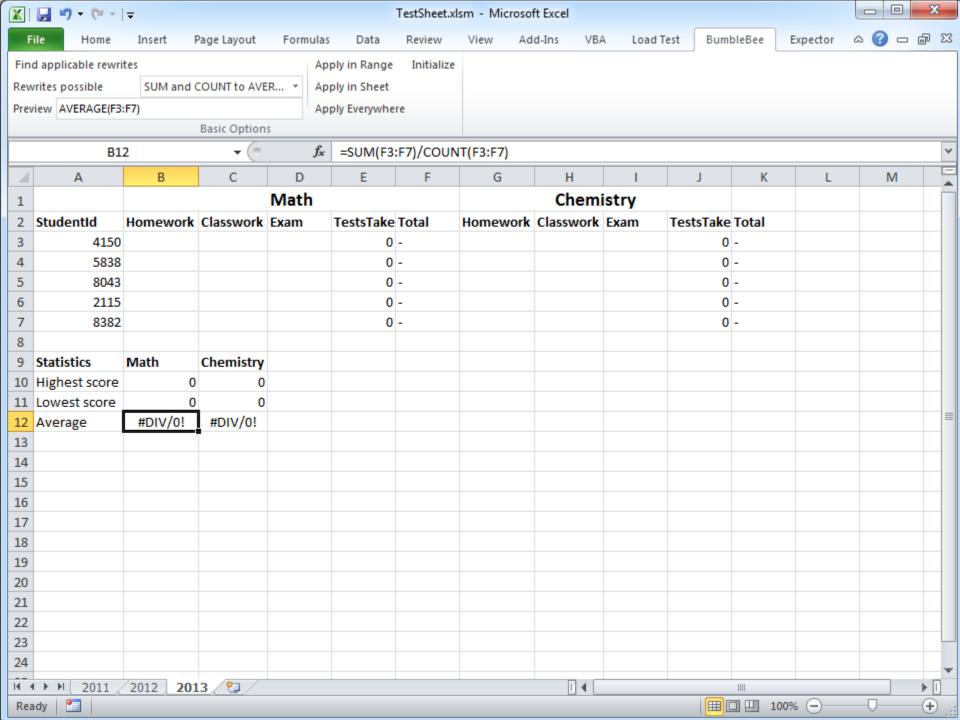


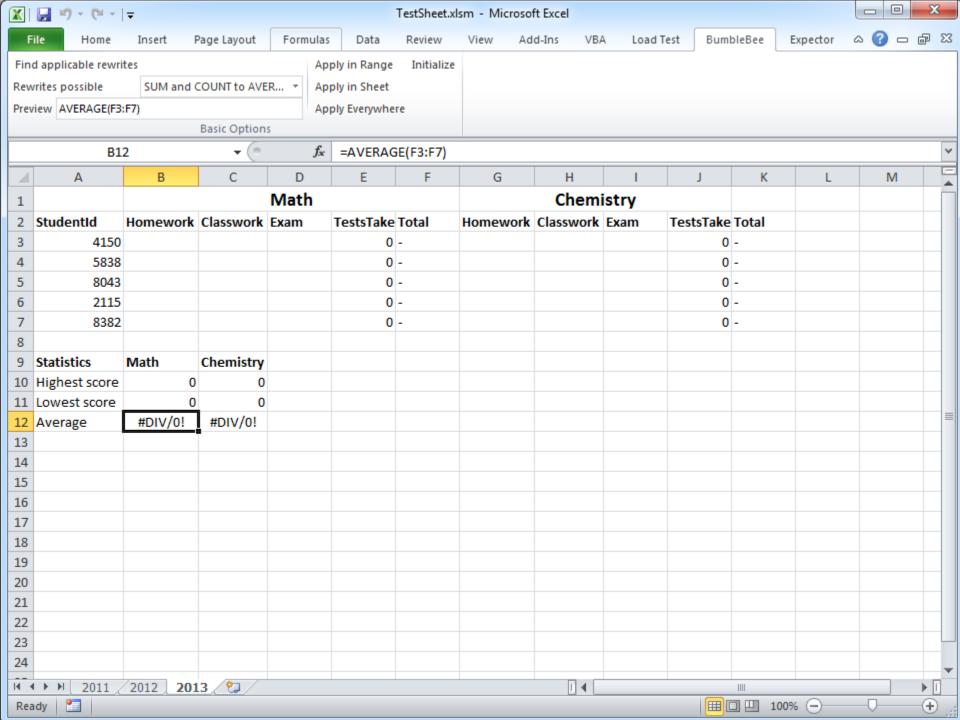


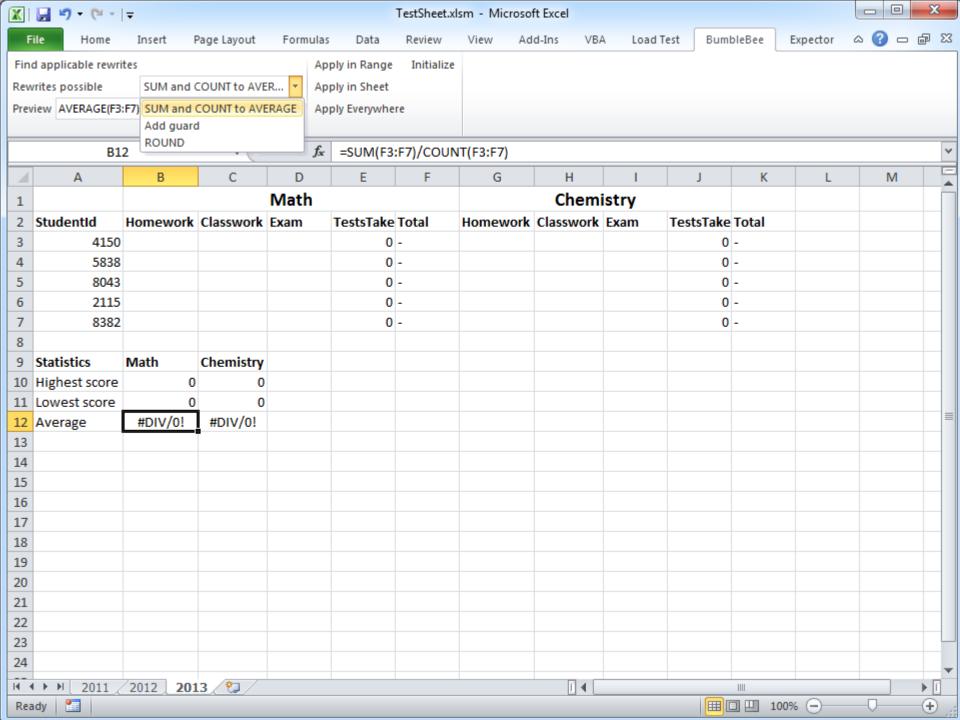


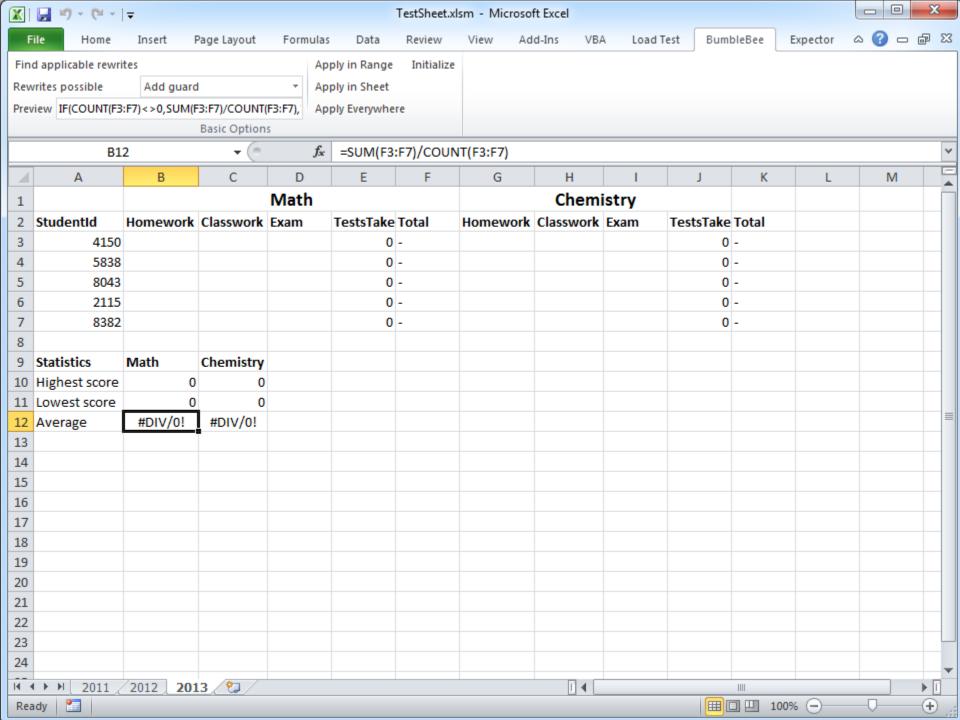


