

# Microsoft Office Excel 2007

## **Advanced Data Analysis: Goal Seeking, Scenarios, Pivot Charts, and Pivot Tables**

# The Goal Seek - Better Than Trial And Error!

- When you use Goal Seek, you specify the result you want, and Goal Seek changes the value in an input cell to arrive at that result.
  - Only one input can be varied at a time
    - All other assumptions remain constant
  - For example, set a desired monthly car payment
    - Vary the amount financed
    - Interest rate and number of months remain the same

# Using Goal Seek

The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. The 'What-If Analysis' dropdown menu is open, showing 'Scenario Manager...', 'Goal Seek...', and 'Data Table...'. The spreadsheet content is as follows:

|    | A   | B | C           | D | E | F | J | K |
|----|---|---|-------------|---|---|---|---|---|
| 1  | <b>Basic Financial Functions</b>                    |   |             |   |   |   |   |   |
| 2  |   |   |             |   |   |   |   |   |
| 3  | <b>PMT Function - The Purchase of an Automobile</b> |   |             |   |   |   |   |   |
| 4  | <b>Purchase Price</b>                               |   | \$35,000.00 |   |   |   |   |   |
| 5  | <b>Manufacturer's rebate</b>                        |   | \$3,000.00  |   |   |   |   |   |
| 6  | <b>Down Payment</b>                                 |   | \$2,500.00  |   |   |   |   |   |
| 7  | <b>Amount to Finance</b>                            |   | \$29,500.00 |   |   |   |   |   |
| 8  | <b>Interest Rate</b>                                |   | 7.25%       |   |   |   |   |   |
| 9  | <b>Term (years)</b>                                 |   | 5           |   |   |   |   |   |
| 10 | <b>Monthly Payments</b>                             |   | \$587.62    |   |   |   |   |   |
| 11 |   |   |             |   |   |   |   |   |

From DATA, “What-If-Analysis”, GOAL SEEK!

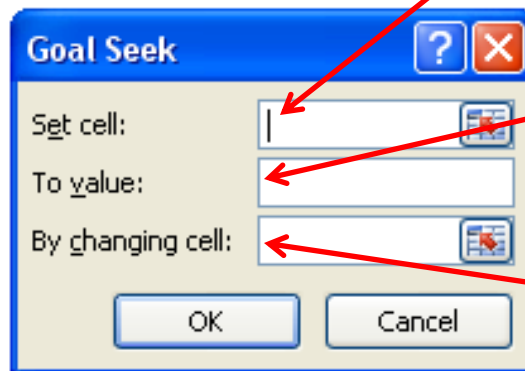
# Goal Seek Arguments

|    | A  | B | C           | D |
|----|--|---|-------------|---|
| 1  | <b>GOAL SEEK</b>   |   |             |   |
| 2  |  |   |             |   |
| 3  | <b>The Purchase of an Automobile (with PMT Function)</b> |   |             |   |
| 4  | <b>Purchase Price</b>                                    |   | \$35,000.00 |   |
| 5  | <b>Manufacturer's Rebate</b>                             |   | \$3,000.00  |   |
| 6  | <b>Down Payment</b>                                      |   | \$2,500.00  |   |
| 7  | <b>Amount to Finance</b>                                 |   | \$29,500.00 |   |
| 8  | <b>Interest Rate</b>                                     |   | 7.25%       |   |
| 9  | <b>Term (years)</b>                                      |   | 5           |   |
| 10 | <b>Monthly Payments</b>                                  |   | \$587.62    |   |
| 11 |  |   |             |   |
| 12 |  |   |             |   |
| 13 |  |   |             |   |
| 14 |  |   |             |   |
| 15 |  |   |             |   |
| 16 |  |   |             |   |
| 17 |  |   |             |   |
| 18 |  |   |             |   |
| 19 |  |   |             |   |

Enter the cell reference to store the desired result

Enter the desired value

Enter the cell that will change to achieve result



# Example Time

- Let's briefly look at Automobile\_Goal.xlsx

(you will find this file on my lecture notes page)

