

APM 153 LECTURE NINETEEN – Boiling_Point Function in VBA, Pivot Tables

Boiling_Point in VBA

- (1) For Assignment Eight, you are **writing a function in VBA**. This means you are writing a **single program** that performs **all the calculations** in the algorithm.
- (2) The **inputs** to the function are a single column of numbers in Excel representing **elevation** from 0 to 10,000 meters and **10 constants** stored in cells on Sheet1.
- (3) As in Assignment Seven, your function will need to first calculate the change in air pressure at each elevation. And, just like in Assignment Seven, you will need to convert meters to feet.
- (4) The conversion factor and pressure equation are in the Assignment Seven handout. Remember that the result of the air pressure equation is the log10 of pressure in psi. The boiling point equation for Assignment Eight however uses air pressure in MPa.
- (5) You will need to first convert log10(P) to P (psi) and then convert P (psi) to P (MPa). Again, the correct conversion factor may be found in the Assignment Seven handout.
- (6) Once your function has converted air pressure to MPa, you can begin the six calculations to convert air pressure to boiling point.
- (7) In the last calculation you may substitute the **name of the function** for the letter “T”
$$\text{Boiling_Point} = \frac{n_{10} + D - ((n_{10} + D)^2 - 4(n_9 + n_{10}D))^{\frac{1}{2}}}{2}$$
- (8) We need to do this because **the name of the function is the output argument**.
- (9) VBA can be difficult to work with. If you type an error into any line of code, sometimes VBA will not catch the error until you try to run the function.
- (10) If there is a problem with one or more calculations, VBA will return the error message VALUE!.

(11) The best way to get your function to work correctly is to write one line of code at a time **and then test it**, a method which you instructor will now demonstrate.

Pivot Tables

(12) Pivot tables are a way of summarizing **categorical data**. For example, consider an Excel spreadsheet with the following **categories** of data,..

Name	Gender	Program of Study	Class
Josh H.	M	EFB	Senior
Jerome P.	M	FEG	Junior
Jane A.	F	ENV	Freshman
Jill K.	F	CHM	Sophomore

(13) With a small dataset it is easy to ask simple questions such as “How many males in the class?” and even very complicated questions such as “How man freshmen women are enrolled in Environmental Studies?”

(14) The larger the dataset however, the more difficult it becomes to just look at the data and answer similar questions. Pivot tables however can easily answer these questions.

(15) To make a pivot table in Excel, **highlight** the categories you want to compare **including the name of the category** at the **top** of each column.

(16) Click on **Data** on the Excel toolbar and select **Pivot Table and Pivot Chart Report**.

(17) The Pivot Chart “Wizard” will open up and help you select how to set up your table.

(18) If you merely click on Finish however, your Pivot Table will be set up with the default settings on **a new WorkSheet**, which is usually where you want your table to be.

(19) Once Excel has made your table, you select the data fields to compare and drop them into three different places in the table.

Position 1	Position 3					
Position 2						

(20) Position 1 represents the data category you are most interested in. Typically, we “drag and drop” the name of that category into Positions 1 and 2.

(21) We drag and drop the name of the second most important category into Position 3. We can add more categories to our table by dropping them into Positions 2 or 3.

(22) As an example, download the Student_Data.xls spreadsheet from the course website and open it in Excel. Highlight columns 2,3, and 4 with the label at the top of each column. Click on Data, select Pivot Table, and click on Finish.

(23) Drag and drop Program of Study into Position 1 and Position 2 in the table. Drag and drop Class Level into Position 3. The Pivot Table should look like this.

Count of Program of Study	Class Level				
Program of Study	Freshman	Junior	Senior	Sophomore	Grand Total
CHEMISTRY	1			1	2
CONSTR MGT	2				2
ENVRN BIOLOGY				1	1
ENVRN SCIENCE	1	1	1	10	13
FOREST ENGR	20	2		4	26
PAPER ENGR	8	1			9
PAPER SCIENCE	3				3
WOOD PROD ENGR		1			1
Grand Total	35	5	1	16	57

(24) Excel creates the pivot table with the labels in alphabetical order. That is why the column showing **Sophomores** comes after Seniors. We can change the **order** to fix this.

(25) Click on the word **Sophomore** and “right click” the mouse and select Move Left. Repeat until the column with Sophomore is positioned after Freshman and before Junior.

Count of Program of Study	Class Level				
Program of Study	Freshman	Sophomore	Junior	Senior	Grand Total
CHEMISTRY	1	1			2
CONSTR MGT	2				2
ENVRN BIOLOGY		1			1
ENVRN SCIENCE	1	10	1	1	13
FOREST ENGR	20	4	2		26
PAPER ENGR	8		1		9
PAPER SCIENCE	3				3
WOOD PROD ENGR			1		1
Grand Total	35	16	5	1	57

(26) The ability to rearrange the data in a Pivot Table is new to MS Office 2003.

(27) Practice using pivot tables by downloading the Student_Data.xls spreadsheet from the course website making a pivot table to answer the following questions.

A. How many males are in Forest Engineering? _____

B. How many freshman males are in Forest Engineering? _____

C. How many women are in APM 153? _____

D. How many Sophomore women are in Environmental Science? _____

Preparing for Second Hourly Exam

(28) The following material will be covered on the second exam.

Matlab

Writing functions in Matlab

Using the roots.m function in Matlab

Importing Data into Matlab

Plotting in Matlab using the plot and ezplot functions

Excel – VBA

Creating columns of numbers, dates, and weekdays using **autofill**

Using the SQRT, LN, LOG functions in Excel

Using the If-Then-Else line function in Excel

Define the differences between functions and subroutines in Excel

Writing and using functions and subroutines in VBA

Making Pivot Tables

(29) Make sure you bring your USB drive with working copies of your Matlab functions least_squares.m and bank.m, as well as a working copy of your CALCROOTS.xls spreadsheet with the Quad_Roots subroutine.

(30) The exam is “open book”. You may use your lecture notes and any other materials you have provided that these materials are stored in **your 3-ring notebook**. You may bring your Matlab textbook, but you probably won’t need it.

(31) As always, cooperation on the exam constitutes academic misconduct. Don’t Do It!