Lecture Note #1: Excel Basics

BUSI 201: Business Data Analysis

Spring 2024

Topic 1. Accessing Excel

For this course, the default option for accessing Excel will be through the desktop application. To open Excel, click the `Start` button located in the taskbar in the bottom of your screen.
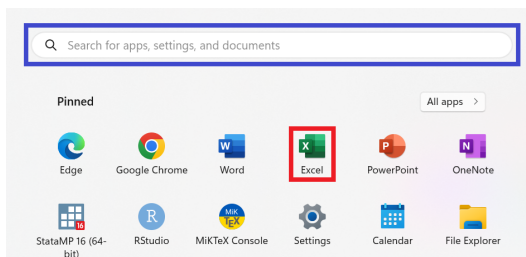

Figure 1: Taskbar

Figure 2: Start Menu

In the start menu that pops up, either select the app in the red box, or search for `Excel` using the search function in the blue box to access the desktop version of Excel. You may also access an online version of Excel from Microsoft 365, but we will be sticking to the desktop version for this course.
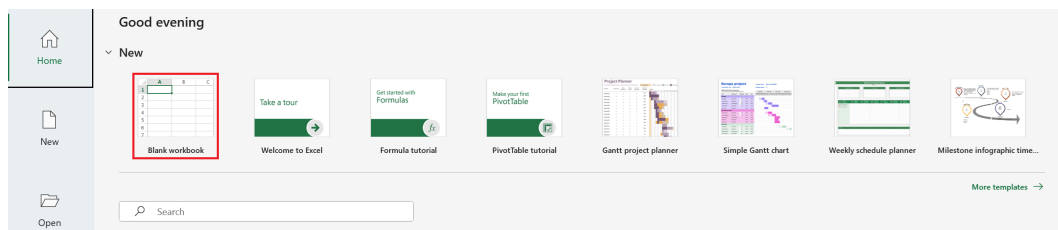

Figure 3: Backstage View

With the Excel window opened, you can start a new workbook by clicking the red box in Figure 3.

We will try to stay away from the online Microsoft 365 version of Excel for the duration of this couse.

Topic 2. What are Spreadsheets

Spreadsheets are essentially collections of data organized into columns and rows. One can think of columns as data stacked on top of each other, while rows represent data arranged side-by-side. The points where columns and rows intersect are known as "cells," which contain the data. A group of these data-holding cells constitutes a spreadsheet.
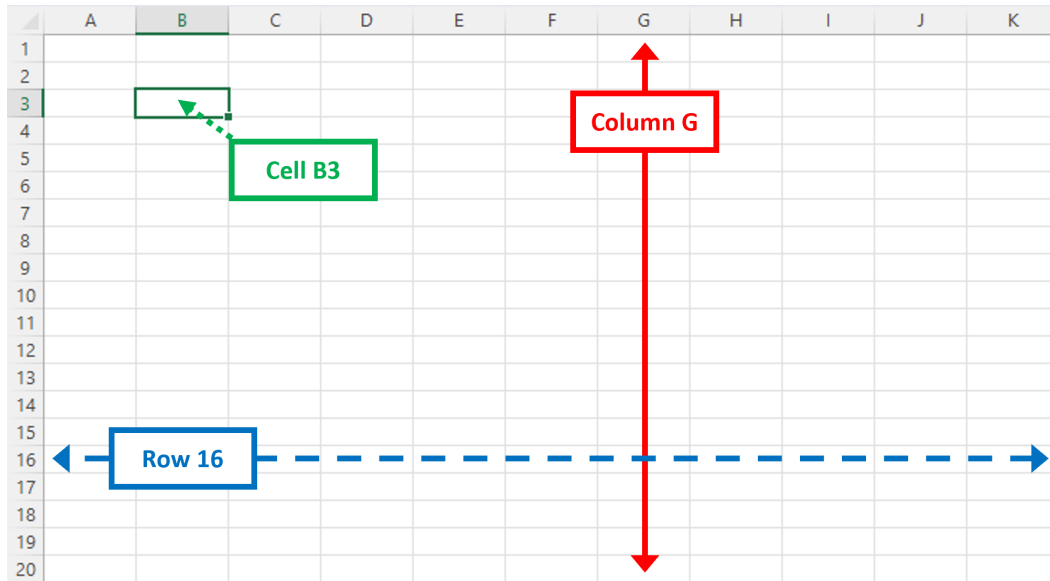

Figure 4: Rows, Columns, and Cells

Columns are labeled using a range of 16,384 letters, and rows are numbered up to 1,048,576. As a result, a single Excel sheet contains a total of 17,179,869,184 cells. The convention for referencing cells is to mention the column followed by the row (e.g., `W18`). You needn't memorize the exact numbers, but it's important to recognize that there are limitations to the dimensions of data that Excel can handle.

- Coumns: `A, B, ⋯, Z, AA, AB, ⋯, ZZ, AAA, AAB, ⋯, XFD`

- Rows: `1, 2, ⋯, 1048576`

- Cells: `A1, A2, ⋯, XFD1048576`

Topic 3. Entering and Editing Data in Excel

Each cell in Excel can have an entry that is either text, numbers, or formulae. To add information to an empty cell in Excel, you can simply select the cell you wish to store information, and type in the desired information. Once you are finished typing in the desired information, simply press the `enter` key on your keyboard. In order to overwrite information in any cell, select said cell, and typing in the new information that you want, pressing `enter` will automatically overwrite the pre-existing information in said cell.
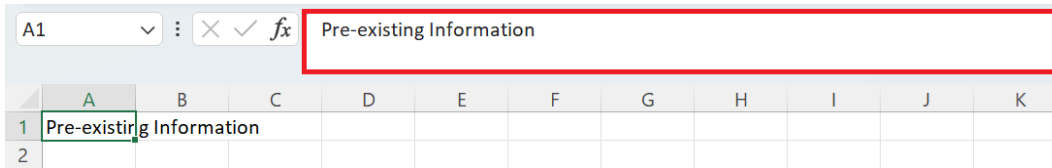
Figure 5: Editing Information in Cells

In order to edit some parts of pre-existing information in a cell, you may first select the cell that contains the information you want to change, and either (a) double-click the cell, (b) press f2 to enter editing mode, or (c) directly edit information in the formula bar in the red box in Figure 5.