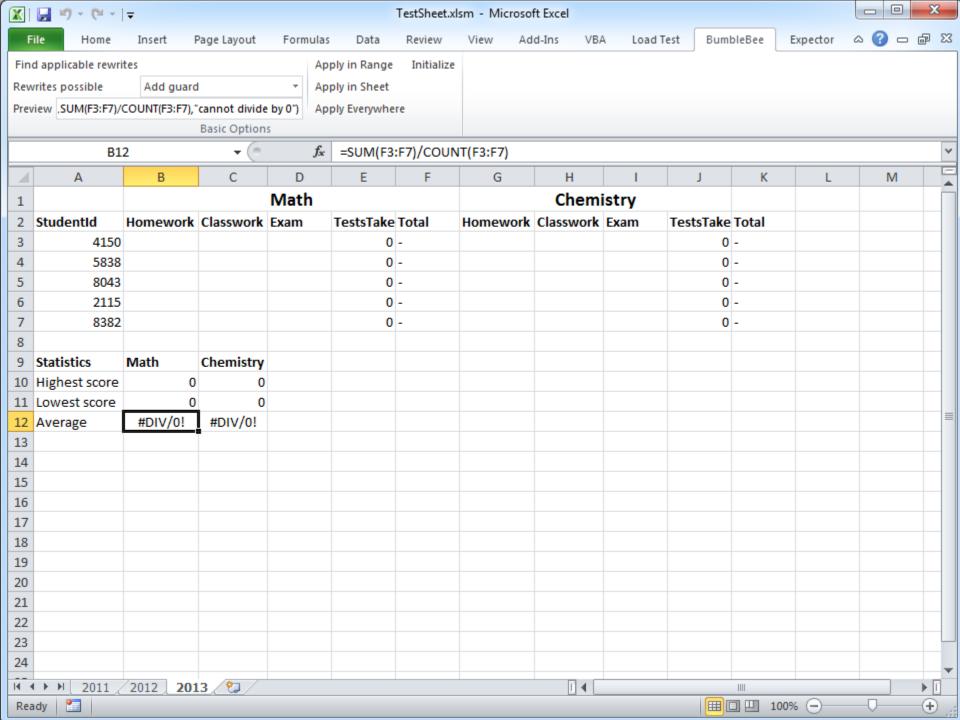


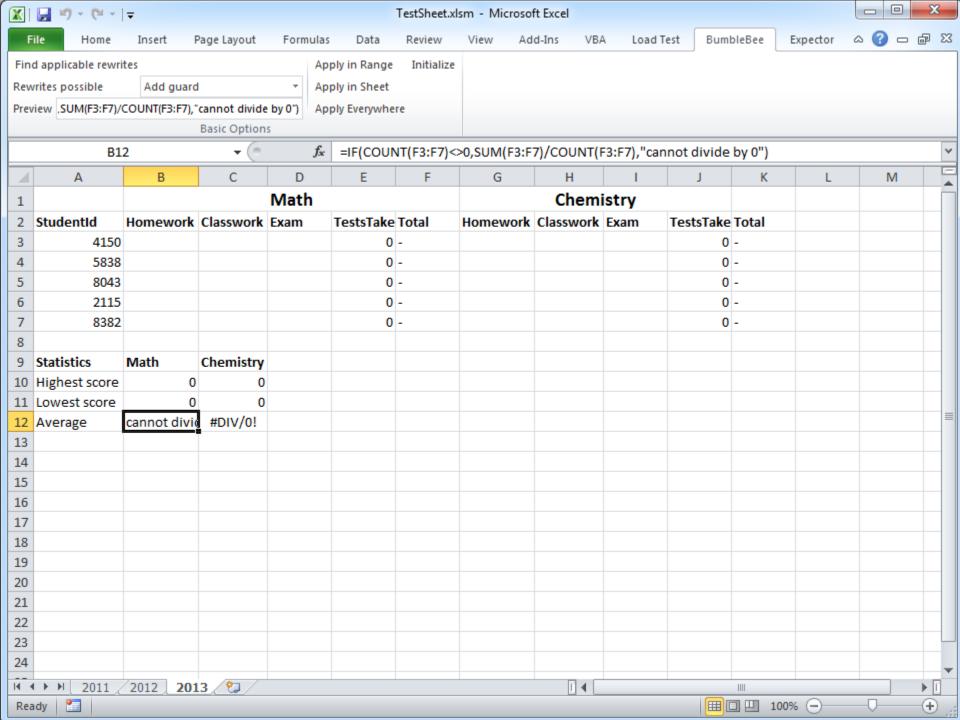


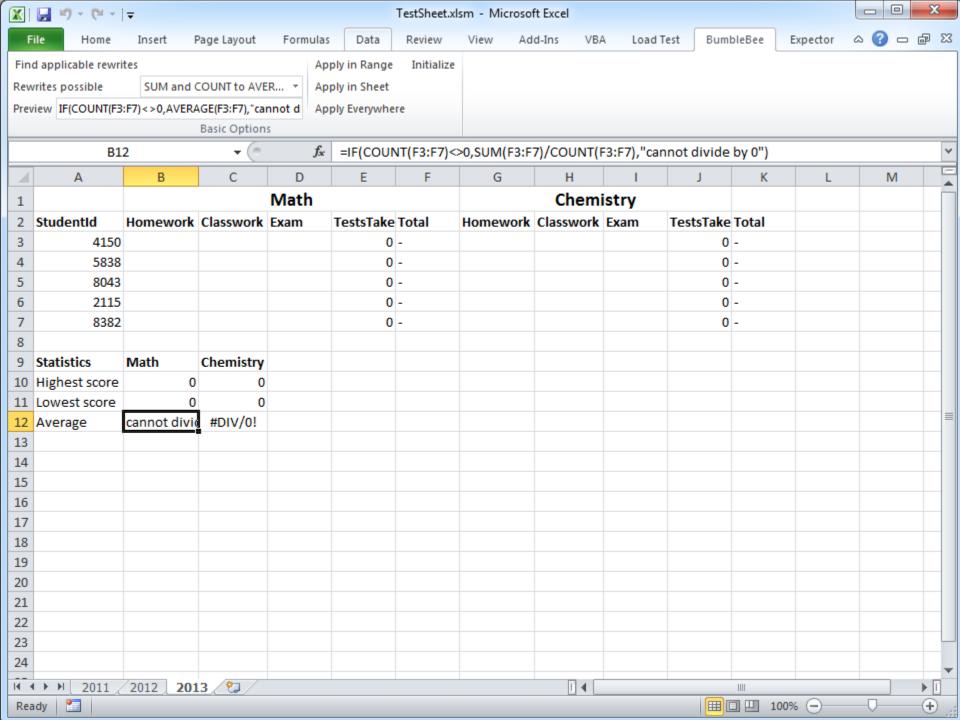


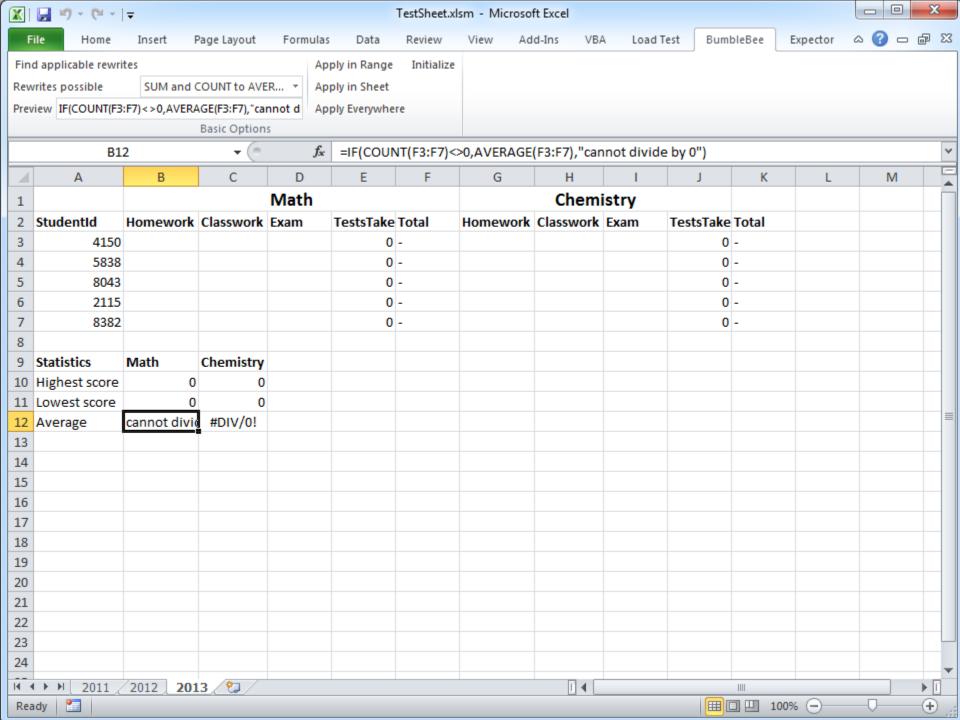


