Portfolio Case Study

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The Situation - Your individual client (Mr. Slade) has been very successful in his business dealings, and has accumulated $1 million in cash and investments. Previously Mr. Slade has invested these funds rather haphazardly, in a potpourri of investments without much strategy or thought. Presented below is a summary of his funds as they are currently invested:

Cash	275,000
Speculative Stocks	400,000
Mutual Funds	325,000

In speaking with Mr. Slade, with your help he determines that he would like to spread his investments around in a variety of investments in an effort to diversify his portfolio. Together, you come up with the following criteria for Mr. Slade's investment strategy:

1. Mr. Slade wants to spread his investments around, including blue chip stocks, growth stocks, speculation stocks, cash, real estate and mutual funds.
2. Mr. Slade needs between $100,000 and $150,000 in liquid cash.
3. Mr. Slade wants to carry about 25% to 35% of the portfolio in blue chip stocks.
4. Mr. Slade would like to no more than 20% of the portfolio invested in speculative stocks.
5. Mr. Slade wants no more than 20% of his investments in mutual funds.

The next step in this process is to estimate the expected return on investment (ROI) for each of investments. Some of these numbers are easy to come by and some are a little more difficult. For example, it is known that the checking account pays 2.2% interest, and of course there is no growth. Mr. Slade's speculative stock investments have grown at an average of 12%, with no dividend payments while his mutual funds have grown 7% per year. A little research reveals that blue chip stocks grow on average 6.0% per year, and pay about 4% in dividends annually, and growth stocks grow at

about 8% per year. The real estate market has shown steady growth of 12% per year, but there is an annual cost of about 3.5% for taxes, insurance and maintenance.

Mr. Slade wants you to help him figure out which portfolio mix maximizes his earnings, while obeying his stated constraints. Thereafter, Mr. Slade wants you to set up a organized approach for tracking these investments in the future.

The Big Picture - Your Goals Are:

Install the Solver tool in Excel.

Use Solver to calculate the best mix of investments that also obeys Mr. Slade's stated investment goals and criteria.

Set up an Excel worksheet that organizes and tracks these investments.

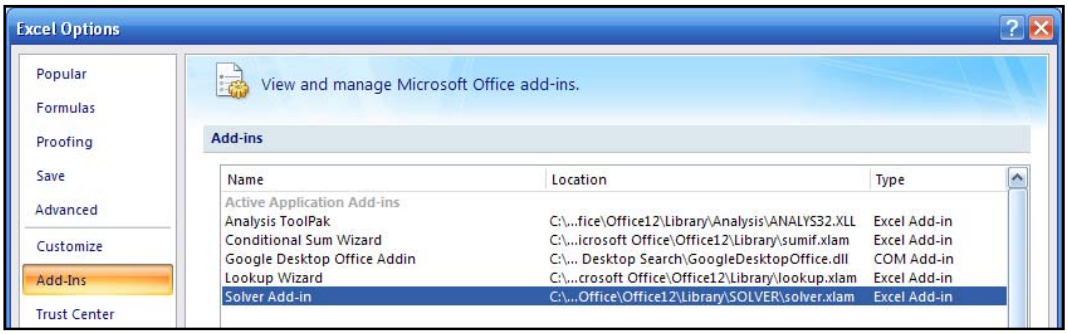
Create web queries that will import stock prices and mutual fund information directly into Excel.

This Case Study Covers the following Excel Features and Concepts:

Add-ins
Solver Overview
Solver Worksheet
Solver Constraints
Solver Targets
Solver Reporting
Portfolio Design
Web Queries
Web Query Parameters
Editing Web Queries
Refreshing Web Queries
Subtotaling
Outlining
Tables
PivotTables
Format Gallery

Steps:

To use the Solver Add-in, you need to load it first. To do this, Click the Microsoft Office Button, and then click Excel Options. Click Add-Ins, and then in the Manage box, select Excel Add-ins. Click Go. In the Add-Ins available box, select the Solver Add-in check box, and then click OK. After you load the Solver Add-in, the Solver command is available in the Analysis group on the Data tab.



1. Set up the "Investment Mix" worksheet, starting with the row and column labels shown below.

	A	B	C	D	E	F	G	H	I	J
1	Portfolio Case Study - Using Solver									
2										
3										
4				Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
5		Blue Chip Stocks								
6		Growth Stocks								
7		Speculation Stocks								
8		Checking Account								
9		Real Estate								
10		Mutual Fund								
11										

2. Enter the percentage returns for each investment, including earnings and growth rate. Note that the earnings rate for real estate is a negative number because the owner must pay money annually for taxes, insurance and maintenance.

	A	B	C	D	E	F	G	H	I	J
1	Portfolio Case Study - Using Solver									
2										
3										
4				Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
5		Blue Chip Stocks		4%	6%					
6		Growth Stocks		0%	8%					
7		Speculation Stocks		0%	12%					
8		Checking Account		2.20%	0					
9		Real Estate		-3.50%	12%					
10		Mutual Fund		0	7%					
11										

3. Enter an amount of funds for each investment, the total of which sums to the $1 million that Mr. Slade owns. It does not matter which amounts you enter here; these are the amounts that will eventually be adjusted by Solver. (For example, you could enter $1 for the first five investments and $999,995 for the last investment if you wanted to.)

			Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
4									
5		Blue Chip Stocks	4%	6%	150000				
6		Growth Stocks	0%	8%	150000				
7		Speculation Stocks	0%	12%	150000				
8		Checking Account	2.20%	0	150000				
9		Real Estate	-3.50%	12%	150000				
10		Mutual Fund	0	7%	250000				
11					1000000				

4. Enter formulas to calculate the percentage of each investment as a percentage to the total investments. This is best accomplished by typing in the top formula, applying absolute references to the denominator, and double clicking the fill handle to copy the formula down.

		Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
4								
5	Blue Chip Stocks	4%	6%	150000	15%			
6	Growth Stocks	0%	8%	150000	15%			
7	Speculation Stocks	0%	12%	150000	15%			
8	Checking Account	2.20%	0	150000	15%			
9	Real Estate	-3.50%	12%	150000	15%			
10	Mutual Fund	0	7%	250000	25%			
11				1000000	100%			

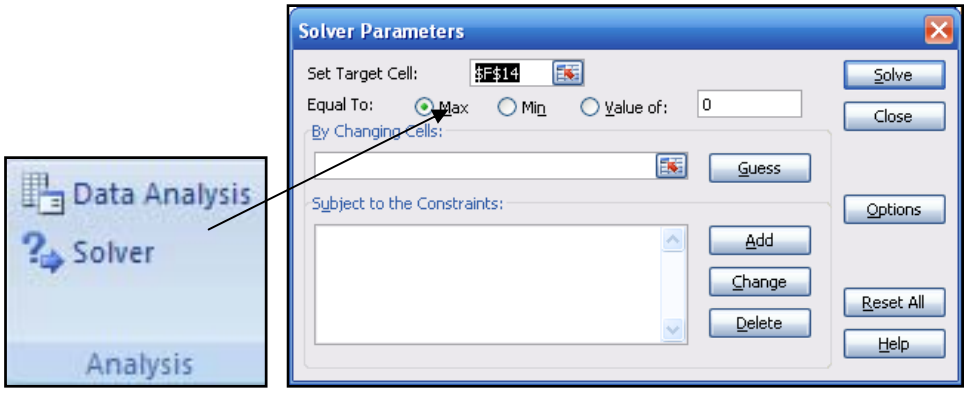
Enter the remaining formulas to complete the schedule. These formulas are straight forward and they are best accomplished by typing the formula once, applying the proper absolute column reference to the "Amount of Investment" cell reference, and then copying this formula down and across. The final column simply sums the earnings and growth to derive a total return on investment.

		Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
4								
5	Blue Chip Stocks	4%	6%	150,000	15%	6,000	9,000	15,000
6	Growth Stocks	0%	8%	150,000	15%	-	12,000	12,000
7	Speculation Stocks	0%	12%	150,000	15%	-	18,000	18,000
8	Checking Account	2.20%	0	150,000	15%	3,300	-	3,300
9	Real Estate	-3.50%	12%	150,000	15%	(5,250)	18,000	12,750
10	Mutual Fund	0	7%	250,000	25%	-	17,500	17,500
11				1,000,000	100%	4,050	74,500	78,550

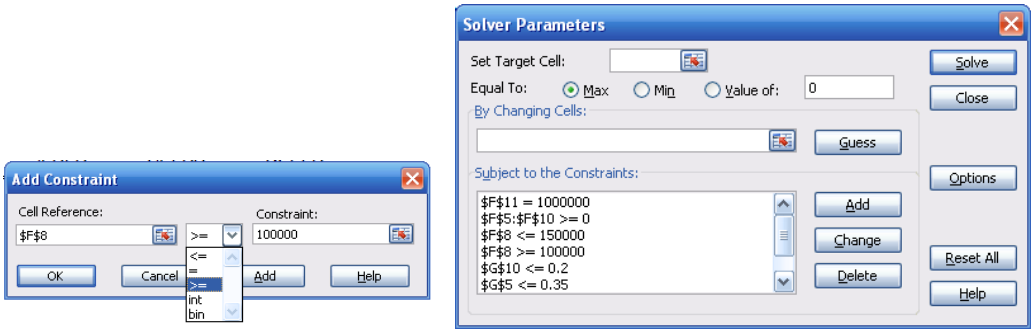
5. Presented below is an auditing view of this schedule with all data and formulas displayed so that you can check your work. This computation represents the Solver Problem which Solver with solve.

		Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
4								
5	Blue Chip Stocks	0.04	0.06	150000	=F5/$F$11	=D5*$F5	=E5*$F5	=I5+H5
6	Growth Stocks	0	0.08	150000	=F6/$F$11	=D6*$F6	=E6*$F6	=I6+H6
7	Speculation Stocks	0	0.12	150000	=F7/$F$11	=D7*$F7	=E7*$F7	=I7+H7
8	Checking Account	0.022	0	150000	=F8/$F$11	=D8*$F8	=E8*$F8	=I8+H8
9	Real Estate	-0.035	0.12	150000	=F9/$F$11	=D9*$F9	=E9*$F9	=I9+H9
10	Mutual Fund	0	0.07	250000	=F10/$F$11	=D10*$F10	=E10*$F10	=I10+H10
11				=SUM(F5:F10)	=F11/$F$11	=SUM(H5:H10)	=SUM(I5:I10)	=SUM(J5:J10)
12								

6. Now that your investment schedule is complete, you are ready to use solver to determine the optimum investment mix that yields the top return, yet obeys Mr. Slade's stated investment objectives. Launch the Solver tool from the Data menu's Analysis chunk.



7. Enter the Constraints into the solver Parameters dialog box one at a time. For example, the amount of cash is to be at least $100,000 and at most $150,000. These constraints are expressed as $F$8 >= 100000 and $F$8 <= 150000.

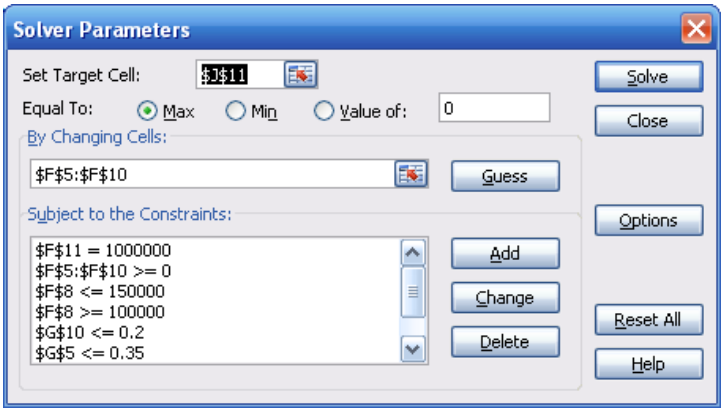


8. Further, in order to make solver work, you must add two additional constraints as follows. A constraint that tells solver the total amount of available funds must also be added by instructing Solver that total funds are $1,000,000. Another constraint that indicates that no investment shall be less than $0.00 must also be added, otherwise solver will try to maximize earnings by suggesting negative investment amounts. (Sure, this sounds crazy, but Solver is not a thinking intelligent being, its just a calculation.)

9. Complete the Solver by referencing the cells to be changed and the cell to be maximized in the solution. The cells to be changed are the 6 cells containing the amounts to be invested in each type of investment, as shown in the dotted line box below.