Topic 4. Row Heights and Column Widths

Row Height

Please take some time to compare the two tables below, and consider which is more "readable". The figure to the left is set to the default row height of 14.4, and to its right is the same table with the row height adjusted to 18.2.

STATE	TOP CROPS				
	#1	#2	#3	#4	#5
US-AZ	COTTON	WHEAT	LETTUCE	BARLEY	MELONS
US-CA	COTTON	HAY & HAYLAGE	WHEAT	GRAPES	RICE
US-FL	ORANGES	SUGARCANE	PEANUTS	GRAPEFRUIT	SOYBEANS
US-GA	COTTON	SOYBEANS	PEANUTS	CORN	WHEAT
US-ID	WHEAT	BARLEY	POTATOES	HAY & HAYLAGE	SUGARBEETS
US-IL	CORN	SOYBEANS	WHEAT		
US-IN	CORN	SOYBEANS	WHEAT		
US-KS	WHEAT	SORGHUM	CORN	SOYBEANS	HAY & HAYLAGE
US-KY	SOYBEANS	CORN	WHEAT	TOBACCO	
US-MI	CORN	SOYBEANS	WHEAT	HAY & HAYLAGE	BEANS
US-NC	SOYBEANS	CORN	WHEAT	CORN	TOBACCO
US-NJ	SOYBEANS	CORN	WHEAT	SWEET CORN	POTATOES
US-NY	HAY & HAYLAGE	CORN	WHEAT	SOYBEANS	OATS
US-OH	SOYBEANS	CORN	WHEAT	HAY & HAYLAGE	OATS
US-OR	WHEAT	BARLEY	POTATOES	OATS	CORN
US-PA	CORN	HAY & HAYLAGE	SOYBEANS	WHEAT	OATS
US-TN	SOYBEANS	CORN	COTTON	WHEAT	SORGHUM
US-TX	COTTON	WHEAT	SORGHUM	HAY & HAYLAGE	CORN
US-WA	WHEAT	BARLEY	HAY & HAYLAGE	POTATOES	CORN
US-WI	CORN	HAY & HAYLAGE	SOYBEANS	OATS	WHEAT
MX-AGU	CORN	BEANS	ALFALFA	GUAVA	OATS
MX-BCN	WHEAT	COTTON	ALFALFA	BARLEY	SORGHUM
MX-CHH	CORN	OATS	BEANS	ALFALFA	COTTON
MX-CHP	CORN	COFFEE	BEANS	GRASS	COCOA
MX-CMX	CORN	OATS	CACTUS	BEANS	BROCCOLI
MX-COA	GRASS	CORN	SORGHUM	COTTON	OATS
MX-COL	GRASS	LEMON	COCONUT	CORN	SUGARCANE
MX-DUR	BEANS	CORN	OATS	SORGHUM	ALFALFA
MX-GRO	CORN	COCONUT	GRASS	COFFEE	MANGO
MX-GUA	CORN	SORGHUM	WHEAT	BEANS	ALFALFA
MX-HID	CORN	BARLEY	BEANS	ALFALFA	COFFEE
MX-JAL	CORN	GRASS	SORGHUM	SUGARCANE	WHEAT
MX-MEX	CORN	OATS	GRASS	BARLEY	WHEAT
MX-MIC	CORN	SORGHUM	AVOCADO	GRASS	WHEAT
MX-MOR	CORN	SORGHUM	SUGARCANE	BEANS	TOMATO
MX-NAY	BEANS	CORN	SORGHUM	GRASS	SUGARCANE
MX-NLE	GRASS	CORN	SORGHUM	WHEAT	ORANGES

Figure 6: Row Height = 14.4

STATE	TOP CROPS				
	#1	#2	#3	#4	#5
US-AZ	COTTON	WHEAT	LETTUCE	BARLEY	MELONS
US-CA	COTTON	HAY & HAYLAGE	WHEAT	GRAPES	RICE
US-FL	ORANGES	SUGARCANE	PEANUTS	GRAPEFRUIT	SOYBEANS
US-GA	COTTON	SOYBEANS	PEANUTS	CORN	WHEAT
US-ID	WHEAT	BARLEY	POTATOES	HAY & HAYLAGE	SUGARBEETS
US-IL	CORN	SOYBEANS	WHEAT		
US-IN	CORN	SOYBEANS	WHEAT		
US-KS	WHEAT	SORGHUM	CORN	SOYBEANS	HAY & HAYLAGE
US-KY	SOYBEANS	CORN	WHEAT	TOBACCO	
US-MI	CORN	SOYBEANS	WHEAT	HAY & HAYLAGE	BEANS
US-NC	SOYBEANS	CORN	WHEAT	CORN	TOBACCO
US-NJ	SOYBEANS	CORN	WHEAT	SWEET CORN	POTATOES
US-NY	HAY & HAYLAGE	CORN	WHEAT	SOYBEANS	OATS
US-OH	SOYBEANS	CORN	WHEAT	HAY & HAYLAGE	OATS
US-OR	WHEAT	BARLEY	POTATOES	OATS	CORN
US-PA	CORN	HAY & HAYLAGE	SOYBEANS	WHEAT	OATS
US-TN	SOYBEANS	CORN	COTTON	WHEAT	SORGHUM
US-TX	COTTON	WHEAT	SORGHUM	HAY & HAYLAGE	CORN
US-WA	WHEAT	BARLEY	HAY & HAYLAGE	POTATOES	CORN
US-WI	CORN	HAY & HAYLAGE	SOYBEANS	OATS	WHEAT
MX-AGU	CORN	BEANS	ALFALFA	GUAVA	OATS
MX-BCN	WHEAT	COTTON	ALFALFA	BARLEY	SORGHUM
MX-CHH	CORN	OATS	BEANS	ALFALFA	COTTON
MX-CHP	CORN	COFFEE	BEANS	GRASS	COCOA
MX-CMX	CORN	OATS	CACTUS	BEANS	BROCCOLI
MX-COA	GRASS	CORN	SORGHUM	COTTON	OATS
MX-COL	GRASS	LEMON	COCONUT	CORN	SUGARCANE
MX-DUR	BEANS	CORN	OATS	SORGHUM	ALFALFA
MX-GRO	CORN	COCONUT	GRASS	COFFEE	MANGO

