Lesson 1

Introduction to Windows 10 and Microsoft Excel

Lesson Objectives:

- Learn how to start computer applications using the Windows 10 operating system
- Be able to create new folders and organize files
- Move and copy folders using Windows 10 Explorer
- Be able to apply the 5-step problem-solving process to solve engineering problems using MS Excel
- Open, save and print Excel workbooks
- Learn the parts of the Excel window
- Execute commands using toolbar and menus
- Format spreadsheet cells
- Create borders and shading in Excel

Penn State Computing – Logging On:

On any of the campus computers at the Behrend College, students must log-on to the system to access the computer. Prior to logging-on, students must obtain an access account (an id and password). See a computer consultant in the Hammermill Building if you have not already received your access account.

The basic log-on procedure is: read the instructions for logging-on on the monitor screen and pick *ok*. Type in your Penn State access id followed by *@dce.psu.edu* and password in the next window box and pick *ok*. It will take a few moments to enter the Windows 10 environment. To log-out of the system, pick the *Start* button on the left side of the bottom taskbar, then pick the *log-out* option. For your own protection, **be sure to log-off when you have finished your computer session**.

Penn State Computing – cloud storage:

When you have a student access account established at Penn State, an allotment of network drive space will be assigned to you. This personal network drive will automatically be connected to any of the campus computers when you log on as the "V" drive as well as a Microsoft OneDrive account. You should use these spaces to save all of your coursework since it can be accessed from any campus computer at Behrend, and OneDrive can be accessed from any browser on or off campus. The V: drive can also be accessed from non-campus computers via a Remote Desktop connection through https://cloud.bd.psu.edu. Do **NOT** save your files to the "C:" drive of the lab computer if you want to keep them. The "C:" drive is the local drive space for the particular computer on which you are logged in. Any files saved to the "C:" drive will not automatically transfer to other campus computers and will be wiped daily from the lab computers.

Microsoft Windows 10:

All computers work by following instructions which are contained in programs or software. Windows 10 is an *operating system*, which is a program used by a computer to run other applications (programs) and to manage program files. The operating system on a computer also controls the computer devices, such as the monitor and printer. Windows XP, Windows 98, DOS, Unix and Mac OS are other operating systems. You may be familiar with Windows 7, Windows 8 or Windows 10 since many home computers use these as an operating system. Windows 10 is a commonly-used operating system provided by Microsoft. Most of the campus computers at Behrend use Windows 10, but some may use other operating systems.

The *taskbar* is the gray bar at the bottom of the Windows 10 desktop. As applications are opened, or started, an *application button* appears in the taskbar to represent that program. Clicking on the appropriate button in the taskbar can restore minimized applications. Figure 1-1 shows a typical taskbar. The current time is displayed at the right side of the taskbar, and the *Start Button* is on the left side.

Depending on the available memory in the computer, several applications can be open at the same time. Pick on the application buttons to switch between open applications.

Clicking on the Start Button brings up a single menu from which programs can be accessed. Program group icons have an arrow after them indicating that more menus are available. Program icons have no arrow. Figure 1-2 shows the start button menu. Program groups, displayed by picking on the Programs icon, are used to group similar software. For example, the *Word Processing* program group contains icons for MS Word, WordPerfect, etc. Click on the icon to start the program it represents.