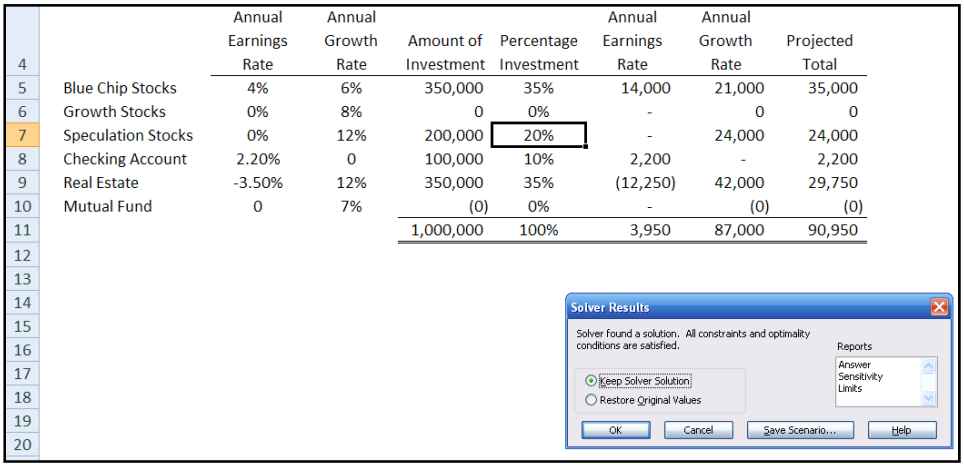
Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
6%	150,000	15%	6,000	9,000	15,000
8%	150,000	15%	-	12,000	12,000
12%	150,000	15%	-	18,000	18,000
0	150,000	15%	3,300	-	3,300
12%	150,000	15%	(5,250)	18,000	12,750
7%	250,000	25%	-	17,500	17,500
	1,000,000	100%	4,050	74,500	78,550

10. The cell to be maximized is the total amount of return on investment, or the total of the “Projected Total” column.



Solver is Ready to Run

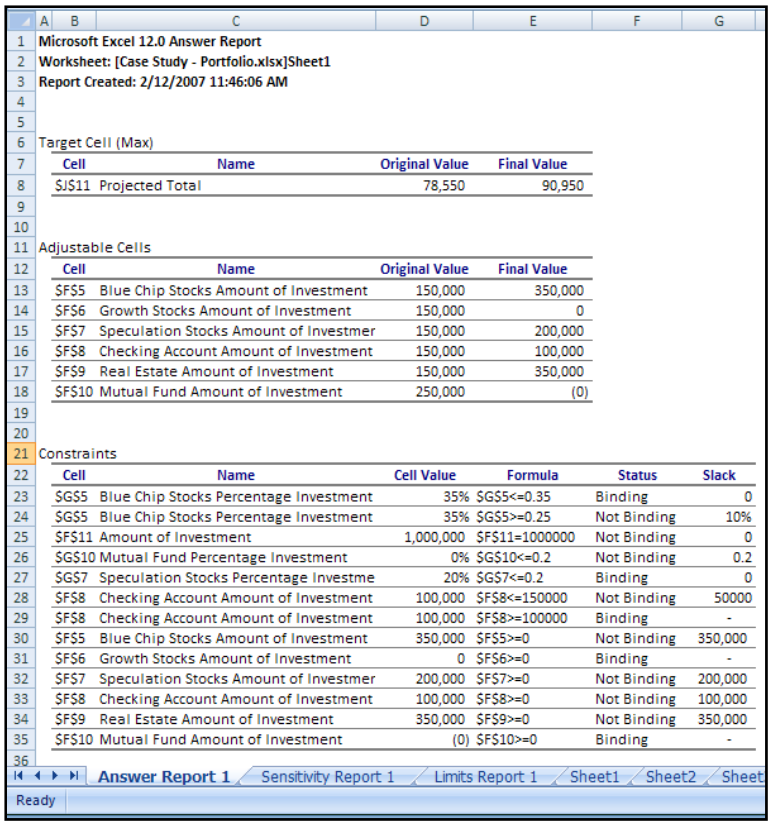
11. With all constraints, changing cells, and maximized cell properly referenced, you are now ready to produce the solution by pressing the Solve button. This action will adjust the portfolio mix schedule to provide those top results which obey the stated investment objectives.



	Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
Blue Chip Stocks	4%	6%	350,000	35%	14,000	21,000	35,000
Growth Stocks	0%	8%	0	0%	-	0	0
Speculation Stocks	0%	12%	200,000	20%	-	24,000	24,000
Checking Account	2.20%	0	100,000	10%	2,200	-	2,200
Real Estate	-3.50%	12%	350,000	35%	(12,250)	42,000	29,750
Mutual Fund	0	7%	(0)	0%	-	(0)	(0)
			1,000,000	100%	3,950	87,000	90,950

12. As you can see by the serene above, solver has adjusted the portfolio investment mix to show that total earnings of $90,950 can be achieved by maximizing the investments in blue chip stocks, avoiding growth stocks, placing the minimum amount of $100,000 in checking, etc. After producing this report, Mr. Slade may decide that additional constraints are needed, and if so, the numbers can be massaged accordingly.

13. Solver now offers a variety of options for reporting the results. The report can be saved as a scenario. Thereafter, Solver will produce various reports to help you understand the results. The first of these reports is the Answers Report shown to the right.



Microsoft Excel 12.0 Answer Report
Worksheet: [Case Study - Portfolio.xlsx]Sheet1
Report Created: 2/12/2007 11:46:06 AM

Target Cell (Max)

Cell	Name	Original Value	Final Value
$J$11	Projected Total	78,550	90,950

Adjustable Cells

Cell	Name	Original Value	Final Value
$F$5	Blue Chip Stocks Amount of Investment	150,000	350,000
$F$6	Growth Stocks Amount of Investment	150,000	0
$F$7	Speculation Stocks Amount of Investmer	150,000	200,000
$F$8	Checking Account Amount of Investment	150,000	100,000
$F$9	Real Estate Amount of Investment	150,000	350,000
$F$10	Mutual Fund Amount of Investment	250,000	(0)