Figure 7: Row Height = 18.2

While there isn't a definitive consensus on the ideal row height for a given document, a useful rule of thumb is to aim for around 1.5~1.7 times your font size. For instance, with a font size of 12, a suitable range for your row height would be between 18 and 20.4. Nevertheless, this guideline heavily relies on factors such as the document's purpose, target audience, and whether it's intended for paper printing, among other considerations.

Adjusting the Height of a Row

To adjust the height of a single row, start by left-clicking on the row number that you want to modify. Next, right-click on the same row number to bring up a menu, as illustrated in Figure 8.
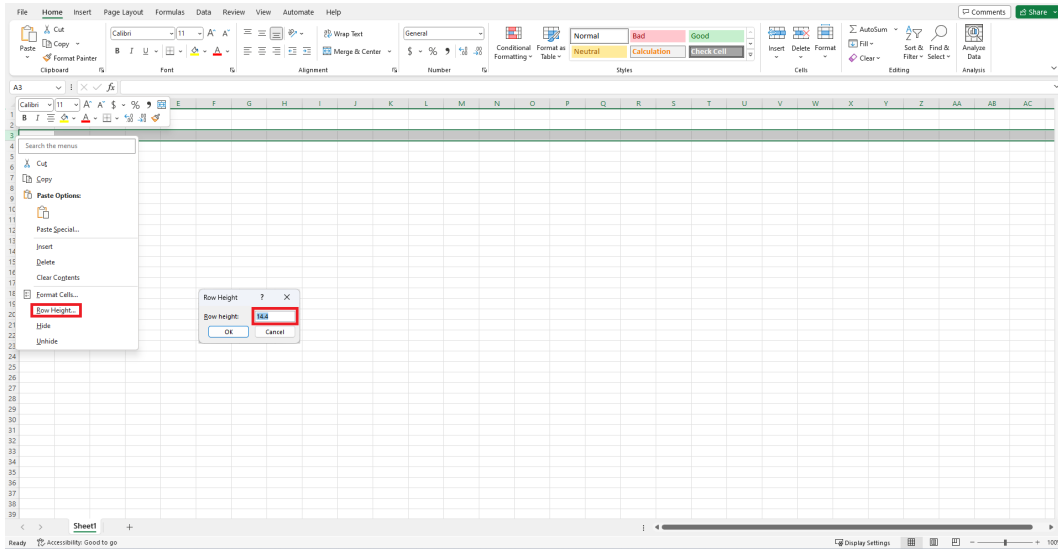

Figure 8: Adjusting the height of row 3

Adjusting the Height of Multiple Rows

To modify the row height for multiple rows, follow these steps: left-click on the first row you want to include, hold down the $\boxed{\text{Shift}}$ key, and then left-click on the last row you want to adjust. After that, release the $\boxed{\text{Shift}}$ key. Next, right-click on any of the selected row numbers and proceed with the same steps as you would when changing the height of a single row.
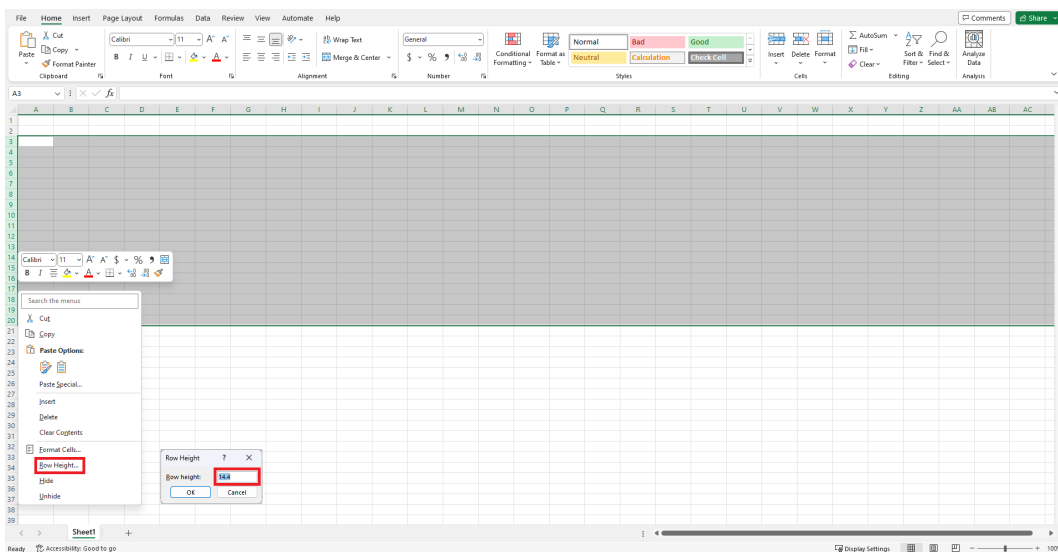
Figure 9: Adjusting the height of rows 3 to 20

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Adjusting the Height of All Rows