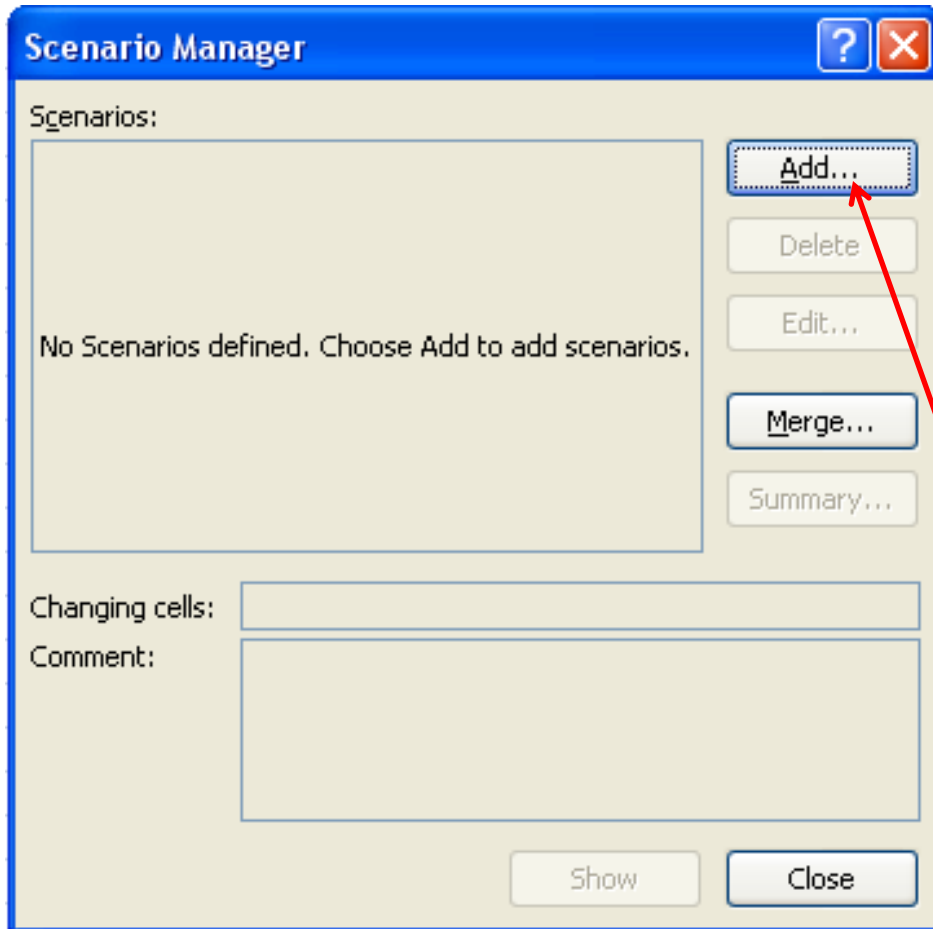
# Did Goal Seek provide the final answer?

- Goal Seek helped find a solution that worked, but remember that our problem was to find the best solution - the one that yields THE DESIRED PAYMENT.
- The only way to be absolutely sure that you have found the best solution using the trial-and-error method is to create all the solutions and then pick the best one.
- However, when it comes to purchasing automobiles, be prepared to spend more \$\$\$!

# Create scenarios to perform What-If-Analyses

- To perform what-if analyses with several input variables, you have to use *scenarios*, which are:
  - A set of values that Excel can put into a worksheet
  - Created based on existing spreadsheets in Excel
- You use the Scenario Manager to set up and view different scenarios.
- Once you have the spreadsheet with one set of values, you can create several scenarios with different values.
- As you view each scenario, Excel uses the values in the scenario as input to calculate the results.

# Creating scenarios



- Step #1:  
Data -> Data Tools ->  
What-If- Analysis ->  
Scenario Manager
- Click Add to add a new data scenario.

# Creating scenarios (cont)

**Add Scenario**

Scenario name:

Changing cells:

Ctrl+click cells to select non-adjacent changing cells.

Comment:

Created by Thomas L Snider on 9/16/2007

**Protection**

Prevent changes

Hide

OK Cancel

- Step #2:  
Give the Scenario a name
- Select the cells whose values you will be changing to define a scenario.