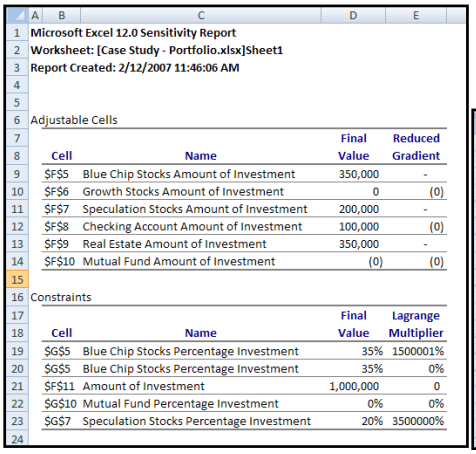
Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$G$5	Blue Chip Stocks Percentage Investment	35%	$G$5<=0.35	Binding	0
$G$5	Blue Chip Stocks Percentage Investment	35%	$G$5>=0.25	Not Binding	10%
$F$11	Amount of Investment	1,000,000	$F$11=1000000	Not Binding	0
$G$10	Mutual Fund Percentage Investment	0%	$G$10<=0.2	Not Binding	0.2
$G$7	Speculation Stocks Percentage Investme	20%	$G$7<=0.2	Binding	0
$F$8	Checking Account Amount of Investment	100,000	$F$8<=150000	Not Binding	50000
$F$8	Checking Account Amount of Investment	100,000	$F$8>=100000	Binding	-
$F$5	Blue Chip Stocks Amount of Investment	350,000	$F$5>=0	Not Binding	350,000
$F$6	Growth Stocks Amount of Investment	0	$F$6>=0	Binding	-
$F$7	Speculation Stocks Amount of Investmer	200,000	$F$7>=0	Not Binding	200,000
$F$8	Checking Account Amount of Investment	100,000	$F$8>=0	Not Binding	100,000
$F$9	Real Estate Amount of Investment	350,000	$F$9>=0	Not Binding	350,000
$F$10	Mutual Fund Amount of Investment	(0)	$F$10>=0	Binding	-

Answer Report 1 | Sensitivity Report 1 | Limits Report 1 | Sheet1 | Sheet2 | Sheet

Ready

14. The Sensitivity and Limit Reports provide details into how the final answers were derived.



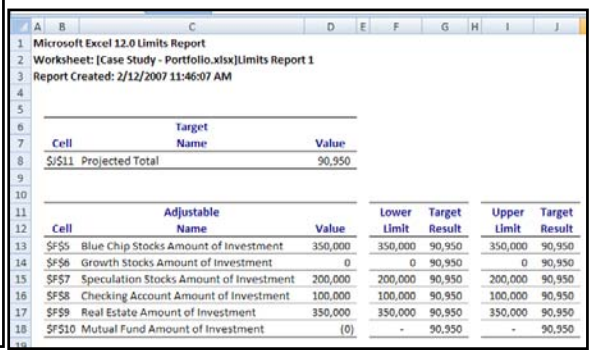
Microsoft Excel 12.0 Sensitivity Report
Worksheet: [Case Study - Portfolio.xlsx]Sheet1
Report Created: 2/12/2007 11:46:06 AM

Adjustable Cells

Cell	Name	Final Value	Reduced Gradient
$F$5	Blue Chip Stocks Amount of Investment	350,000	-
$F$6	Growth Stocks Amount of Investment	0	(0)
$F$7	Speculation Stocks Amount of Investment	200,000	-
$F$8	Checking Account Amount of Investment	100,000	(0)
$F$9	Real Estate Amount of Investment	350,000	-
$F$10	Mutual Fund Amount of Investment	(0)	(0)

Constraints

Cell	Name	Final Value	Lagrange Multiplier
$G$5	Blue Chip Stocks Percentage Investment	35%	1500001%
$G$5	Blue Chip Stocks Percentage Investment	35%	0%
$F$11	Amount of Investment	1,000,000	0
$G$10	Mutual Fund Percentage Investment	0%	0%
$G$7	Speculation Stocks Percentage Investment	20%	3500000%



Microsoft Excel 12.0 Limits Report
Worksheet: [Case Study - Portfolio.xlsx]Limits Report 1
Report Created: 2/12/2007 11:46:07 AM

Cell	Target Name	Target Value
$J$11	Projected Total	90,950

Cell	Adjustable Name	Adjustable Value	Lower Limit	Target Result	Upper Limit	Target Result
$F$5	Blue Chip Stocks Amount of Investment	350,000	350,000	90,950	350,000	90,950
$F$6	Growth Stocks Amount of Investment	0	0	90,950	0	90,950
$F$7	Speculation Stocks Amount of Investment	200,000	200,000	90,950	200,000	90,950
$F$8	Checking Account Amount of Investment	100,000	100,000	90,950	100,000	90,950
$F$9	Real Estate Amount of Investment	350,000	350,000	90,950	350,000	90,950
$F$10	Mutual Fund Amount of Investment	(0)	-	90,950	-	90,950

15. Now that the Portfolio Investment Mix and Solver worksheets have both been created, they can be rerun as frequently as desired in just a few seconds. For example, assume that the checking account interest rate changes, blue chip returns fall, and Mr. Slade's objectives change. This is no problem as you can open the worksheets and make these adjustments in only a few seconds. Specifically, assume that Mr. Slade decides that at least 10% of the investments should be invested in Mutual funds. Simply add this new constraint to Solver and recomputed the results.

	Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
Blue Chip Stocks	4%	6%	350,000	35%	14,000	21,000	35,000
Growth Stocks	0%	8%	0	0%	-	0	0
Speculation Stocks	0%	12%	200,000	20%	-	24,000	24,000
Checking Account	2.20%	0	100,000	10%	2,200	-	2,200
Real Estate	-3.50%	12%	250,000	25%	(8,750)	30,000	21,250
Mutual Fund	0	7%	100,000	10%	-	7,000	7,000
			1,000,000	100%	7,450	82,000	89,450

As market conditions change, the Investment Mix Schedule assumptions can be updated and Solver can be re-run to produce new results. Thereafter, Mr. Slade needs only to track investments and move them around as the amounts grow to match his desired investment goals.