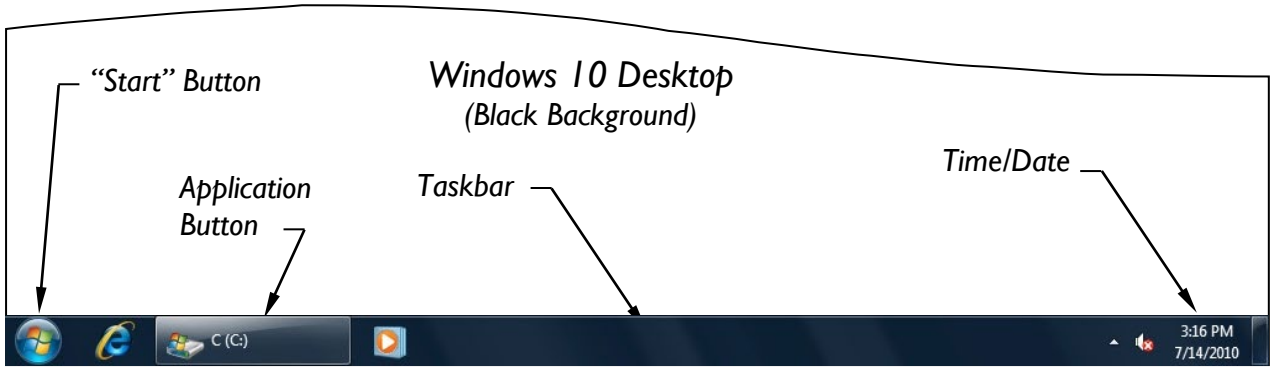


Figure 1-1: Windows 10 Taskbar

The menu found in the Behrend College computer labs also has an icon that is used to log-off from the system. **Be sure to log-off when you are finished with your computer session to keep your account secure.**

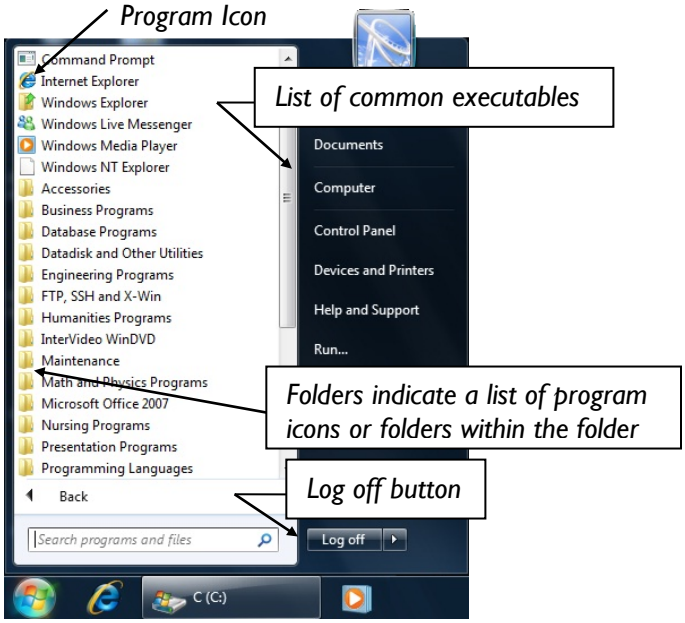


Figure 1-2: Start Button Menu

Computer Files:

When working with an application, your work can be saved as a *file* to a storage media. Files saved in this manner can be used again at a later date. Work which is not saved is permanently lost once the application is closed. Files can be saved on network drives, USB drives or to a local hard-drive. Penn State students should automatically have access to their personal network drive (V: drive) when logged into a campus computer. USB drives are portable while hard-disks are built into the computer allowing large quantities of data to be saved. In Behrend College computer labs, all personal files are erased from hard-drives each day.

Some of the files generated for this class may be quite large. Saving files on your network V: drive should assure the files will be accessable when you need them. Backing up data to a USB drive is also good practice.

Files are defined by their extension, the three letters after the <.> in the file name. Table 1-1 lists the file types which may be encountered throughout this course. Files are often organized by saving them in folders. Folders are represented with yellow filing folder icons and can be named to describe their contents. A filename can contain up to 255 characters, including spaces. A filename may not contain any of the following characters: \ / : * ? " < > | .