# Creating scenarios (cont)

**Edit Scenario**

Scenario name:  
First Case

Changing cells:  
\$B\$4,\$B\$5,\$B\$6,\$B\$7,\$B\$11

Ctrl+click cells to select non-adjacent changing cells.

Comment:  
Created by Thomas L Snider on 9/16/2007

**Protection**

Prevent changes  
 Hide

OK Cancel

Scenario defined!

- Notice that the cells used for the scenario are listed in the Changing Cells section of the dialog box.

# Example Time

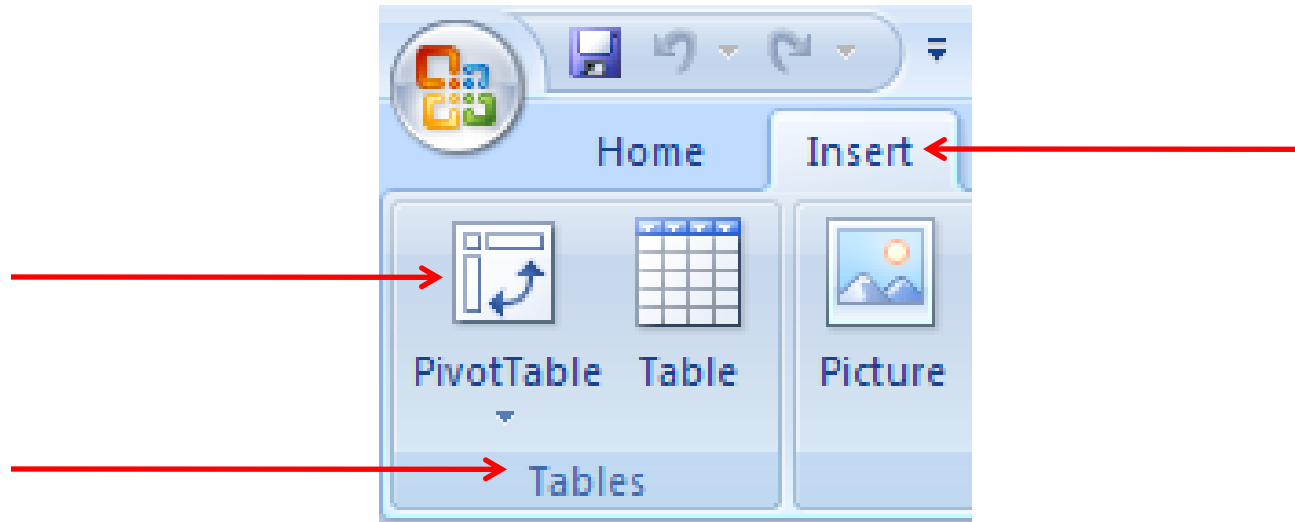
- Example: RedDog\_Scenarios.xlsx

(you will find this file on my lecture notes page)

# PivotTables and PivotCharts

- A PivotTable provides the ultimate flexibility in data analysis...
  - Lists data in categories
  - Computes summary statistics for those categories
- A PivotChart is a flexible chart that pivots!
  - Out of one comes many
  - Save loads of time

# Create a PivotTable



**As with MANY Excel functions, derive what you want to do ... you want to INSERT a PivotTable.**

# Create a PivotTable (cont)

|    | A         | B           | C        | D        | E | F | G | H | I | J |
|----|-----------|-------------|----------|----------|---|---|---|---|---|---|
| 1  | Sales Rep | Quarter     | Media    | Amount   |   |   |   |   |   |   |
| 2  | Frank     | 1st quarter | Magazine | \$2,000  |   |   |   |   |   |   |
| 3  | Frank     | 1st quarter | Radio    | \$1,000  |   |   |   |   |   |   |
| 4  | Frank     | 1st quarter | Magazine | \$2,000  |   |   |   |   |   |   |
| 5  | Frank     | 1st quarter | Radio    | \$1,000  |   |   |   |   |   |   |
| 6  | George    | 1st quarter | Radio    | \$4,000  |   |   |   |   |   |   |
| 7  | George    | 1st quarter | Radio    | \$4,000  |   |   |   |   |   |   |
| 8  | George    | 1st quarter | TV       | \$16,000 |   |   |   |   |   |   |
| 9  | George    | 1st quarter | TV       | \$16,000 |   |   |   |   |   |   |
| 10 | Grace     | 1st quarter | Radio    | \$4,000  |   |   |   |   |   |   |
| 11 | Mary      | 1st quarter | Radio    | \$3,250  |   |   |   |   |   |   |
| 12 | Nancy     | 1st quarter | TV       | \$15,000 |   |   |   |   |   |   |
| 13 | Nancy     | 1st quarter | Radio    | \$4,000  |   |   |   |   |   |   |
| 14 | Nancy     | 1st quarter | TV       | \$15,000 |   |   |   |   |   |   |
| 15 | Nancy     | 1st quarter | Radio    | \$4,000  |   |   |   |   |   |   |
| 16 | Peter     | 1st quarter | Radio    | \$1,000  |   |   |   |   |   |   |

