Design Document: MS Excel – Advanced Topics

Class Description

Learn how to quickly highlight important numbers using conditional formatting, work with multiple sheets in an Excel file, calculate percentages, and use the PMT and VLOOKUP functions in this class.

**Curriculum Track**

Microsoft Tools

**Audience**

Adults

**Course Length**

90 minutes

**Training Method**

Instructor-led hands-on

**Purpose**

To introduce users to more advanced Excel features

Equipment Requirements

Projector and projection screen; computers with internet access for the instructor and each participant; laser pointer (recommended)

Software Requirements

Windows 7, Microsoft Excel 2010 or 2013

Material Requirements

Pens or pencils, *Budget* Practice File, *Loan Calculator* Practice file, *Market Orders* Practice File, *Vehicle Order* Practice File, Activity Sheets, handouts, participant surveys

**Learning Objectives**

At the end of the session, learners will be able to:

* Apply at least one type of conditional formatting to a cell
* Create an Absolute Reference in a formula
* Create multiple worksheets in a workbook and link a formula between them
* Access the Function Library
* Use the PMT function to calculate a loan payment
* Use the VLOOKUP function to find a value in a numeric range

**Assessment Technique(s)**

Successful completion of class activities

Content Outline

**Agenda (2 mins)**

* Outline the following topics that will be covered in class
  + Conditional Formatting
  + Creating an Absolute Reference in formula
  + Working with multiple worksheets in a workbook
  + Review of formulas/functions & the Function Library
  + The PMT function
  + The VLOOKUP function

**Topics, Talking Points, and Activities (85 mins)**

* Conditional Formatting
  + Explain that conditional formatting is the function where a user can apply pre-made rules to a cell to make the data stand out through the use of color, data bars or icons
  + For example, you may need to keep track of certain values in a spreadsheet. You can use conditional formatting to have a cell appear bold only when the value is between $5 and $10
  + On the **Orders** worksheet inside the *Market Orders* Practice file, demonstrate the use of conditional formatting to highlight all the shipping values between 5 and 10 using the following steps:
  1. Select cells **F2:F74**
  2. On the **Home** tab in the **Styles** group, click on **Conditional Formatting**
  3. Scroll down to **Highlight Cell Rules**,then click on the **Between** option in the dialog box
  4. In the **Between** window, type **5** in the first box and **10** in the second box
  5. Select **Yellow Fill with dark yellow text** from the dropdown list
  6. Click the **OK** button
  7. Clear the rules by clicking on **Conditional Formatting**, then **Clear rules from Selected Cells**
* With cells F2:F74 still selected, briefly demonstrate the other conditional formatting styles available by arrowing over examples from **Data bars**, **Color Scales**, and **Icon Sets**
* Explain that to create a more custom formatting rule, users need to click the **New Rule** option in the **Conditional Formatting** dialog box

**ACTIVITY**: Have participants complete **Activity #1** on the *Activity Sheet*

* Creating an Absolute Reference in a formula
  + Explain that an absolute reference is one which constantly refers to a specific cell or range of cells, even if the spreadsheet is edited or the formula is copied/filled into another cell
  + Share that a row is made static by adding a **$** before the row and/or column in the formula. For example, **$C$3** is an absolute reference to the third column and the third row vs. the relative cell of C3 which could change, if copied.
  + To further illustrate the concept, share this example with participants: If a user has multiple orders and he or she wants to determine the cost for a purchase PLUS a flat rate shipping fee, he or she would create a formula including an absolute reference to the cell containing the shipping fee to determine the total cost of the order
  + On the **Orders** worksheet in the *Market Orders* Practice File, first demonstrate what happens if an absolute reference is not used in the following example:
  1. In cell **H2**, type **=E2 + G2** and hit the **Enter** key
  2. Point out that the total now reflects the price plus the new shipping fee
  3. Using the **Fill** feature, fill cells **H2:H74**
  4. Point out that only cell **H2** has the correct value. Click on cell **H3** to see that the formula has changed. Explain that because the formula did not include an absolute reference to the cell containing the shipping fee, the formula adjusted to fit the pattern
* Now, walk through the same example using an absolute reference to show participants the difference between the two methods