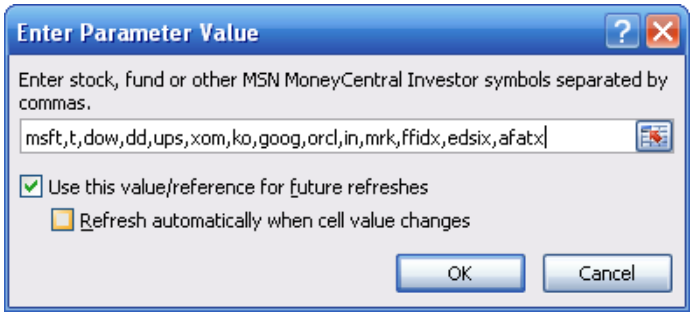
16. The next step is to assist Mr. Slade in selecting investments from each category, and then creating a worksheet to track those investments. While the selection of each individual investment is complex, strategic and personal (and hence beyond the scope of this case study), let us assume that Mr. Slade has decided upon the following specific investments:

Category	Symbol	Company Name	Intial Amount
Blue Chip Stocks	MSFT	Microsoft	50,000
Blue Chip Stocks	T	AT&T Inc.	50,000
Blue Chip Stocks	DOW	Dow Chemical	50,000
Blue Chip Stocks	DD	Du Pont	50,000
Blue Chip Stocks	UPS	UPS	50,000
Blue Chip Stocks	XOM	Exon Mobil	50,000
Blue Chip Stocks	KO	Coca Cola	50,000
Speculation Stocks	GOOG	Google	50,000
Speculation Stocks	ORCL	Oracle	50,000
Speculation Stocks	IN	Intermec	50,000
Speculation Stocks	MRK	Merck	50,000
Checking Account			100,000
Real Estate		Undeveloped Land	70,000
		Townhome	180,000
Mutual Fund	FFIDX	Fidelity Fund	50,000
Mutual Fund	EDSIX	Evergreen Disciplined Value Fund	25,000
Mutual Fund	AFATX	Afba 5Star Science & Technology	25,000
			1,000,000

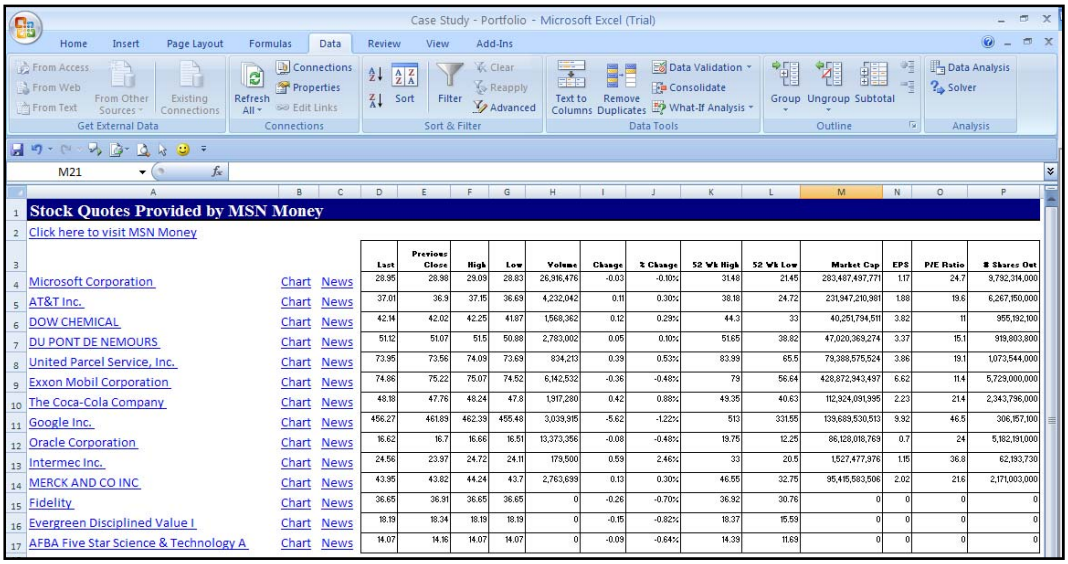
17. Set up an initial Portfolio that list these investments and the initial amounts that Mr. Slade has decided to place in each investment. Include a column for share price and the total number of shares as shown below.

Category	Symbol	Company Name	Intial Amount	Share Price	Shares
Blue Chip Stocks	MSFT	Microsoft	50,000		
Blue Chip Stocks	T	AT&T Inc.	50,000		
Blue Chip Stocks	DOW	Dow Chemical	50,000		
Blue Chip Stocks	DD	Du Pont	50,000		
Blue Chip Stocks	UPS	UPS	50,000		
Blue Chip Stocks	XOM	Exon Mobil	50,000		
Blue Chip Stocks	KO	Coca Cola	50,000		
Speculation Stocks	GOOG	Google	50,000		
Speculation Stocks	ORCL	Oracle	50,000		
Speculation Stocks	IN	Intermec	50,000		
Speculation Stocks	MRK	Merck	50,000		
Checking Account			100,000		
Real Estate		Undeveloped Land	70,000		
		Townhome	180,000		
Mutual Fund	FFIDX	Fidelity Fund	50,000		
Mutual Fund	EDSIX	Evergreen Disciplined Value Fund	25,000		
Mutual Fund	AFATX	Afba 5Star Science & Technology	25,000		
			1,000,000		

18. On a separate sheet, insert a Web Query to retrieve these stock and mutual fund prices using the ticker symbols provided. To do this, select "Existing Connections from the Data Ribbon's "Get External Data" Chunk, and select "Stock Quotes". Enter the ticker symbols in the "Enter Parameter Value" dialog box shown below. Be sure to check the checkbox titled "Use this value/reference for future refreshes".



19. This action will cause Excel to reach out to a stock portfolio database on the Internet and create the following summary report:



			Last	Previous Close	High	Low	Volume	Change	% Change	52 Wk High	52 Wk Low	Market Cap	EPS	P/E Ratio	# Shares Out
Microsoft Corporation	Chart	News	28.95	28.98	29.09	28.83	26,916,476	-0.03	-0.10%	31.48	21.45	283,487,497,771	1.17	24.7	9,792,314,000
AT&T Inc.	Chart	News	37.01	36.9	37.15	36.69	4,232,042	0.11	0.30%	38.18	24.72	231,947,210,981	1.88	19.6	6,267,150,000
DOW CHEMICAL	Chart	News	42.14	42.02	42.25	41.87	1,568,362	0.12	0.29%	44.3	33	40,251,794,511	3.82	11	955,192,100
DU PONT DE NEMOURS	Chart	News	51.12	51.07	51.5	50.88	2,783,002	0.05	0.10%	51.65	38.82	47,020,369,274	3.37	15.1	919,803,800
United Parcel Service, Inc.	Chart	News	73.95	73.56	74.09	73.69	834,213	0.39	0.53%	83.99	65.5	79,388,575,524	3.86	19.1	1,073,544,000
Exxon Mobil Corporation	Chart	News	74.86	75.22	75.07	74.52	6,142,532	-0.36	-0.48%	79	56.64	428,872,943,497	6.62	11.4	5,729,000,000
The Coca-Cola Company	Chart	News	48.18	47.76	48.24	47.8	1,917,280	0.42	0.88%	49.35	40.63	112,924,091,995	2.23	21.4	2,343,796,000
Google Inc.	Chart	News	456.27	461.89	462.39	455.48	3,039,915	-5.62	-1.22%	513	331.55	139,689,530,513	9.92	46.5	306,157,100
Oracle Corporation	Chart	News	16.62	16.7	16.66	16.51	13,373,356	-0.08	-0.48%	19.75	12.25	86,128,018,769	0.7	24	5,182,191,000
Intermec Inc.	Chart	News	24.56	23.97	24.72	24.11	179,500	0.59	2.46%	33	20.5	1,527,477,976	1.15	36.8	62,193,730
MERCK AND CO INC	Chart	News	43.95	43.82	44.24	43.7	2,763,699	0.13	0.30%	46.55	32.75	95,415,583,506	2.02	21.6	2,171,003,000
Fidelity	Chart	News	36.65	36.91	36.65	36.65	0	-0.26	-0.70%	36.92	30.76	0	0	0	0
Evergreen Disciplined Value I	Chart	News	18.19	18.34	18.19	18.19	0	-0.15	-0.82%	18.37	15.59	0	0	0	0
AFBA Five Star Science & Technology A	Chart	News	14.07	14.16	14.07	14.07	0	-0.09	-0.64%	14.39	11.69	0	0	0	0

20. Return to the Portfolio and insert formulas to pull stock price data from the web query into the Portfolio as shown below.

	Category	Symbol	Company Name	Intial Amount	Share Price	Shares
16						
17	Blue Chip Stocks	MSFT	Microsoft	50,000	=Sheet3!D4	
18	Blue Chip Stocks	T	AT&T Inc.	50,000	37.01	
19	Blue Chip Stocks	DOW	Dow Chemical	50,000	42.14	
20	Blue Chip Stocks	DD	Du Pont	50,000	51.12	
21	Blue Chip Stocks	UPS	UPS	50,000	73.95	
22	Blue Chip Stocks	XOM	Exon Mobil	50,000	74.86	
23	Blue Chip Stocks	KO	Coca Cola	50,000	48.18	
24						
25	Speculation Stocks	GOOG	Google	50,000	456.27	
26	Speculation Stocks	ORCL	Oracle	50,000	16.62	
27	Speculation Stocks	IN	Intermec	50,000	24.56	
28	Speculation Stocks	MRK	Merck	50,000	43.95	

21. Add formulas in the shares column by dividing the amount of each investment by the share price in order to determine the appropriate number of shares of each investment Mr. Slade should purchase to meet his investment goals. Be sure to use the round function and round to the nearest tenth.

	Category	Symbol	Company Name	Intial Amount	Share Price	Shares
16						
17	Blue Chip Stocks	MSFT	Microsoft	50,000	28.95	=ROUND(F17
18	Blue Chip Stocks	T	AT&T Inc.	50,000	37.01	1,350
19	Blue Chip Stocks	DOW	Dow Chemical	50,000	42.14	1,190
20	Blue Chip Stocks	DD	Du Pont	50,000	51.12	980
21	Blue Chip Stocks	UPS	UPS	50,000	73.95	680
22	Blue Chip Stocks	XOM	Exon Mobil	50,000	74.86	670
23	Blue Chip Stocks	KO	Coca Cola	50,000	48.18	1,040
24						
25	Speculation Stocks	GOOG	Google	50,000	456.27	110
26	Speculation Stocks	ORCL	Oracle	50,000	16.62	3,010
27	Speculation Stocks	IN	Intermec	50,000	24.56	2,040
28	Speculation Stocks	MRK	Merck	50,000	43.95	1,140

22. Once Mr. Slade has made all of the necessary investments, recreate the portfolio on a new sheet, and make the necessary adjustments to reflect the actual results of these transactions. Due to the requirements of purchasing bocks of shares, Mr. Slade will not be able to purchase the exact number of shares indicated above at the exact same price indicated above. Therefore there will be slight discrepancies. Once those transactions are completed, Mr. Slade will need a worksheet that documents the beginning point in which Mr. Slade begins to track his investments. For example, the resulting Portfolio might look like this:

	A	B	C	D	E	F	G
1	Category		Symbol	Company Name	Shares	Share Price	Shares
2	Blue Chip Stocks		MSFT	Microsoft	1750	28.95	50,663
3	Blue Chip Stocks		T	AT&T Inc.	1300	37.01	48,113
4	Blue Chip Stocks		DOW	Dow Chemical	1200	42.14	50,568
5	Blue Chip Stocks		DD	Du Pont	1000	51.12	51,120
6	Blue Chip Stocks		UPS	UPS	700	73.95	51,765
7	Blue Chip Stocks		XOM	Exon Mobil	600	74.86	44,916
8	Blue Chip Stocks		KO	Coca Cola	1000	48.18	48,180
9	Speculation Stocks		GOOG	Google	100	456.27	45,627
10	Speculation Stocks		ORCL	Oracle	3000	16.62	49,860
11	Speculation Stocks		IN	Intermec	2000	24.56	49,120
12	Speculation Stocks		MRK	Merck	1100	43.95	48,345
13	Checking Account			Wachovia			109,621
14	Real Estate			Undeveloped Land - Houston			70,000
15	Real Estate			Townhome - Destin, FL			180,000
16	Mutual Fund		FFIDX	Fidelity Fund	1400	36.65	51,310
17	Mutual Fund		EDSIX	Evergreen Disciplined Value Fund	1400	18.19	25,466
18	Mutual Fund		AFATX	Afba 5Star Science & Technology	1800	14.07	25,326
19							
20							1,000,000