**Create PivotTable**

Choose the data that you want to analyze

Select a table or range

Table/Range:

Use an external data source

Choose Connection...

Connection name:

Choose where you want the PivotTable report to be placed

New Worksheet

Existing Worksheet

Location:

OK Cancel

Select where the data is and where the PivotTable goes.

# Create a PivotTable (cont)

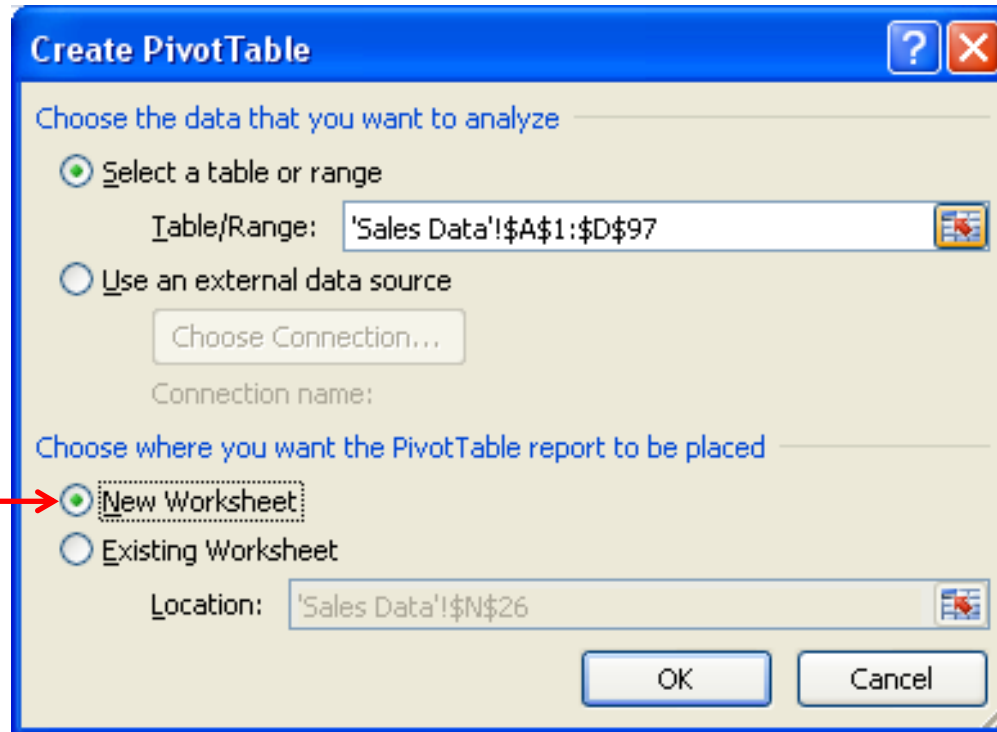
|   | A                | B              | C            | D             | E | F | G | H | I | J | K |
|---|------------------|----------------|--------------|---------------|---|---|---|---|---|---|---|
| 1 | <b>Sales Rep</b> | <b>Quarter</b> | <b>Media</b> | <b>Amount</b> |   |   |   |   |   |   |   |
| 2 | Frank            | 1st quarter    | Magazine     | \$2,000       |   |   |   |   |   |   |   |
| 3 | Frank            | 1st quarter    | Radio        | \$1,000       |   |   |   |   |   |   |   |
| 4 | Frank            | 1st quarter    | Magazine     | \$2,000       |   |   |   |   |   |   |   |
| 5 | Frank            | 1st quarter    | Radio        | \$1,000       |   |   |   |   |   |   |   |
| 6 | George           | 1st quarter    | Radio        | \$4,000       |   |   |   |   |   |   |   |