In Excel, left-clicking on the top left-hand corner, as shown in Figure 10, will select all cells in the sheet. Once you have selected all cells, you can adjust the height of all rows by right-clicking on any of the row numbers and then following the same steps as you would for changing the height of a single row.
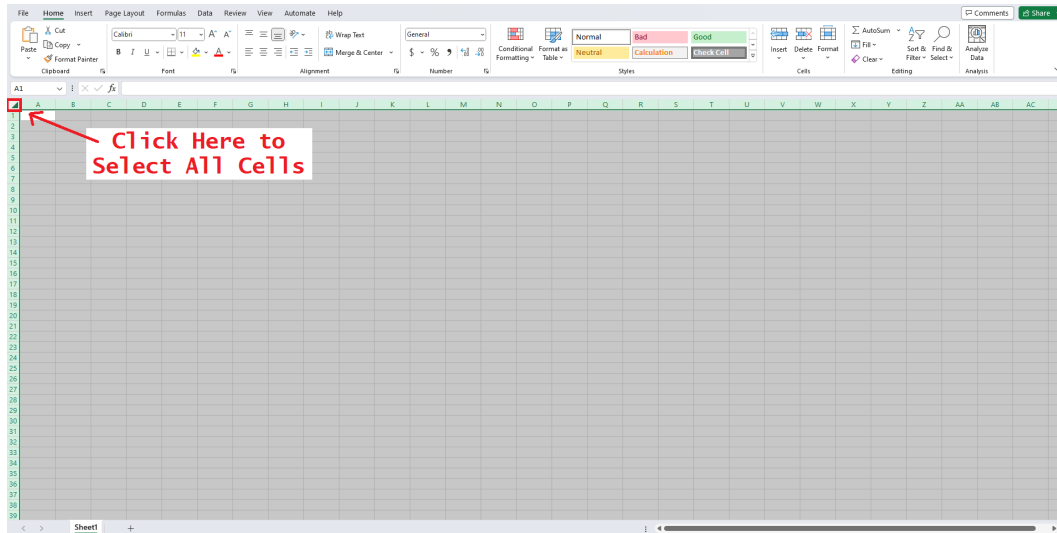
Figure 10: Selecting all cells

Width of Columns?

Similar to adjusting row heights, the width of each column may need to be modified to accommodate the length of the information stored in specific cells. As with rows, there is no definitive rule to follow when determining the width of a column. Feel free to experiment with different widths, but ensure that all the information in the column remains easily visible.
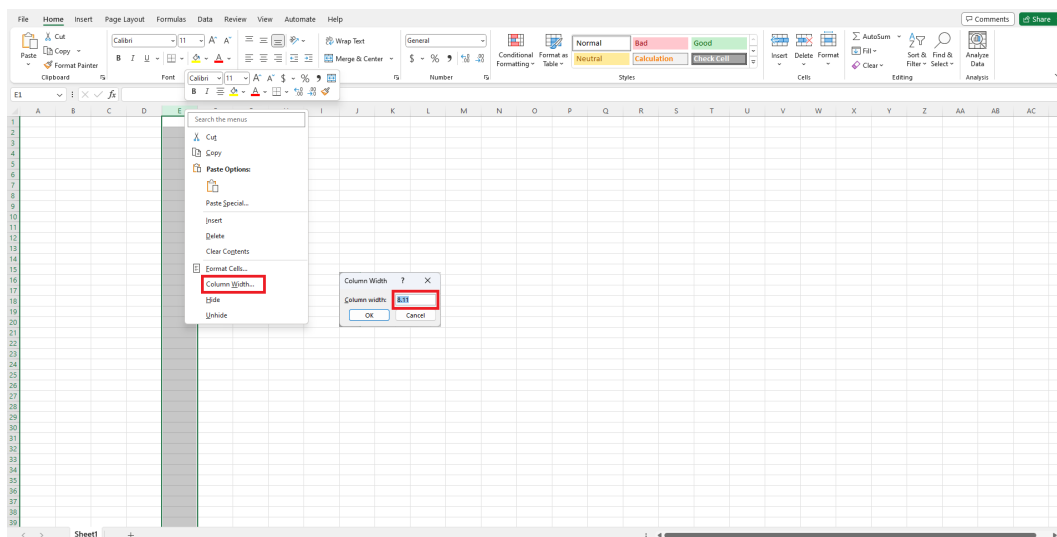
Figure 11: Adjusting the width of column E

Automatic Adjustments

If you're uncertain about the appropriate width or height for specific columns or rows, there's a way to let Excel make the selection for you. If you encounter a column (or row) that is too narrow (or short) to display all of its content, you can hover your mouse over the "end" of the column (or the "bottom" of the row) as shown in Figure 12. The mouse cursor should change its shape, and when you double-click, Excel will examine all the elements in the column (or row) and adjust the width (or height) to neatly fit all the content.
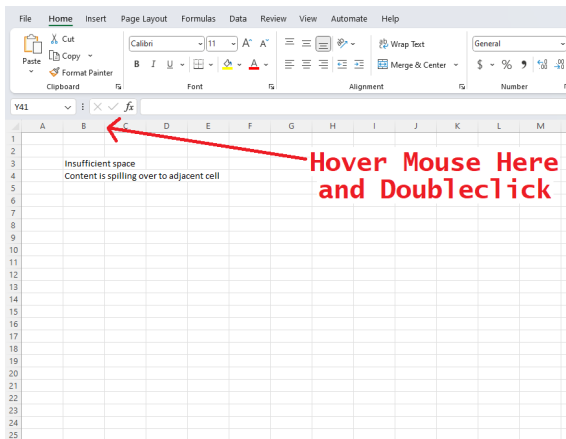
Figure 12: Narrow columns
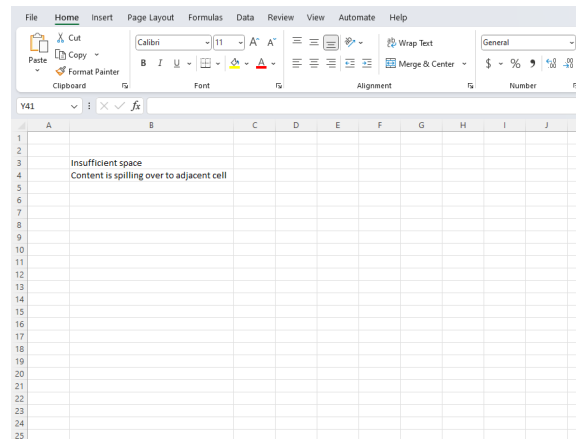
Figure 13: Column width adjusted