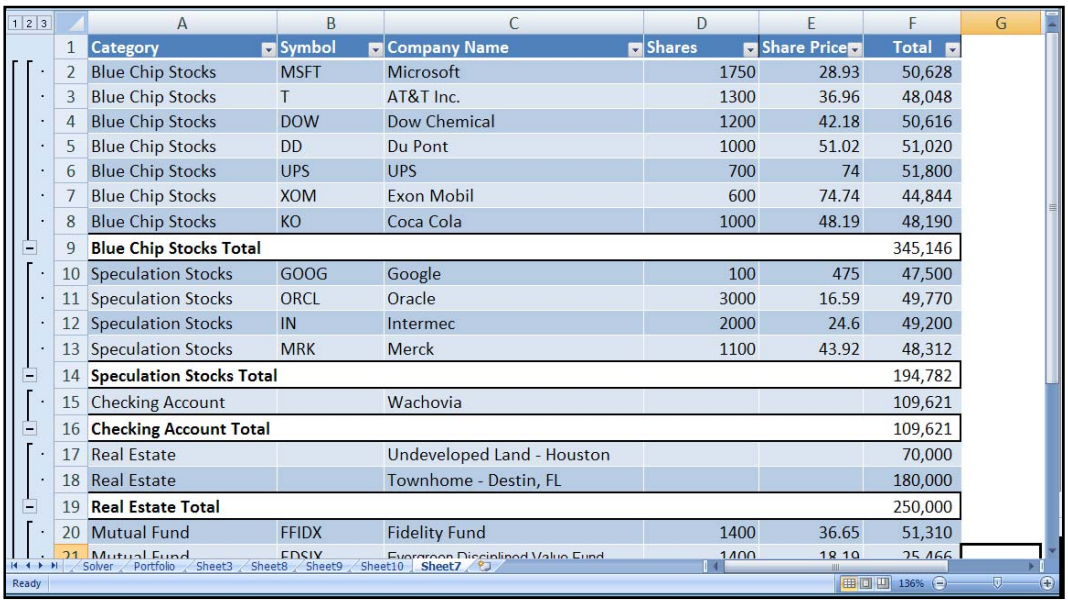
23. Once created, the portfolio can be updated at any time by pressing the "Refresh Data" button. As an example, just moments after completing this portfolio, Mr. Slade's investments had grown by $1,651, as shown below. Of course changes in the real estate holdings and checking account balance will need to be input manually on a periodic basis such as every 6 months or each year.

24. Next, practice converting this data to both a table, and a PivotTable. Therefore select the top cell referencing the share price, and press F2 and then F$ to toggle on the absolute references. Use the down arrow and repeat this until all share formulas have an absolute reference. Copy the Portfolio to a new sheet, and again to yet another new sheet.

25. Select one of the portfolio examples and apply Subtotals to the Portfolio using the "Subtotal" tool from the Data Ribbon's "Outline" Chunk. This action will automatically subtotal the Portfolio by category as shown below.

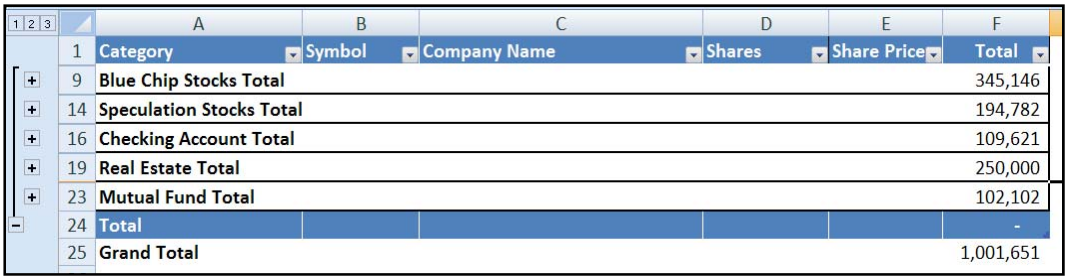
	A	B	C	D	E	F	G
1	Category	Symbol	Company Name	Shares	Share Price	Total	
2	Blue Chip Stocks	MSFT	Microsoft	1750	28.93	50,628	
3	Blue Chip Stocks	T	AT&T Inc.	1300	36.96	48,048	
4	Blue Chip Stocks	DOW	Dow Chemical	1200	42.18	50,616	
5	Blue Chip Stocks	DD	Du Pont	1000	51.02	51,020	
6	Blue Chip Stocks	UPS	UPS	700	74	51,800	
7	Blue Chip Stocks	XOM	Exon Mobil	600	74.74	44,844	
8	Blue Chip Stocks	KO	Coca Cola	1000	48.19	48,190	
9	**Blue Chip Stocks Total**					345,146	
10	Speculation Stocks	GOOG	Google	100	475	47,500	
11	Speculation Stocks	ORCL	Oracle	3000	16.59	49,770	
12	Speculation Stocks	IN	Intermec	2000	24.6	49,200	
13	Speculation Stocks	MRK	Merck	1100	43.92	48,312	
14	**Speculation Stocks Total**					194,782	
15	Checking Account		Wachovia			109,621	
16	**Checking Account Total**					109,621	
17	Real Estate		Undeveloped Land - Houston			70,000	
18	Real Estate		Townhome - Destin, FL			180,000	
19	**Real Estate Total**					250,000	
20	Mutual Fund	FFIDX	Fidelity Fund	1400	36.65	51,310	
21	Mutual Fund	EDSIX	Evergreen Disciplined Value Fund	1400	18.19	25,466	

26. Convert the portfolio to a table using the "Table" tool from the Insert Ribbon's "Tables" Chunk. This will automatically apply formatting and drop down filters to the Portfolio. Yu change the formatting using the gallery or by applying new formats to individual rows or columns.