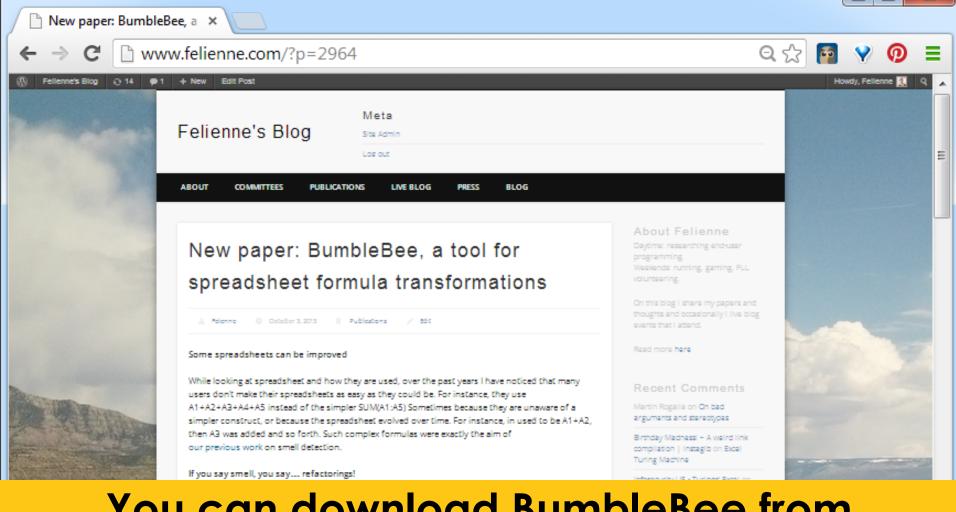






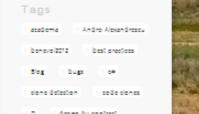




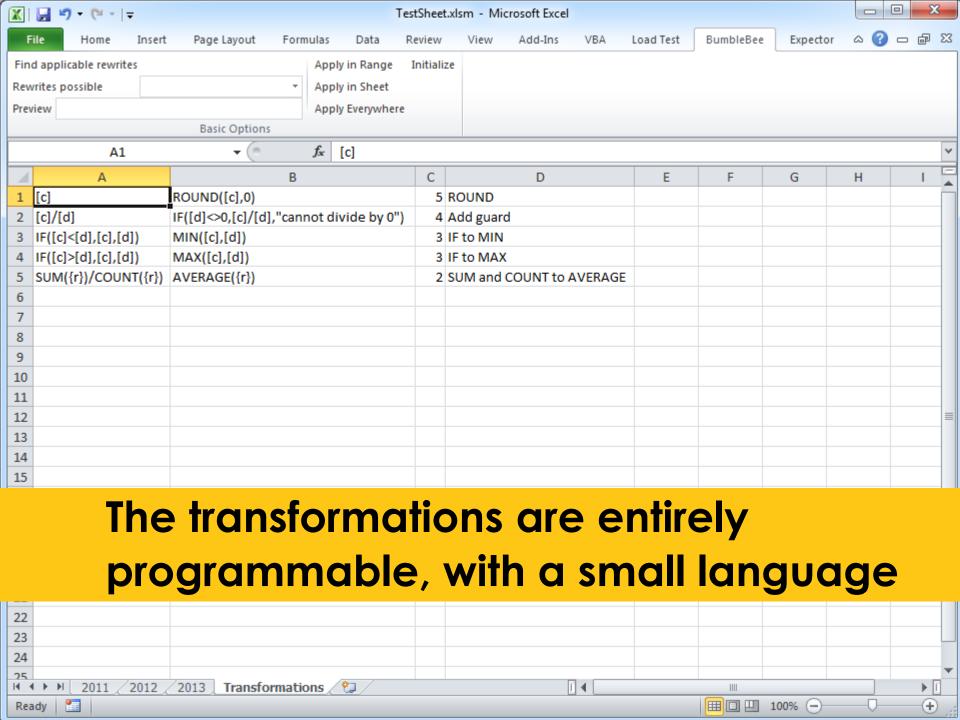


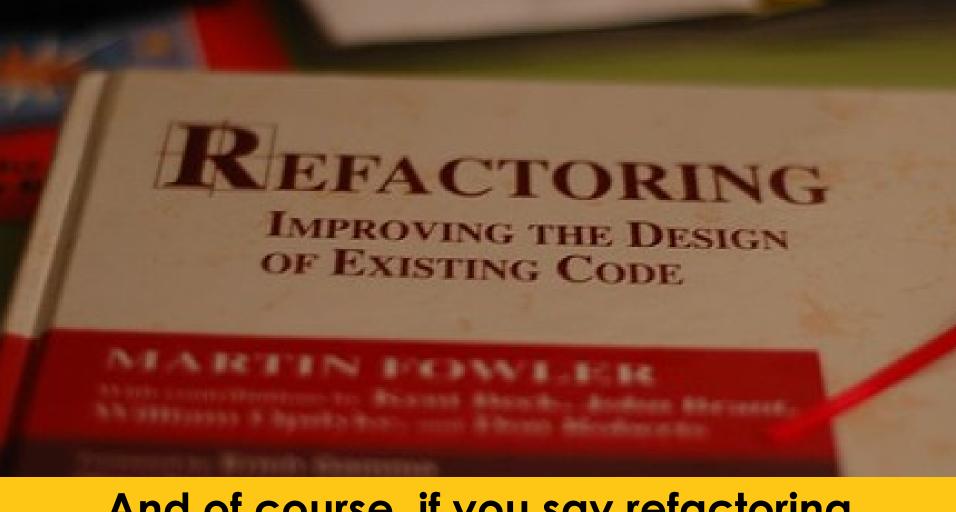