**Create PivotTable** [?] [X]

'Sales Data'!\$A\$1:\$D\$97 [Icon]

**Grab & Go! It's a good idea to include your column headers with your data table.**

# Create a PivotTable (cont)



**Do it in a new Worksheet! Things can get messy with lots of data in one sheet.**

# Create a PivotTable (cont)

The screenshot displays the Microsoft Excel interface. On the right side, the **PivotTable Field List** task pane is open, showing a list of fields to be added to a report:  Sales Rep,  Quarter,  Media, and  Amount. Below this list, there are four designated areas for field placement: **Report Filter**, **Column Labels**, **Row Labels**, and **Values**. At the bottom of the task pane, there is a **Defer Layout Update** checkbox and an **Update** button.

On the left side of the worksheet, a tutorial box titled **PivotTable1** is displayed. It contains the text: "To build a report, choose fields from the PivotTable Field List". Below the text are two small icons: one representing a data table and another representing the PivotTable Field List task pane, with a magnifying glass highlighting the checkboxes in the task pane.

The worksheet grid shows columns A through K and rows 1 through 27. The status bar at the bottom indicates the current sheet is **Sheet1** and the data source is **Sales Data**.

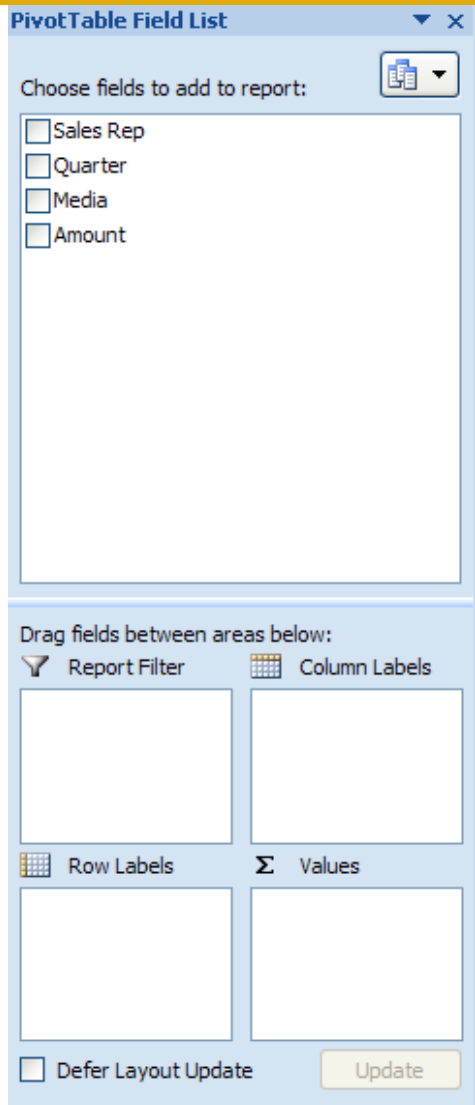
# Create a PivotTable (cont)

- The data field areas can be confusing!
- Remember to assign *levels of definition* to the data columns in the original data sheet
  - What is the major category?
  - What are the subordinate categories?
  - The Data is the *detail* category
- Do you see why a new sheet is the best idea?

# Create a PivotTable (cont)

- In our example, the categories are:
  - Sales Rep
  - Quarter
  - Media
  - Amount
  
- Do you know the levels of definition?

# Create a PivotTable (cont)



- Quarter should go to the Report Filter.
- Media should go to the Row Labels.
- Sales Rep should go to the Column Labels.
- Amount should go to the Values.