1. In cell **H2**, change the formula to include the absolute reference: **=E2+$G$2**
2. Refill cells **H3:H74** to reflect the change and produce the correct total amounts

**ACTIVITY**: Have participants complete **Activity #2** on the *Activity Sheet*

* Working with multiple worksheets in a workbook
  + Discuss how a workbook can be made up of multiple worksheets (usually just called sheets) and the benefits of using multiple sheets
  + Discuss how you can create formulas that reference another workbook or sheet. For example, you may have a list of orders that came from various companies and want a separate sheet for each company that tracks their orders, dollars spent, etc.
  + Using the *Market Orders* Practice File, demonstrate how to add a new worksheet for one of the companies listed. Follow the steps listed below to add a new worksheet to the workbook and name it:
    1. If a new tab is not already present in the workbook, click on the **+** to add one
    2. After adding a new worksheet (or if one already exists), right-click on the tab and select the **Rename** option
    3. Type **Arnold’s** into the box and press the **Enter** key
    4. Change the color of the tab.
  + Next, create a formula that references the **Company** **Orders** worksheet to determine what percentage of the total order amount belongs to Arnold’s
    1. Copy and paste cells **A1:C8** from the **Company Orders** worksheet into **Arnold’s** worksheet
    2. Type **Total** in cell **B9** and calculate the sum in cell **C9**
    3. In cell **B10**, type **Percent of Total Orders**
    4. In cell **C10**, start typing the formula needed to calculate the percent: **=C9/**
    5. Click on the **Company Orders** worksheet, then scroll down to click on cell **C75** which contains the total amount of sales. The cell reference will be added to the formula. Because it is in another worksheet, the reference includes the worksheet name: **worksheet name!cell reference;** Example: =**’1st Quarter!E4’**
    6. Press the **Enter** key to complete the formula, then format cell **C10** as a percentage. You should see that Arnold’s orders made up approximately 7% of the total sales.
    7. Demonstrate how to copy a worksheet by right-clicking on the **Arnold’s** tab and selecting **Move or Copy**
    8. Select **Move to End** and check the box that says **Create a Copy**, then click the **OK** button

**ACTIVITY**: Have participants complete **Activities #3 & 4** on the *Activity Sheet*

* Review of formulas/functions & the **Function Library**
  + Quickly review with participants that a formula is an expression that calculates a value.
  + Share that a formula includes the following elements:
* Starts with an **=** (equal sign)
* Must contain cell addresses
* Must contain operators to perform the calculations (such as **:**, **+**, **/**, or **-**)
  + Share that a function, which can be used in a formula, pre-defines required operations for users. Explain that functions include the following elements:
* Most functions contain at least one an argument that produces a result
* Must contain a specific structure that occurs in a particular order (part 1 = function name followed by a parenthesis, part 2 = arguments inside the parenthesis)
* For example, the **SUM** function looks like this: **SUM(number1,[number2],...)** where Number 1 refers to the number in the first cell to be added, Number 2 refers to the second cell to be added, etc.
  + Explain that all functions in Excel are located in the **Function Library** on the **Formula** tab
  + Click on each category (**AutoSum**, **Recently** **Used**, **Financial**, **Logical**, **Text**, **Date** **&Time**, **Lookup** **& Reference**, **Math & Trig**, and **More Functions**) to display examples of each
* The PMT Function
  + Explain that the PMT function allows users to calculate the payment for a loan based on constant payments and a constant interest rate. Share that this function is located in the **Financial** category of the **Function Library**
  + Outline that the structure of the PMT function is **PMT(rate,nper,pv,fv,type)**
  + **rate**: The interest rate for the loan per period. Yearly loans can be expressed as **Rate%/12**. For example 5%/12. (**NOTE**: This is a required field)
  + **nper**: The total number of payments for the loan. (**NOTE**: This is a required field)
  + **pv**: The present value, or the total amount that a series of future payments is worth now; also known as the principal (**NOTE**: This is a required field)
  + **fv**: The future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (zero) [the future value of the loan is 0]
  + **type**: The number 0 (zero) or 1 and indicates when payments are due. A 0 indicates that the payment is made at the end of the period; a 1 indicates that the payment is made at the beginning of the period
* For example, the companies listed on the **Loans** tab of your *Market Orders* Practice File all are owned by the same corporation. Assume that this year they took out a loan to cover some operating expenses. The loan was issued for $3000 to be paid back in two years at an annual interest rate of 2.5%. Using the PMT function, the monthly payment—including interest—can be calculated
* Demonstrate how to use the PMT function using the **Loan** worksheet in the *Advanced Market Orders* Practice File as you outline the following steps:

1. Click on cell **H14**,then click on the **Formulas** tab
2. Click on the **Financial** button in the **Function Library** and select **PMT**
3. In the **rate** box, type **H9/12** (or select the cell, then type **/12**)
4. In the **nper** box, type or select **H13**
5. In the **pv** box, type or select **H7**,then click the **OK** button

* The calculated value of $128.28 will appear in red in cell **H14**. Click on the cell to verify that your formula matches this: **=PMT(H9/12,H13,H7)**

**ACTIVITY**: Have participants complete **Activity #5** on the *Activity Sheet*

* VLOOKUP
  + Explain that the **VLOOKUP** function is located in the **Lookup & Reference** option within the **Function Library**
  + Share that this function allows users to search for something in a table or a range by row by looking for a value in the leftmost column of a table and returning a value in the same row as the column specified
  + Share that if when looking up a range, users must be sure their table is in ascending order (1st column)
  + Outline that the VLOOKUP function is structured like this: **(lookup\_value, table\_array, col\_index\_num, [range\_lookup])**
  + Next explain what these elements indicate, as listed below:
* **lookup\_value**: Indicates the value you are searching for
* **table\_array**: The data range used to search for the **lookup value**. The left-most column will be searched. If the VLOOKUP formula will be copied the reference to the table should be made absolute.
* **col\_index\_num**: The column number of the **table array** containing the value to be used for the **VLOOKUP**. the columns are numbered, left to right, starting with 1.
* **range\_lookup**: Determines if you want to find the closest match or an exact match. For the closest match, type **True**; for an exact match, type **False**.
* For example, one could find all sales totals for one company by looking up the order number
  + Demonstrate the **VLOOKUP** function using the Paul’s Beverage worksheet inside the *Advanced Market Orders* Practice File worksheet as you outline the following steps:
  1. Click on cell **C3**, then click on the **Formulas** tab
  2. Click on **Lookup & Reference** in the **Function Library** and select **VLOOKUP**
  3. In the **lookup\_value** box, type **A3** and press the **Enter** key
  4. In the **table\_array** box, click on the spreadsheet icon, then click on the **Orders** tab. Select cells **A1:H74** and click on the spreadsheet icon again
  5. Click in the **col\_index\_num** box (you should be returned to your original tab) and type **8**. This tells Excel that the value you are looking for (**Total**) will be found in the 8th column from the left. Point out that it has displayed **4.42** as the return value in the **VLOOKUP** box
  6. In the **range­­\_lookup** box, type **FALSE** and press the **OK** button. The value will appear in box **C3**
  7. Click on cell **C3** to verify that the formula displayed in the formula bar matches this: **=VLOOKUP(A3,ORDERS!$A$1:$H$74,8,TRUE)**
  8. Click on the **Orders** tab to verify that **$4.42** is the total amount for **Paul’s Beverage Order 10943**. Return to **Paul’s Beverage** tab to fill cells **C4:C13**

**ACTIVITY**: Have participants complete **Activity #6** on the *Activity Sheet*

**Wrap Up/Closing (3 mins)**

* Highlight the upcoming technology classes and share the types of topics that will be covered
* Ask if there are questions and answer any that were “parked” during the session
* Thank participants for coming and ask them to complete the class survey before leaving