Table 1-1: Computer File Types

EXTENSION	FILE TYPE
.docx, doc	MS Word Document
.xlsx, xls	MS Excel Workbook
.ipt	Autodesk Inventor Part
.idw	Autodesk Inventor Drawing
.iam	Autodesk Inventor Assembly
.exe	Program or Executable file

Windows 10 Explorer:

The Windows 10 Explorer is the tool within Windows 10 used to manage computer files. The Explorer is accessed through the Programs icon in the Start Button menu. Figure 1-3 shows the typical parts of the Explorer window. The left panel shows the content of each disk attached to the computer. Picking on an item in the left panel highlights it. The contents of the highlighted folder is displayed in the right panel. Programs can be executed here by double-clicking on the icon. Some folders icons are attached to a plus (+) sign, which indicates that the folder contains subfolders. Clicking on the plus sign expands the folder to display the subfolders in the left panel. Once a folder has been expanded, the plus sign is replaced with a minus (-) sign. Folders having no subfolders are not attached to a plus sign. File icons are displayed in the right panel.

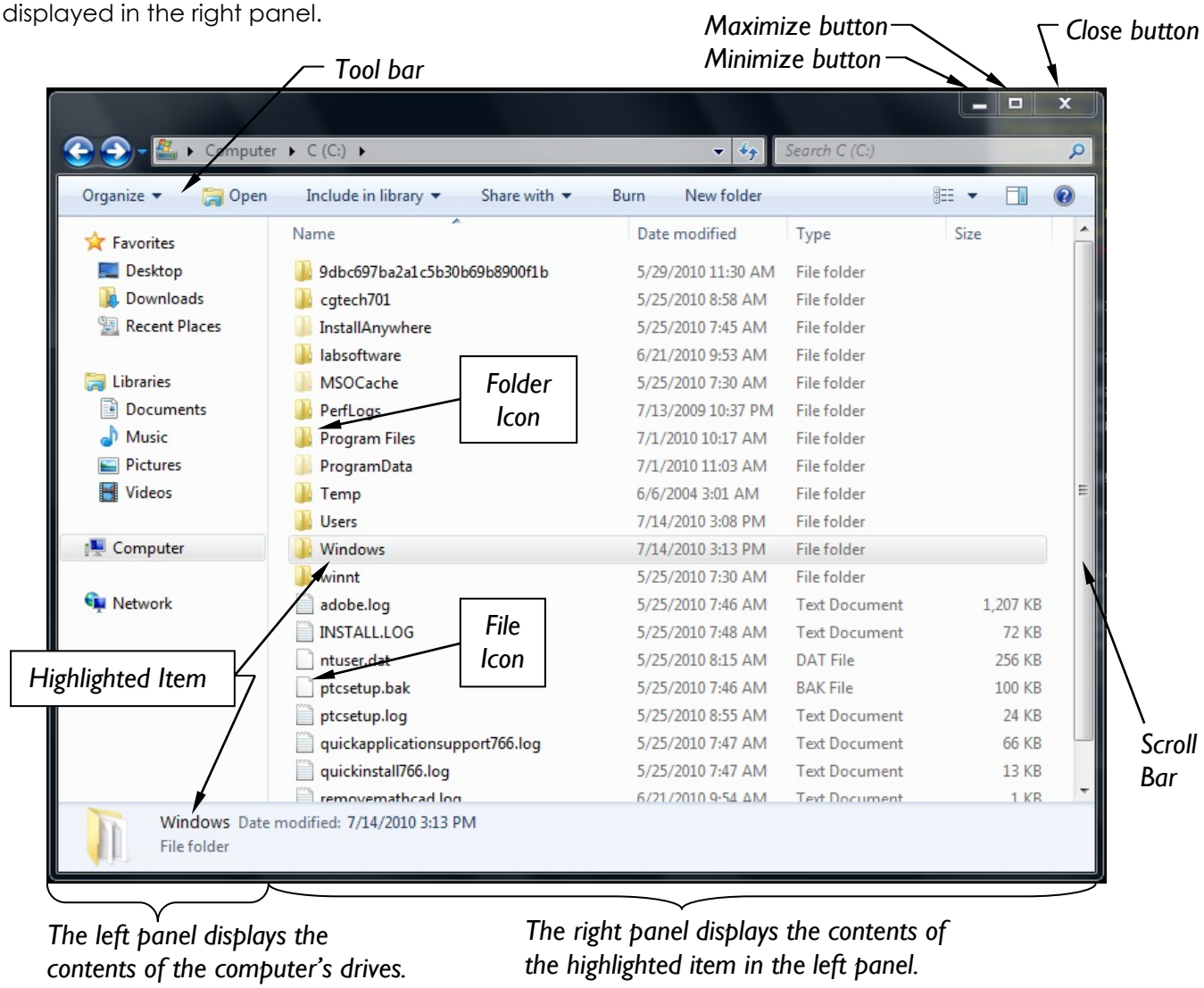


Figure 1-3: Windows Explorer Window

Close Button:

This button closes the application window and ends the application. See Figure 1-3 for location of the close button. Any work not saved before clicking this button is lost. It is usually better to pick File from the menu bar, then select ***Exit*** to quit an application.

Minimize Button:

This button closes the application window, but keeps the program active in the computer's memory. This allows you to work in several applications at a time. Pick the application button in the taskbar to restore the window to its size prior to minimizing.

Maximize Button:

This button expands the window to fill the monitor screen. The button switches to the "restore" button which can be used to restore the window to its original size prior to maximizing. This is helpful for having multiple applications open at one time.