You can download BumbleBee from my website (felienne.com)







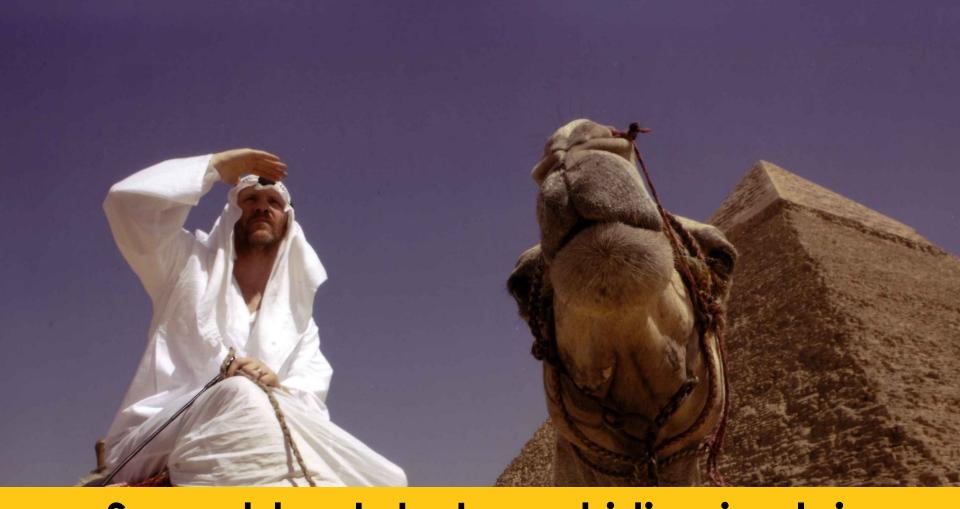




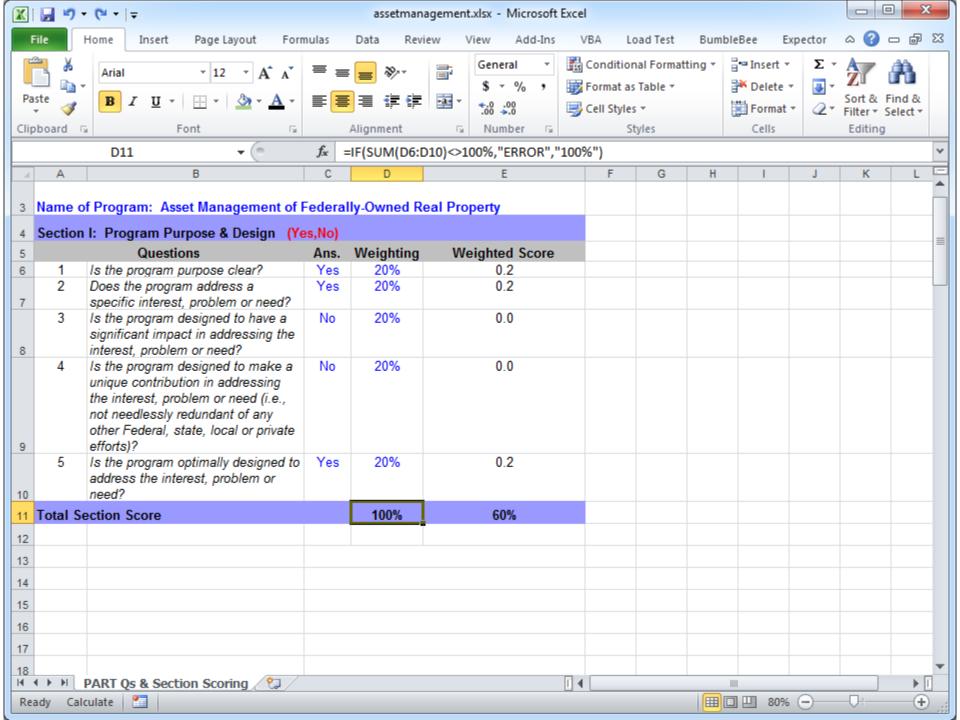
And of course, if you say refactoring, you say ...