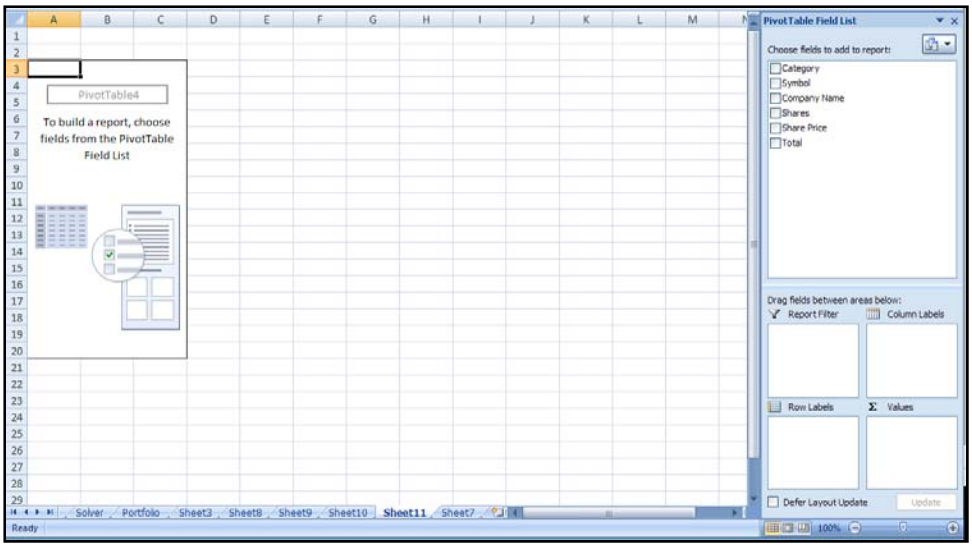
	A	B	C	D	E	F	G
1	Category	Symbol	Company Name	Shares	Share Price	Total	
2	Blue Chip Stocks	MSFT	Microsoft	1750	28.93	50,628	
3	Blue Chip Stocks	T	AT&T Inc.	1300	36.96	48,048	
4	Blue Chip Stocks	DOW	Dow Chemical	1200	42.18	50,616	
5	Blue Chip Stocks	DD	Du Pont	1000	51.02	51,020	
6	Blue Chip Stocks	UPS	UPS	700	74	51,800	
7	Blue Chip Stocks	XOM	Exon Mobil	600	74.74	44,844	
8	Blue Chip Stocks	KO	Coca Cola	1000	48.19	48,190	
9	**Blue Chip Stocks Total**					345,146	
10	Speculation Stocks	GOOG	Google	100	475	47,500	
11	Speculation Stocks	ORCL	Oracle	3000	16.59	49,770	
12	Speculation Stocks	IN	Intermec	2000	24.6	49,200	
13	Speculation Stocks	MRK	Merck	1100	43.92	48,312	
14	**Speculation Stocks Total**					194,782	
15	Checking Account		Wachovia			109,621	
16	**Checking Account Total**					109,621	
17	Real Estate		Undeveloped Land - Houston			70,000	
18	Real Estate		Townhome - Destin, FL			180,000	
19	**Real Estate Total**					250,000	
20	Mutual Fund	FFIDX	Fidelity Fund	1400	36.65	51,310	
21	Mutual Fund	FDSIX	Evergreen Disciplined Value Fund	1400	18.19	25,466	

27. Next click the "Outline" selection number 2 to display the collapsed version of the data, displaying subtotals and grand totals only.

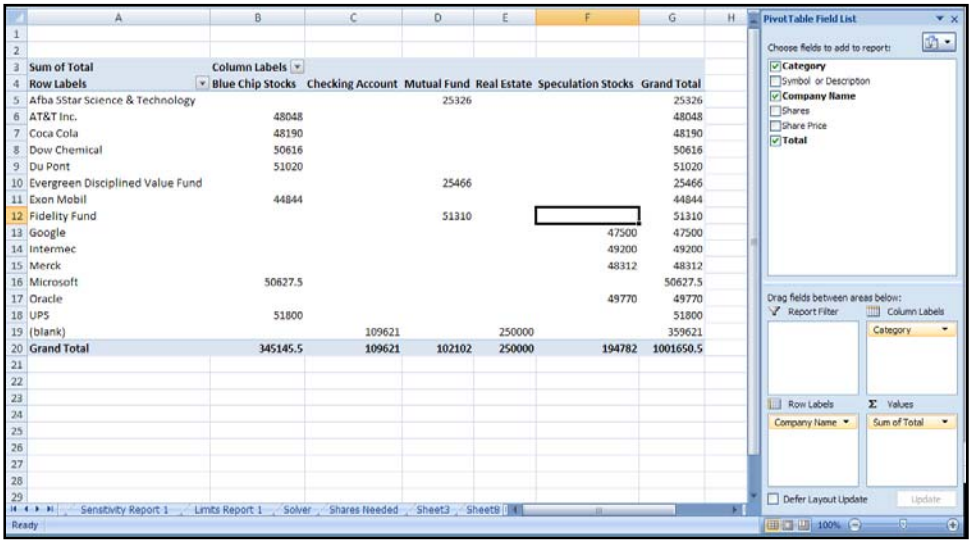


	A	B	C	D	E	F
1	Category	Symbol	Company Name	Shares	Share Price	Total
9	**Blue Chip Stocks Total**					345,146
14	**Speculation Stocks Total**					194,782
16	**Checking Account Total**					109,621
19	**Real Estate Total**					250,000
23	**Mutual Fund Total**					102,102
24	**Total**					-
25	**Grand Total**					1,001,651

28. Now select the second copy of the Portfolio, and with your cursor positioned on any cell in the table, select the "PivotTable" tool from the Insert Ribbon's PivotTable Chunk. This action will produce a new Sheet with a Blank Pivot Pallet displayed as shown below.



29. In the Pivot Table Field List dialog box, check the "Category", "Company Name" and "Total" column. Next drag the Category field from the Row Labels box and drop it in the Column labels box. The resulting pivot report should appear as follows:



30. Finish by formatting the table with a "Dark" design from the "Format as Table" tool on the Home Ribbon's Styles chunk. Also apply comma formatting.

Sum of Total	Column Labels					
Row Labels	Blue Chip Stocks	Checking Account	Mutual Fund	Real Estate	Speculation Stocks	Grand Total
Afba 5Star Science & Technology			25,326			25,326
AT&T Inc.	48,048					48,048
Coca Cola	48,190					48,190
Dow Chemical	50,616					50,616
Du Pont	51,020					51,020
Evergreen Disciplined Value Fund			25,466			25,466
Exon Mobil	44,844					44,844
Fidelity Fund			51,310			51,310
Google					47,500	47,500
Intermec					49,200	49,200
Merck					48,312	48,312
Microsoft	50,628					50,628
Oracle					49,770	49,770
UPS	51,800					51,800
(blank)		109,621		250,000		359,621
Grand Total	**345,146**	**109,621**	**102,102**	**250,000**	**194,782**	**1,001,651**

In conclusion, you have assisted Mr. Slade in planning an investment strategy which diversifies his holdings, yet maximizes earnings. Additionally, you have created a worksheet that tracks these investments. As all of the factors change, Mr. Slade can easily determine which monies, if any, need to be moved around to maintain his desired diversity. For example, assume that Mr. Slade makes an additional $200,000 in 2007, and his checking account increases accordingly. He need only insert the new checking account balance into solver, along with any other known adjustments such as changes in earnings, and rerun solver to obtain a new mix, which can be compared to the current investment mix to determine which investments need to be adjusted.