Scroll Bar:

The scroll bars allows you to pan within the window to see hidden items. Click and drag the bar, or pick on the arrows at the end of the bar to scroll in increments.

Creating New Folders:

You may wish to create folders in order to organize your files. To create a folder, open the Windows Explorer. Left-click on the folder or disk icon in which you want to create the new folder. Move the cursor to the right panel of the Explorer. Pick the right mouse button and drag down to "New," then select the "Folder" line. A name can now be typed for the "New folder."

Renaming an Existing Folder:

To rename an existing folder, right-click the folder icon in the Windows Explorer and choose the rename option. Type the new name. Files can be renamed in a similar fashion. Application files should not be renamed since this may cause the application to not run in the future.

Deleting an Existing Folder:

In the Windows Explorer, left-click on the folder to highlight. Press the delete key on the keyboard. The folder and its file contents are deleted. Windows should ask if you are sure you want to delete the folder and files. Files are deleted in a similar fashion.

Moving/Copying Files & Folders:

Moving a file or folder means that the item is completely relocated and no copy is left in the original location. This is the process used for moving working files from the computer hard-drive to a floppy disk/memory stick. Copying a file or folder means creating an additional copy of the item in a new location. The item also remains in the original location.

Copy: Make sure the destination location is visible in the Explorer. Left-click on the file or folder to be copied. While holding the left mouse button down, drag the file (or folder) to the new location. Release the button when the cursor is over the destination.

Move: A move is the same as copy, except the shift key is pressed while dragging the file or folder.