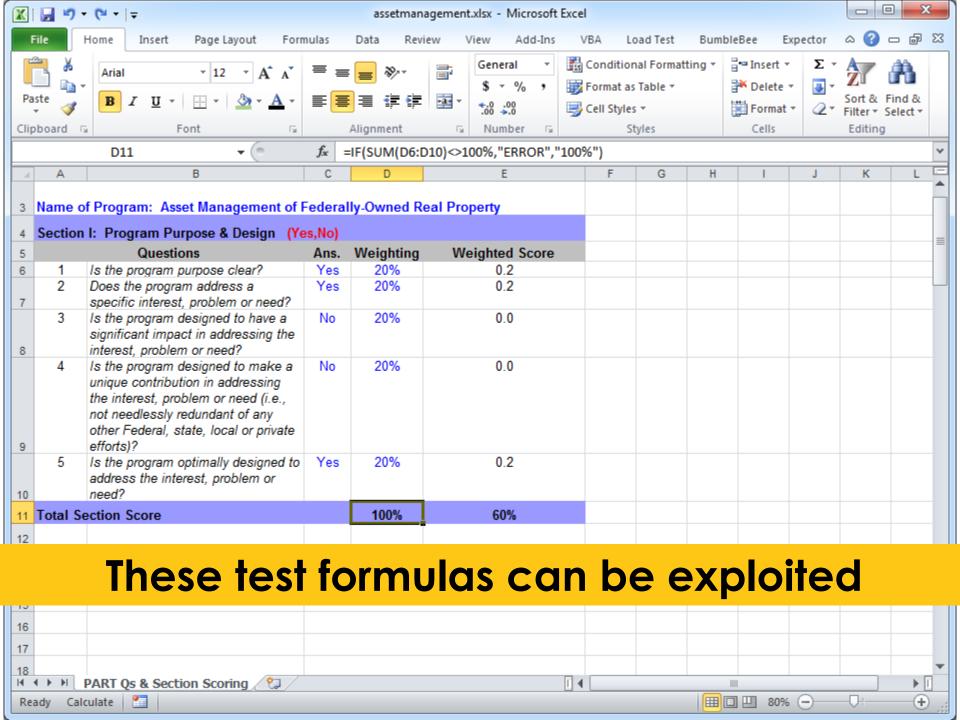


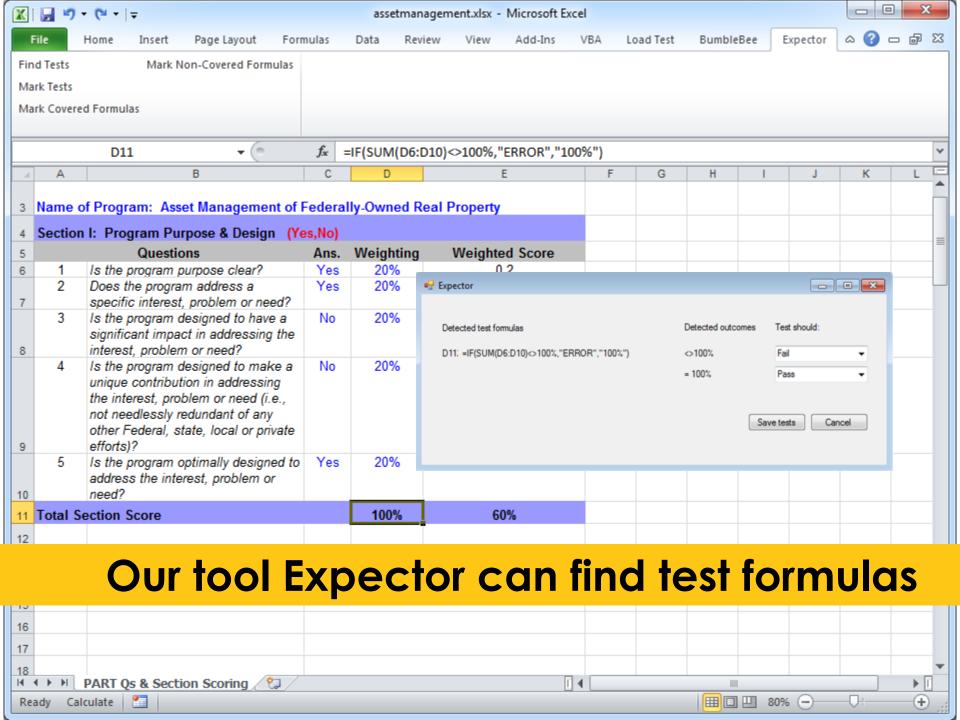
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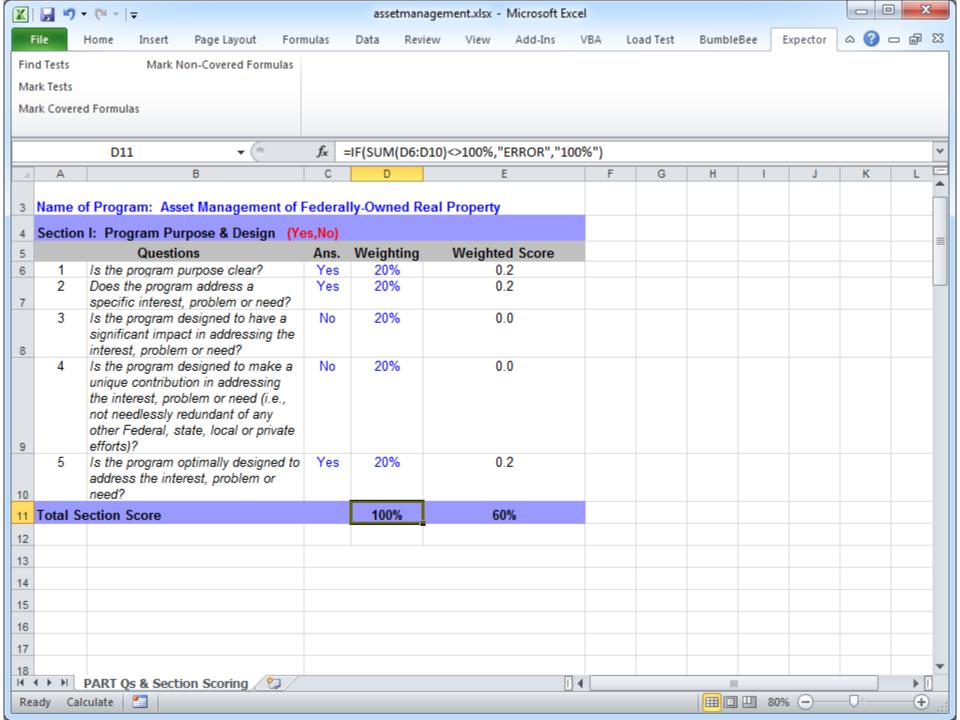