Topic 5. Fonts, Alignments, Colors

Font and Font Size

There are various formatting options when it comes to text in cells. The first topic we will be covering is a review of the font and font size. Recall that the font and font size can be edited accessing the Home tab of the ribbon. You may change the font by either selecting or typing in your desired font in the red box in Figure14. The font size can be changed similarly by using the blue box. A quick alternative to selecting the font size using the blue box would be to use the options given in the orange box to enlarge or shrink the font size of the selected cell(s).
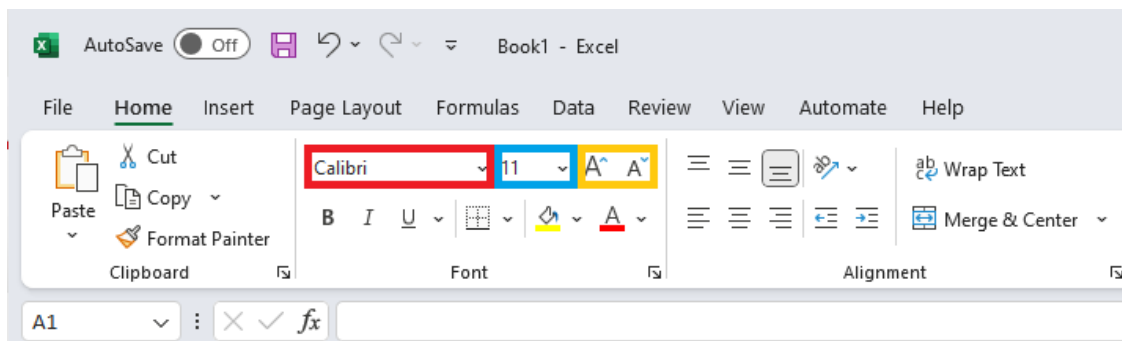

Figure 14: Font and Font Size

Alignment

Users may also change the alignment of the content in a given cell both vertically and horizontally. The contents' vertical alignment within the cell can be changed using the options in the red box of Figure 15. The left aligns contents to the top of the cell, the middle aligns contents to the middle, and the right aligns items to the bottom of each cell. Using the options in the blue box, we can align the content horizontally within the selected cell(s). The two options in the orange box can decrease and increase how much the content is indented in each cell(s). Finally, the green box is an option that can be used to angle the text in various directions.
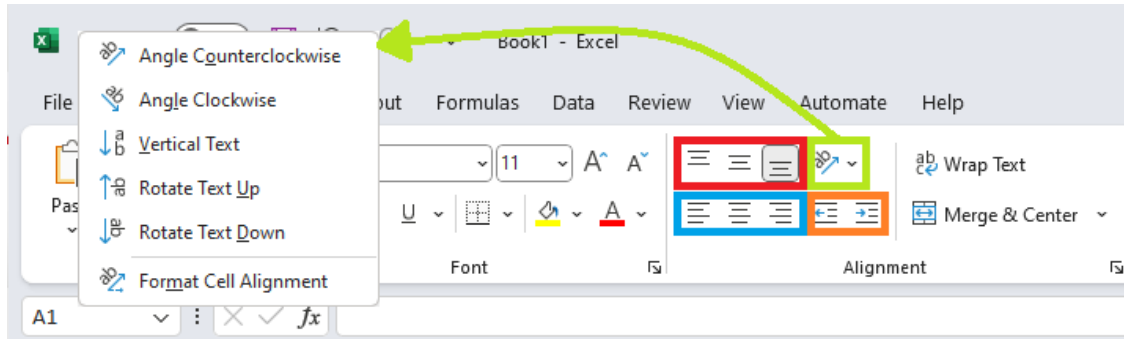
Figure 15: Alignment Options

Colors

Excel allows users to change the color of the content in cells by using the font color options located in the Home tab, highlighted by a red box in Figure 16. The background color of cells can also be changed using the option highlighted by the blue box. Selecting the V on either of the two options will open up the option window shown to the right of Figure 16 where users can choose their color of choice.
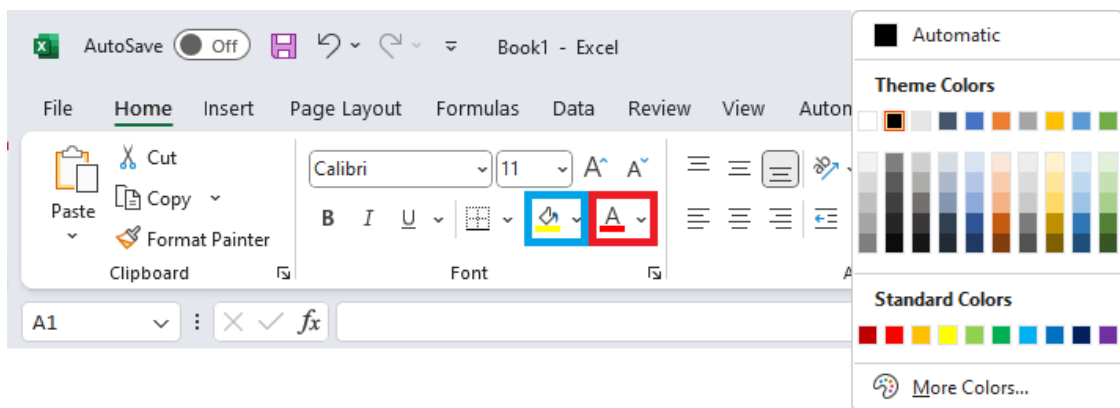