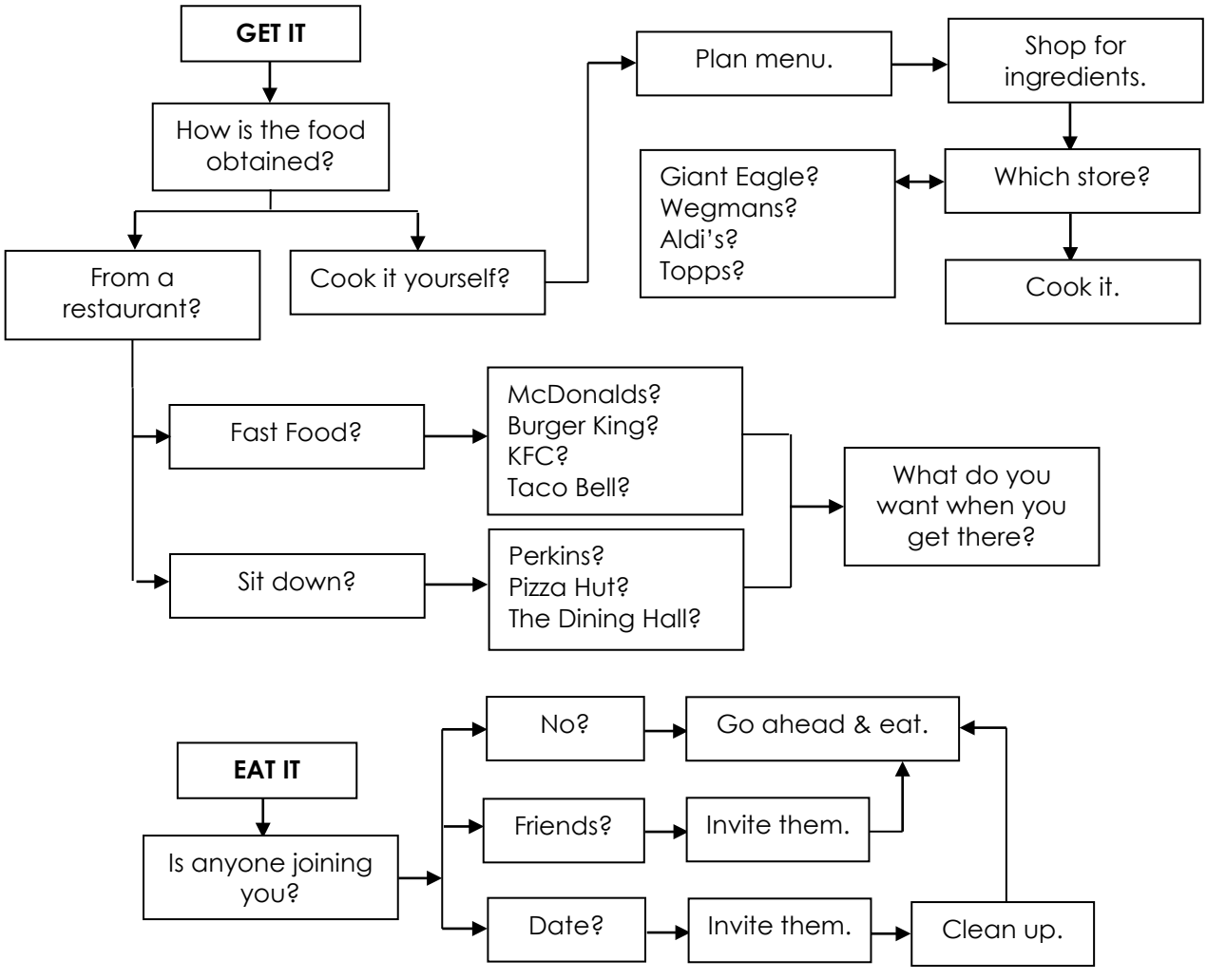
Problem-Solving:

Engineering is the profession in which people solve all kinds of problems using systematic problem-solving methods. In order to become successful engineers, students must become very familiar with the process of problem solving. The text describes a five-step problem solving process. The first step in the process, which is the most critical, is to define the problem. What is the problem to be solved? During the 1960's, NASA spent millions of dollars trying to develop a space capsule material that would not melt during re-entry. The actual solution was to attach a heat shield to the bottom of the capsule. The heat from the friction between the capsule and the atmosphere actually evaporates the heat shield. This evaporative process removes heat from the capsule and prevents it from melting. Clearly, proper definition of the problem is critical in engineering design.

Once a problem is defined, it needs to be broken down into managable chunks. This process, called step-wise refinement, makes even the most difficult problems easier to solve. People often use step-wise refinement while preforming everyday tasks.

EXAMPLE 1: Use step-wise refinement to "design a dinner".