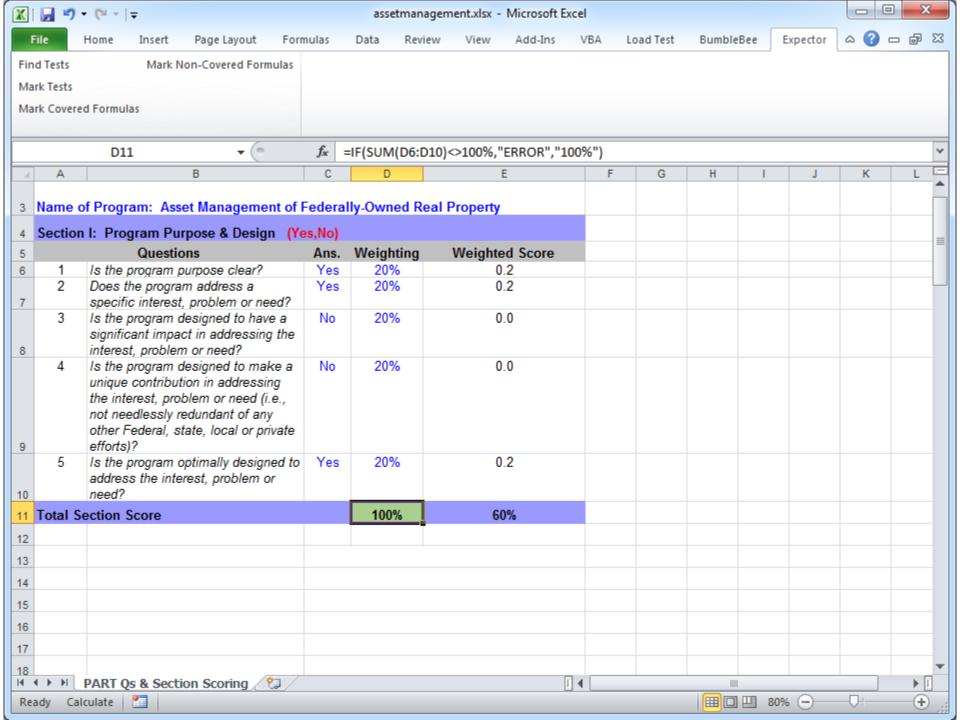
Spreadsheets tests are hiding in plain sight