# Create a PivotTable (cont)

The screenshot displays an Excel spreadsheet with a PivotTable and the PivotTable Field List task pane. The PivotTable is located in the range A3:K8 and summarizes sales data by quarter and media type, broken down by sales representative.

| Row Labels         | Frank        | George       | Grace        | Mary          | Nancy        | Peter         | Sam           | Sandy         | Grand Total   |
|--------------------|--------------|--------------|--------------|---------------|--------------|---------------|---------------|---------------|---------------|
| Magazine           | 62000        | 3250         | 18000        | 19250         | 2000         | 69000         | 17000         | 22750         | 213250        |
| Radio              | 12000        | 23500        | 4000         | 3250          | 21000        | 12000         | 2000          | 4000          | 81750         |
| TV                 | 20000        | 32000        | 72000        | 89000         | 30000        | 23500         | 85000         | 78500         | 430000        |
| <b>Grand Total</b> | <b>94000</b> | <b>58750</b> | <b>94000</b> | <b>111500</b> | <b>53000</b> | <b>104500</b> | <b>104000</b> | <b>105250</b> | <b>725000</b> |

The PivotTable Field List task pane on the right shows the following configuration:

- Choose fields to add to report:** Sales Rep, Quarter, Media, Amount (all checked).
- Report Filter:** Quarter
- Column Labels:** Sales Rep
- Row Labels:** Media
- Values:** Sum of Amount
- Defer Layout Update:** (unchecked)
- Update** button

# Create a PivotTable (cont)

What part of the sales year?

Which salesperson?

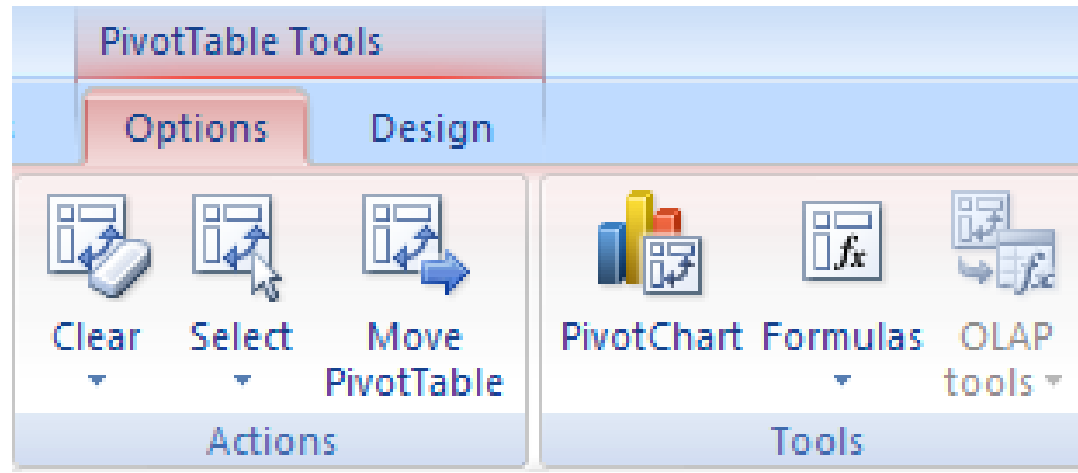
|   | A             | B             | C      | D     | E      | F     | G      | H      | I      | J           |
|---|---------------|---------------|--------|-------|--------|-------|--------|--------|--------|-------------|
| 1 | Quarter       | (All)         |        |       |        |       |        |        |        |             |
| 2 |               |               |        |       |        |       |        |        |        |             |
| 3 | Sum of Amount | Column Labels |        |       |        |       |        |        |        |             |
| 4 | Row Labels    | Frank         | George | Grace | Mary   | Nancy | Peter  | Sam    | Sandy  | Grand Total |
| 5 | Magazine      | 62000         | 3250   | 18000 | 19250  | 2000  | 69000  | 17000  | 22750  | 213250      |
| 6 | Radio         | 12000         | 23500  | 4000  | 3250   | 21000 | 12000  | 2000   | 4000   | 81750       |
| 7 | TV            | 20000         | 32000  | 72000 | 89000  | 30000 | 23500  | 85000  | 78500  | 430000      |
| 8 | Grand Total   | 94000         | 58750  | 94000 | 111500 | 53000 | 104500 | 104000 | 105250 | 725000      |

Which media sales ?

# The PivotChart

- The reason to do the PivotTable first is quite simple, it defines the data range we will be charting! Don't put the chart before the horse ... er, data table.
- Once you have setup the PivotTable, you merely need to decide upon the type of chart you wish to generate.