The three main steps to a typical dinner are (1) get it, (2) eat it, and (3) clean up. The decisions made to complete each step are shown below. Note that most questions are followed by other questions. Once all the questions are answered, dinner will be "designed".



The clean up step includes clearing the dishes, washing them, and putting them away. Take out the trash. Clearly each of the three steps has a number of decisions to be made. Notice that the decision about someone joining you for dinner will likely be made before the decision on what to have for dinner. Part of

solving a problem is deciding what to do first. Once the problem is broken down into managable chunks, the chunks have to be prioritized and completed in an orderly fashion.

Spreadsheets:

One tool that engineers frequently use for solving problems is Mircosoft Excel. Excel is a spreadsheet software which enables engineers to do repetitive calculations quickly while giving them the ability to ask "what if?" type questions. Excel has many powerful functions which can be used to solve complicated engineering problems. A spreadsheet can display text and numerical values in a grid of cells with each cell being identified with a lettered column and a numbered row. Text, numbers, or equations can be entered in a cell. Equations can reference values located in other cells by referencing the corresponding column and row. Spreadsheets can also visually present data through graphs.

The text discusses a five step problem-solving model using Excel. Figure 1-4 shows the Excel format which will be used to solve problems in this course. You are expected to use this format for solving each problem. You can save time by creating a template file that has this format created. The template can be accessed when starting each problem. Examples of this method are shown in Lesson 2.

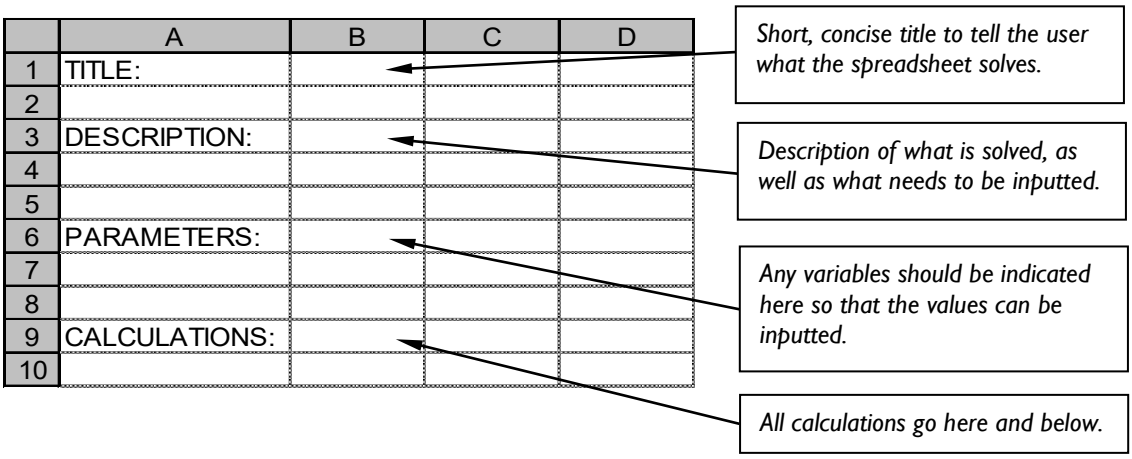


Figure 1-4: Basic Excel Problem-Solving Format

Formatting a Spreadsheet:

The presentation of your data and calculations on a spreadsheet can be greatly clarified and enhanced through formatting. Most of the formatting tools you will need can be found under the "Home" ribbon in the toolbar as shown in Figure 1-5. Refer to the toolbar shown for the following formatting descriptions. Also, more options can be chosen for each of the formatting boxes on the toolbar using the button in the lower-right corner of the box.