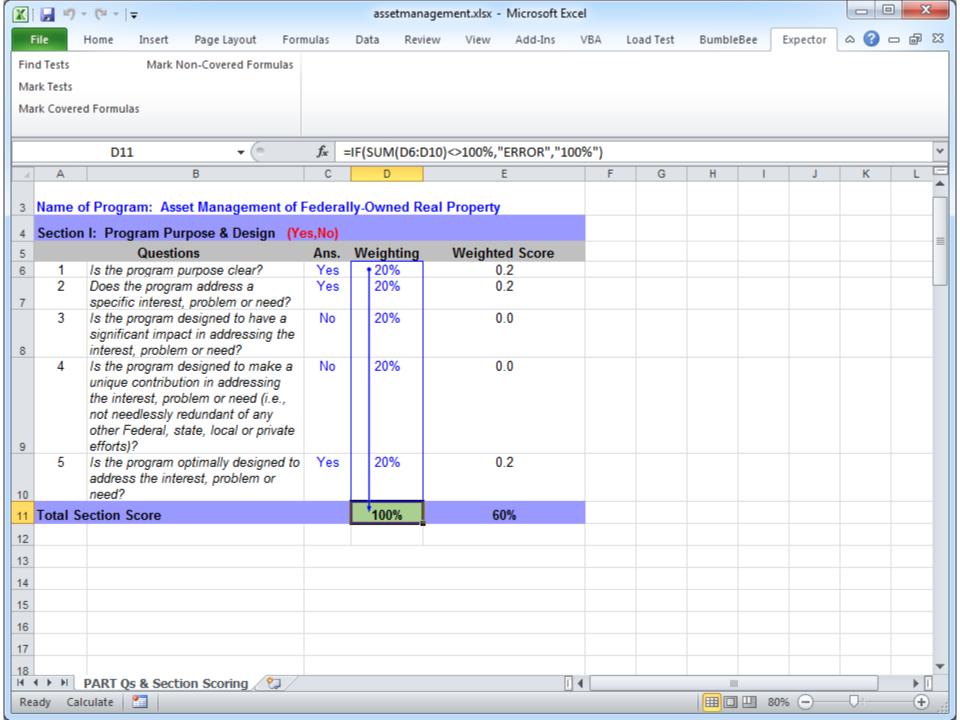


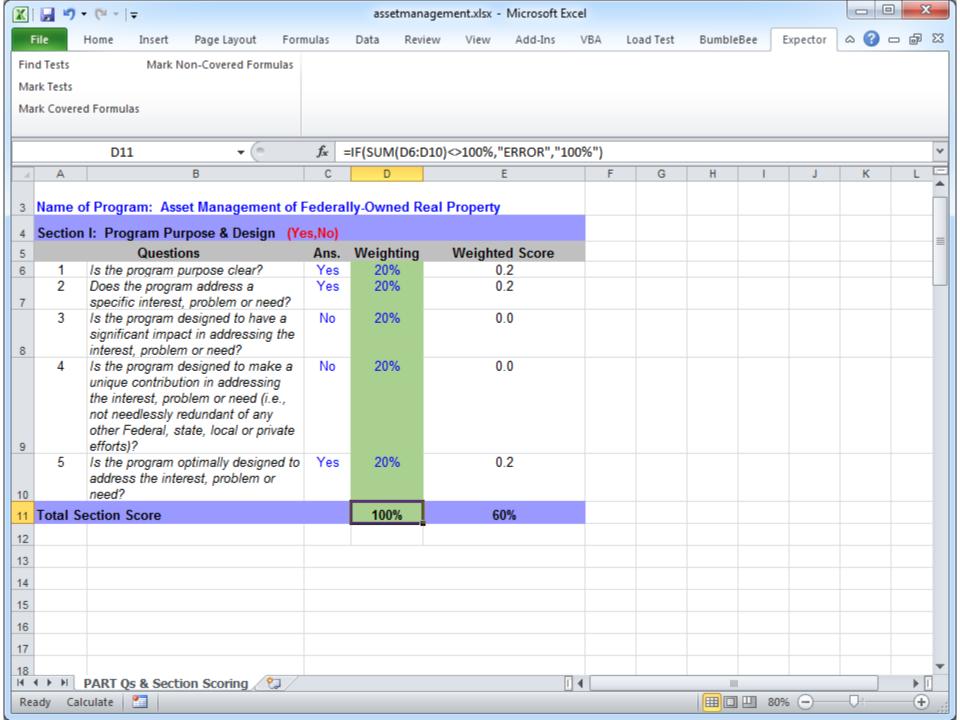


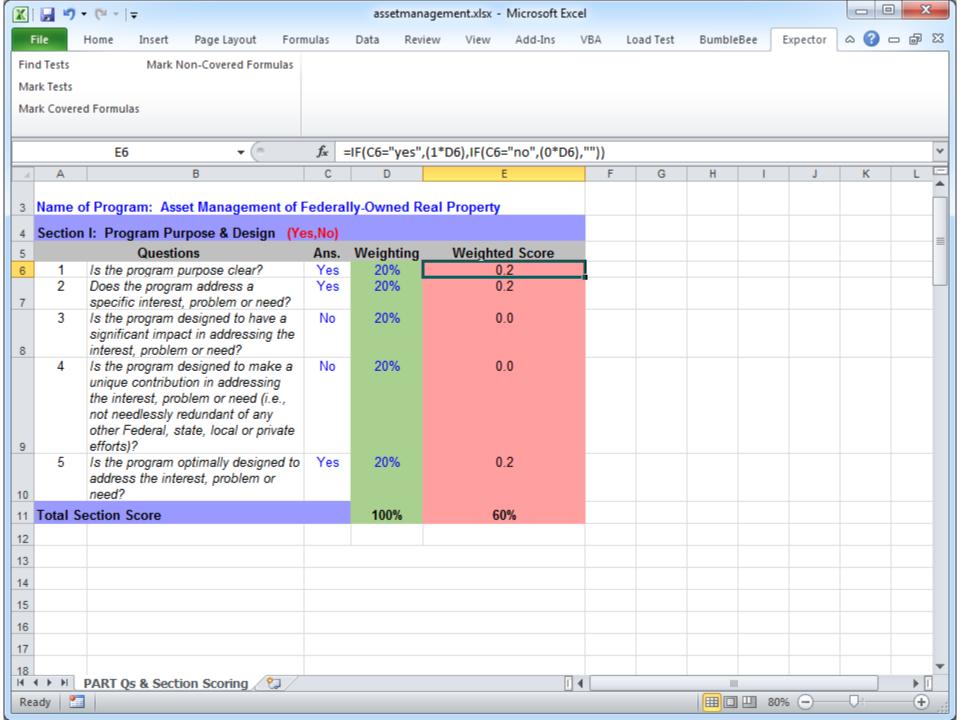


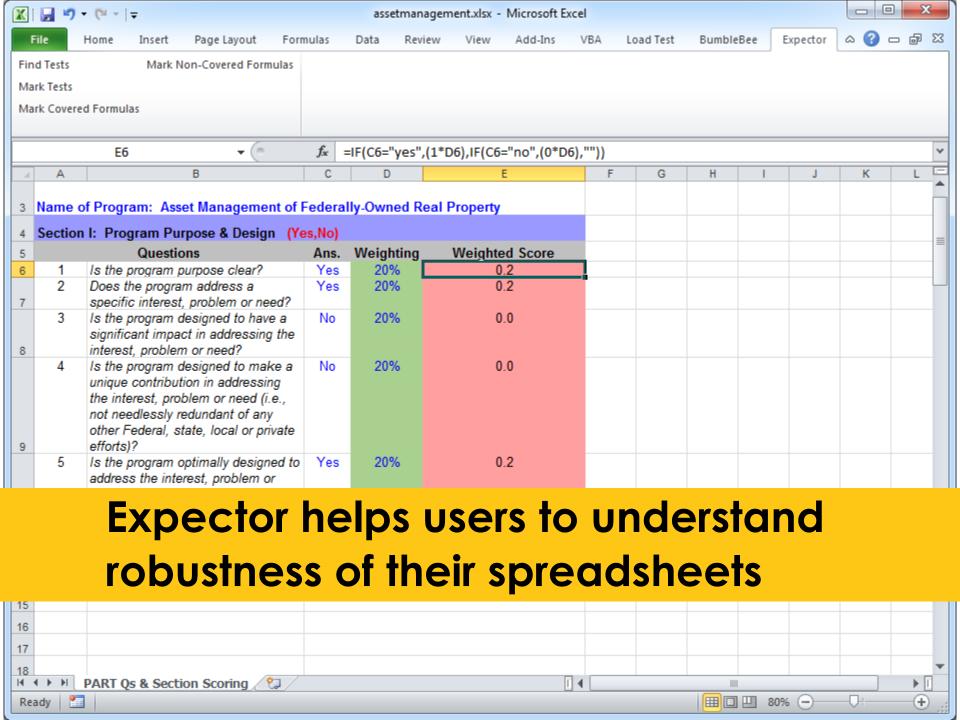




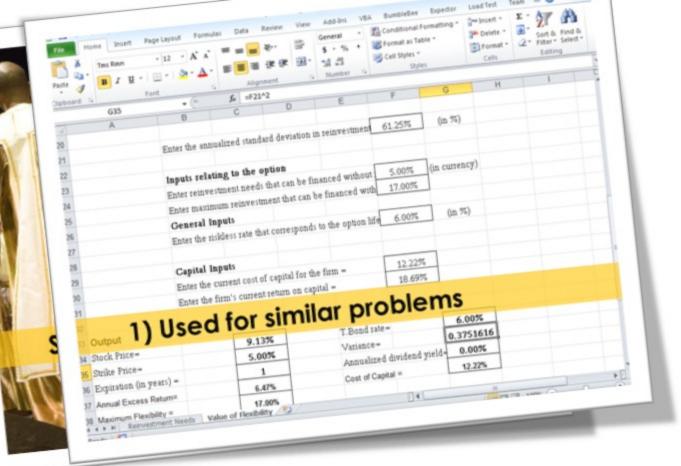


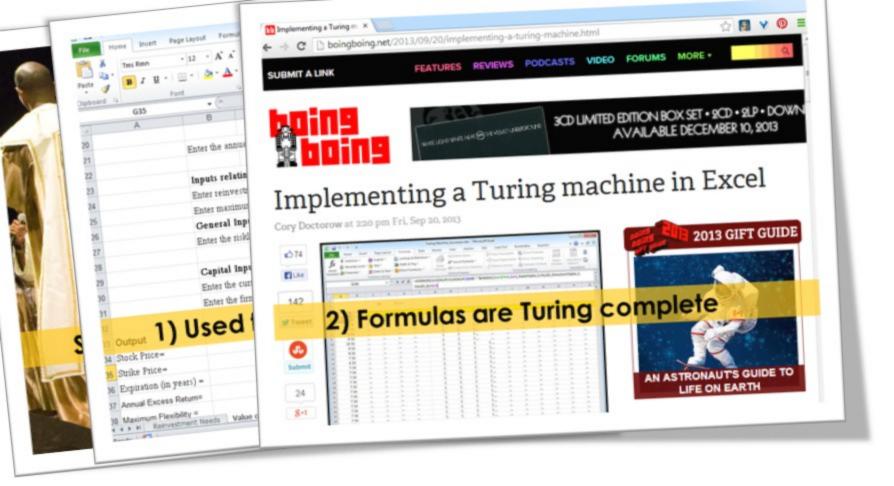












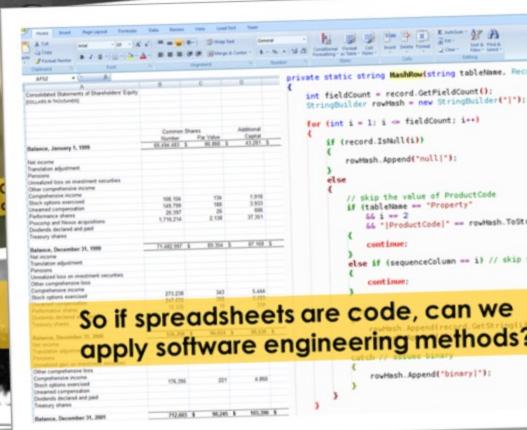




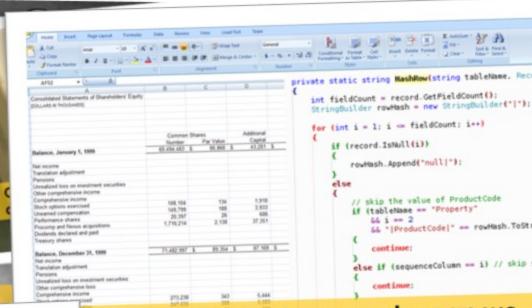














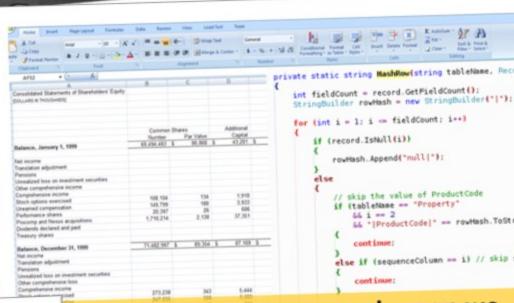


In my dissertation, I defined smells for spreadsheet formulas

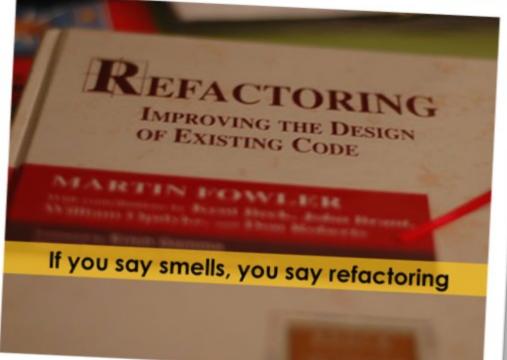
So if spreadsheets are code, can we apply software engineering methods?

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ar 31, 3981	712,660 \$	96245 \$	103,390 \$)	