Figure 16: Font and Cell Color Options

Multiple Lines in a Single Cell

Sometimes users may have certain cells that contain a large amount of text so that it does not nicely fit in one cell. While one may expand the cell width to ensure all content is displayed, this unneccessarily limits the amount of information visible in one sheet by taking up space. One way to work around this issue is to have line breaks within a given cell. In these scenarios users can make use of the wrap text option found in the region highlighted by the red box in Figure 17. An alternate method would be to manually break lines using `alt`+`enter` while editing the content of a given cell.
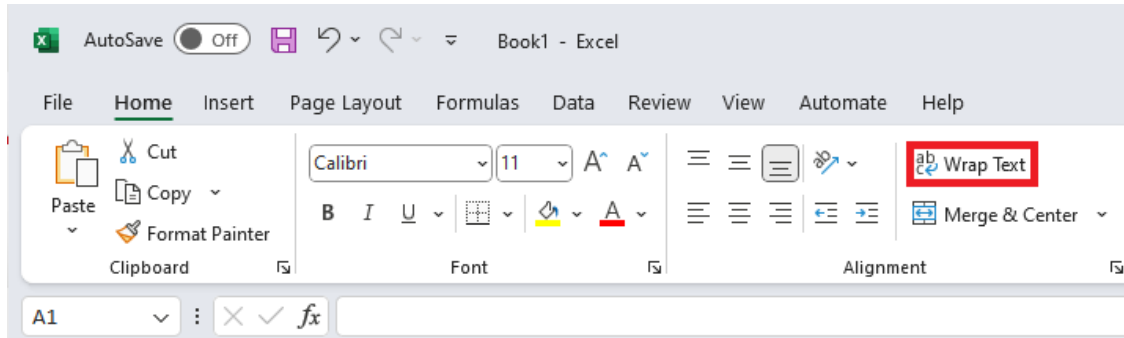
Figure 17: Wrap Text Option

Formatting Contents in Cells

We briefly covered the topic of formats and how it influences the cells' contents. Recall that we can change the content format of the cell by using the dropdown list highlighted in the red box in Figure 18. The blue box is a collection of shortcuts (left to right) to some commonly used formats, being currency(accounting), percentage, and adding commas for each 10^3. Finally the buttons in the orange box can be used to add and remove decimal points.
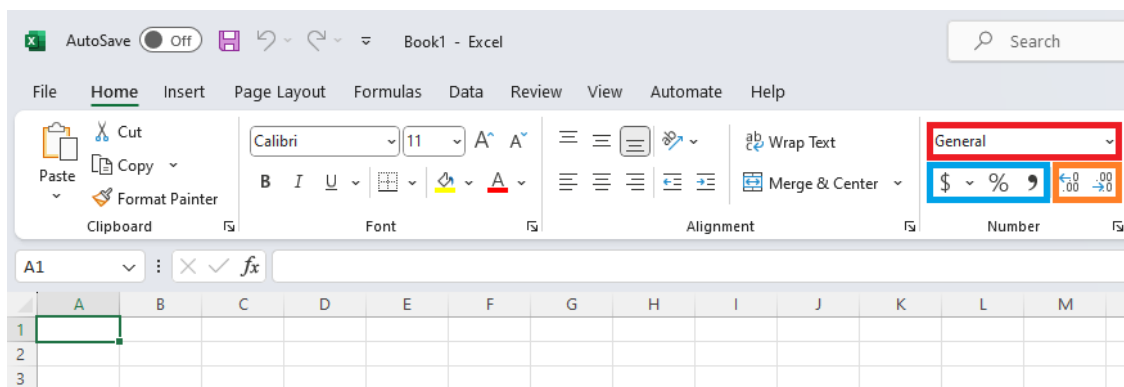

Figure 18: Content Formatting

Merge Cells

The merge cell command can be used to merge multiple cells into one larger cell. This function is typically used to create titles, subtitles, added notes to the bottom of a table, etc. To use this command, users first select the cells that they wish to merge into one, and then click on the merge and center button highlighted by the red box in Figure 19. Accessing the dropdown menu by clicking the V, users can choose different options when it comes to merging cells.
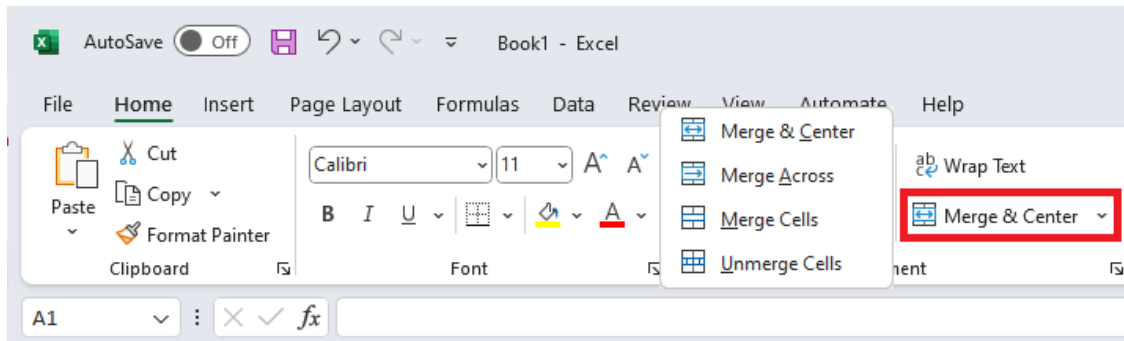