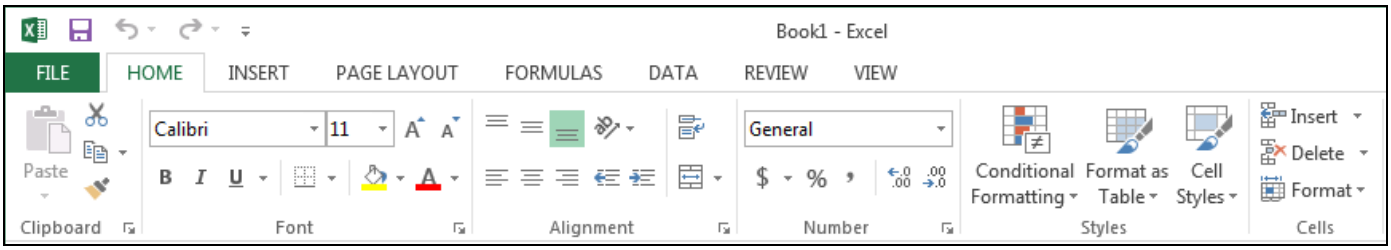


Figure 1-5: Microsoft Excel Home Ribbon

Cell Formatting – Alignment:

The location of the contents of a cell can be set using the buttons in the *Alignment* box on the toolbar. The vertical alignment defaults to the bottom of the cell, but centered and top alignment can be selected. For horizontal alignment, text input will default to *Left* while numbers will default to *Right*. The horizontal alignment can be changed between Left, Center, and Right using the buttons on the toolbar for a single or a selected group of cells. A group of adjacent can be highlighted and combined into once cell using the *Merge & Center* button.

Cell Formatting – Borders & Shading:

Lines can be placed on different edges of cells to create borders around individual or groups of cells in order to organize and present certain information. With a single or group of cells selected, a variety of different options for borders can be applied with the  drop-down button in the *Font* box. The *More Borders* option allows for more flexible options for creating or modifying borders. The color of the cell (shading) can also be chosen with the  drop-down box in the *Font* box.

Font Formatting – Font Styles:

The style of the contents of a cell can be set using the *Font* box on the toolbar. Button options include making the text bold, itallicized, or underlined with additional options including subscript and superscript. The font size can be selected using the drop-down box (default is 11 point), or the size can be increased or decreased using the up and down size buttons. The color of the font can also be chosen with the drop-down box in the *Font* box.

Font Formatting – Number Styles:

Some values in spreadsheets should be presented in terms or currency, times, dates, percentages, fractions or scientific notation. The numerical style of values can be selected with the buttons and drop-down boxes in the *Number* box on the toolbar.

Font Formatting – Font Types:

Many different types of fonts are installed on the campus computers. You may be familiar with some font types such as Times Roman or Arial. Microsoft Excel uses a default font type called Calibri. The drop-down box in the *Font* box on the toolbar can be used to select different font types. Greek letters are commonly used in engineering practice and can be used in a spreadsheet by using the *Symbol* font. The symbol characters are shown in Table 1-2 along with their Arabic letter counterparts.

Table 1-2: Greek Letters Using Symbol Font

Arabic Letter	Symbol Font	Arabic Letter	Symbol Font	Arabic Letter	Symbol Font	Arabic Letter	Symbol Font	Arabic Letter	Symbol Font
A	Α	L	Λ	W	Ω	h	η	s	σ
B	Β	M	Μ	X	Ξ	i	ι	t	τ
C	Χ	N	Ν	Y	Ψ	j	φ	u	υ
D	Δ	O	Ο	Z	Ζ	k	κ	v	ϖ
E	Ε	P	Π	a	α	l	λ	w	ω
F	Φ	Q	Θ	b	β	m	μ	x	ξ
G	Γ	R	Ρ	c	χ	n	ν	y	ψ
H	Η	S	Σ	d	δ	o	ο	z	ζ
I	Ι	T	Τ	e	ε	p	π	@	≅
J	ϑ	U	Υ	f	ϕ	q	θ	$	∃
K	Κ	V	ς	g	γ	r	ρ	^	⊥