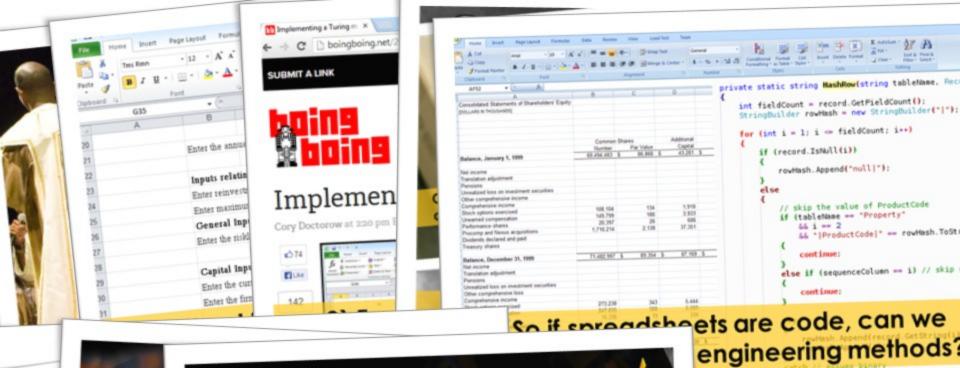
So if spreadsheets are code, can we



software engineering methods:

100.306 221 AMD rowHash.Append("binary|"):

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56 "[ProductCode]" == rowHash. ToSt

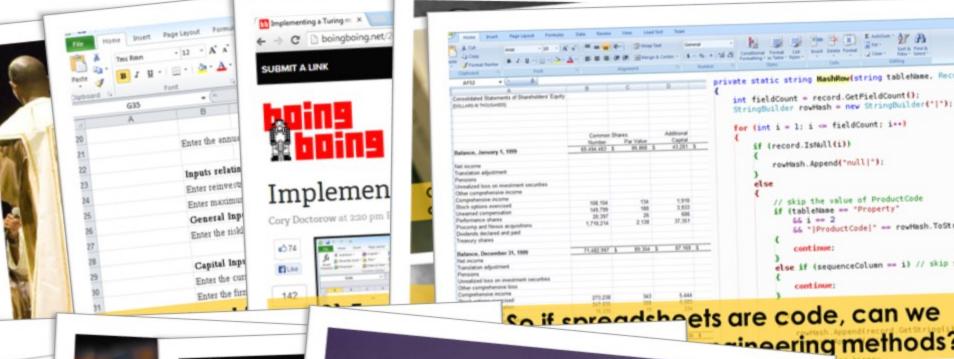
rowHash.Append("binary|"):

continue;

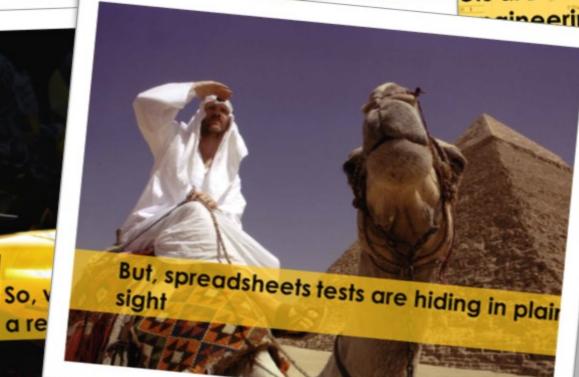
continue;



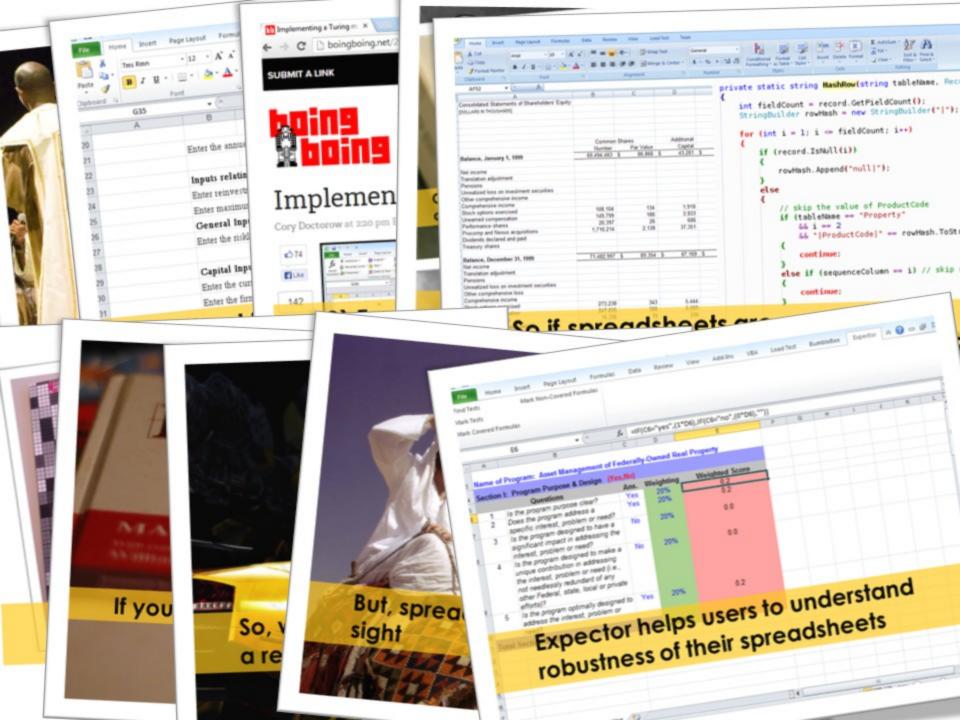
If you



If you



Append("binary|"):





Thanks for attending my talk:

Spreadsheets: The dark matter of IT

Want to know more?

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