Figure 19: Merging Cells

Merge Alternatives

Merging cells can cause issues when we need to reference cells, copy and pasting, or hiding cells from view. A neat alternative is to use the "center across selection" alignment option. Users should first select the region where the text should be centered in, right click on the selected region, and select the Format Cells option, and select "Center Across Selection."
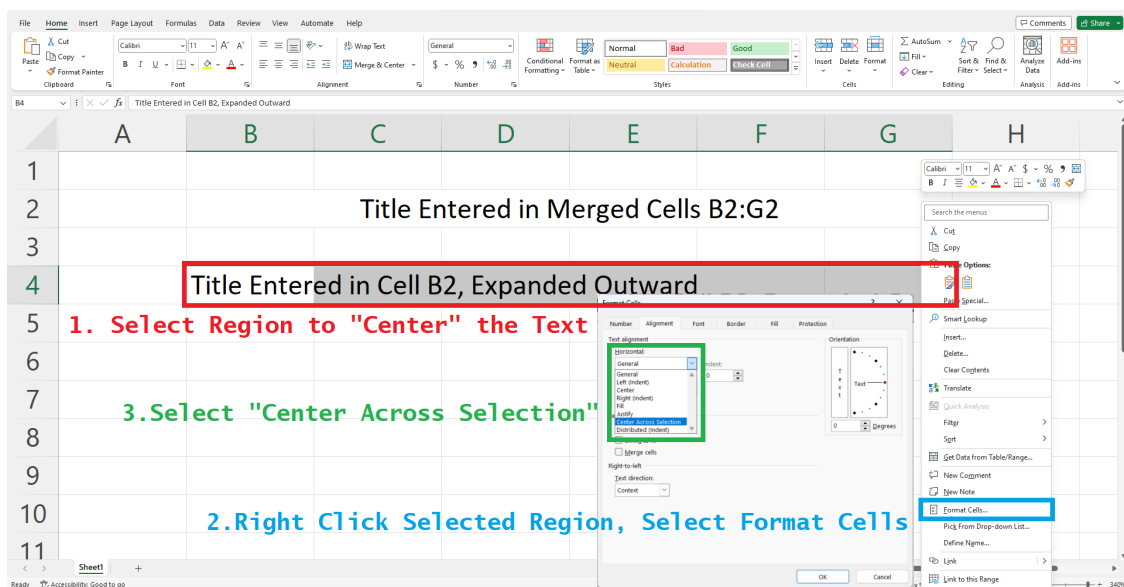

Figure 20: Alternative to Merge and Center

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Borders

Boders in the context of Excel refer to any lines that users may place in or around cells. By default, Excel does not print the borders of each cell, instead has light gray gridlines that do not show up when printing the material.[1] In order to add borders to your worksheet, first select the range where you are seeking to add borders. Then, navigate to the borders button in the Home tab highlighted by the red box in Figure 21, and click on the dropdown button ⌄ to see the available options.
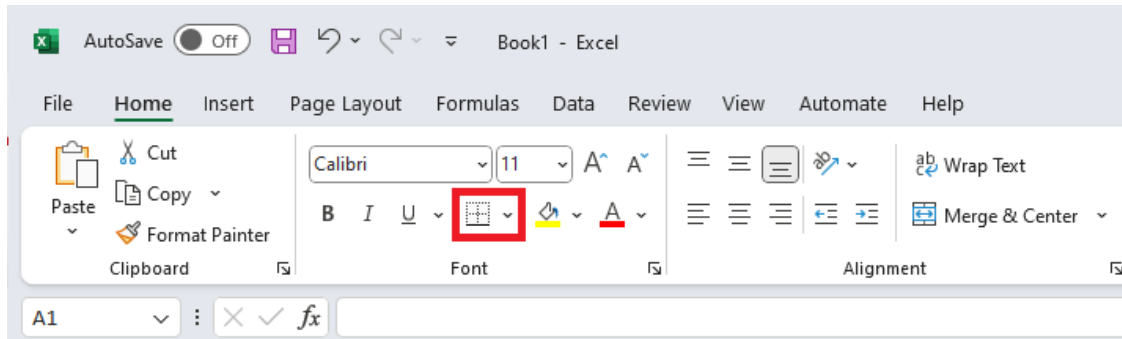

Figure 21: Borders Button Location

Figure 22 shows us the available preset options when it comes to the borders. While it is perfectly fine to apply any of these options, we are primarily interested in the last option, "More Borders…" Selecting this option will bring us to Figure 23. Here we can manually tell Excel which borders we want to add, the colors they should be, and the patterns and thickness, etc.
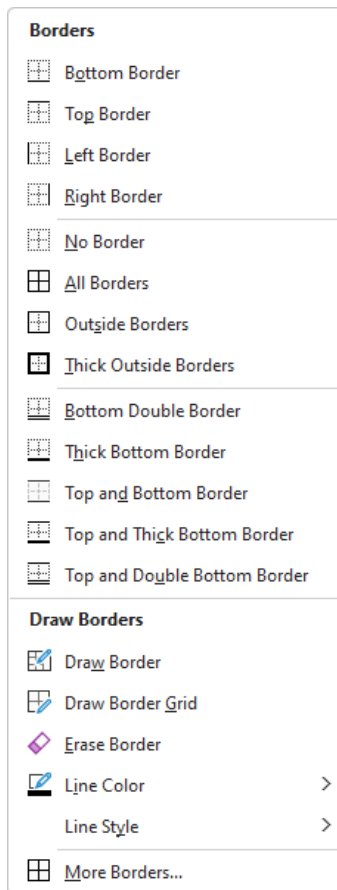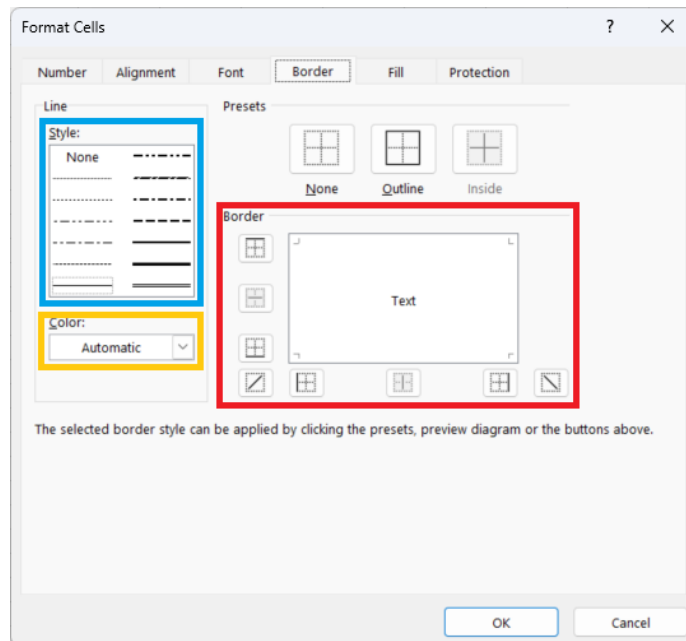

Figure 22: Border Dropdown

Figure 23: Border Options

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[1]Setting the cells' background color to be white will hide the gridlines from those cells.