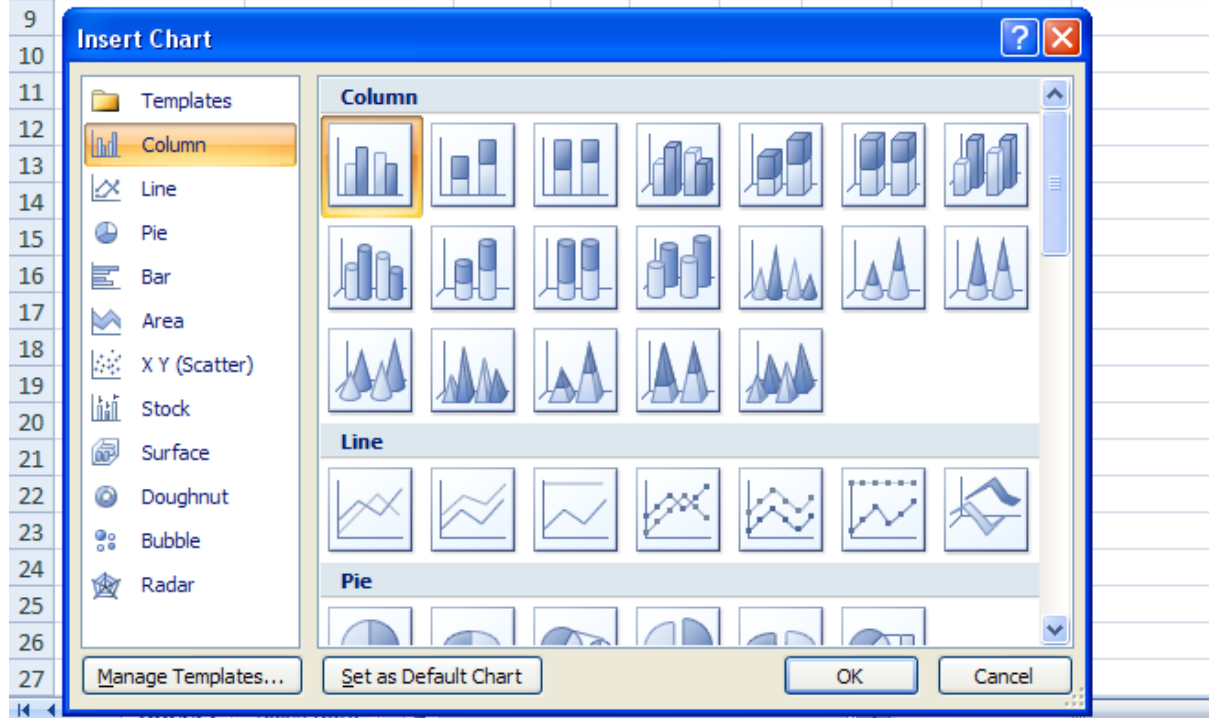
# Creating a PivotChart



**As with Charts, PivotTables have their own TAB and RIBBONS. Which option do you think might create a PivotChart?**

# Creating a PivotChart (cont)

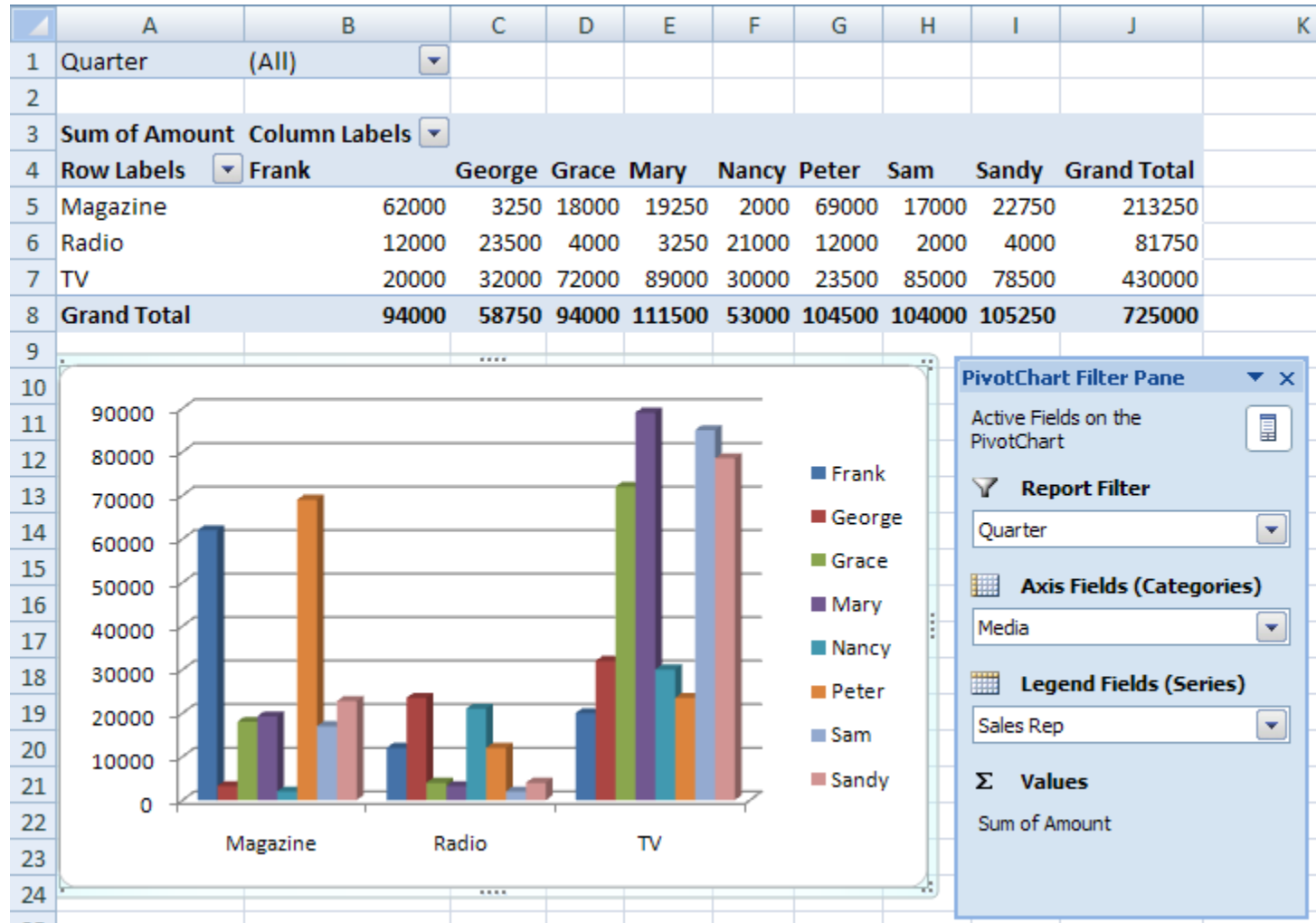
|   | A             | B             | C      | D     | E      | F     | G      | H      | I      | J           |
|---|---------------|---------------|--------|-------|--------|-------|--------|--------|--------|-------------|
| 1 | Quarter       | (All)         |        |       |        |       |        |        |        |             |
| 2 |               |               |        |       |        |       |        |        |        |             |
| 3 | Sum of Amount | Column Labels |        |       |        |       |        |        |        |             |
| 4 | Row Labels    | Frank         | George | Grace | Mary   | Nancy | Peter  | Sam    | Sandy  | Grand Total |
| 5 | Magazine      | 62000         | 3250   | 18000 | 19250  | 2000  | 69000  | 17000  | 22750  | 213250      |
| 6 | Radio         | 12000         | 23500  | 4000  | 3250   | 21000 | 12000  | 2000   | 4000   | 81750       |
| 7 | TV            | 20000         | 32000  | 72000 | 89000  | 30000 | 23500  | 85000  | 78500  | 430000      |
| 8 | Grand Total   | 94000         | 58750  | 94000 | 111500 | 53000 | 104500 | 104000 | 105250 | 725000      |



**What is the Number One Rule for creating a chart?**

**The amount and type of the Data!**

# Create a PivotChart (cont)



# Example Time

- Example: Advertising\_Agency\_Pivot.xlsx

(you will find this file on my lecture notes page)

# Review

- Goal Seek is used for ....
- Scenarios are used for ....
- PivotTables (and PivotCharts) are ....

# Questions?