Topic 6. Worksheets

Adding New Worksheets

A single Excel work'book' can have multiple work'sheets'. To add another worksheet to your current workbook, simply click on the + sign on the bottom of the window. It is highlighted by a red box in Figure 24.
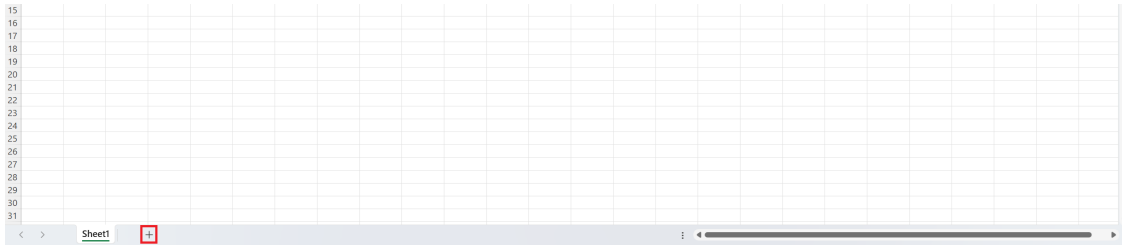

Figure 24: Adding New Worksheets

Renaming Worksheets

By default, each sheet will be named `Sheet#` where # increases from 1,···. Since this naming scheme does not reflect the information contained in each worksheet, Excel allows users to rename each worksheet. To change the name of the worksheet, right click the worksheet's tab on the bottom of the window, and select `rename` in the red box. You may also double-click the name of the worksheet to rename the worksheet.
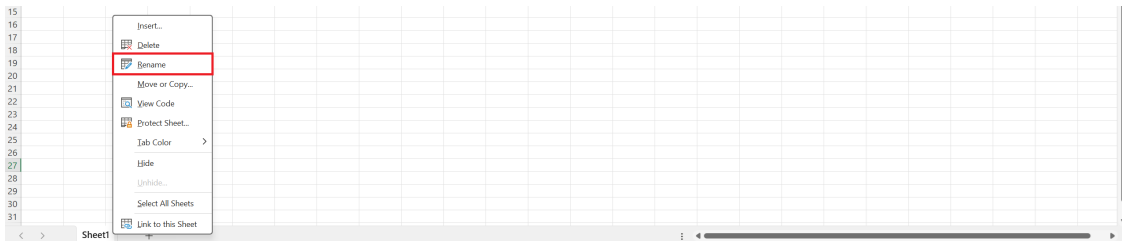

Figure 25: Renaming Worksheets

Navigating Between Worksheets

The easiest way of navigating between worksheets is to left click the worksheet tab on the bottom of the window. You can also navigate between adjacent worksheets using the hotkeys ctrl+pageup to move to the previous sheet or ctrl+pagedown to move to the next sheet. Holding down the hotkeys will take you to the first and last worksheets, respectively.

The Activate Worksheet Window

However, in a real-world scenario, the list of worksheets could be much longer and more detailed, with dozens of sheets spanning several years. If worksheet names are sufficiently long, locating and clicking on the desired worksheet might become challenging. What can be done in such situations? The most "powerful" method for navigating between worksheets is to use the `Activate` option. Right-clicking the boxed region shown in Figure 26 will bring up the `Activate` window, which displays the complete list of worksheets included in the workbook.
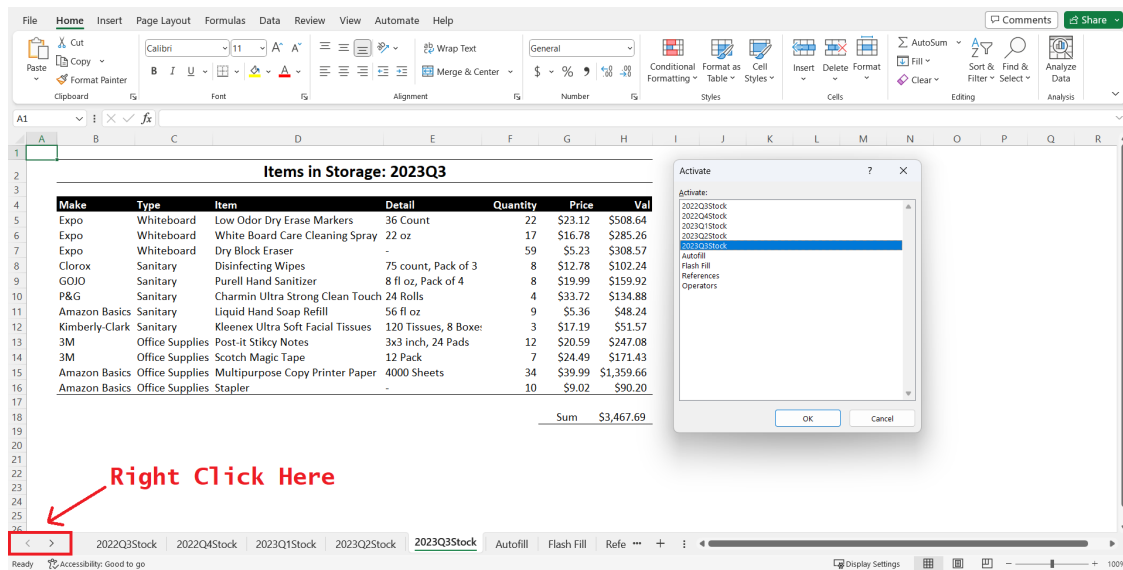

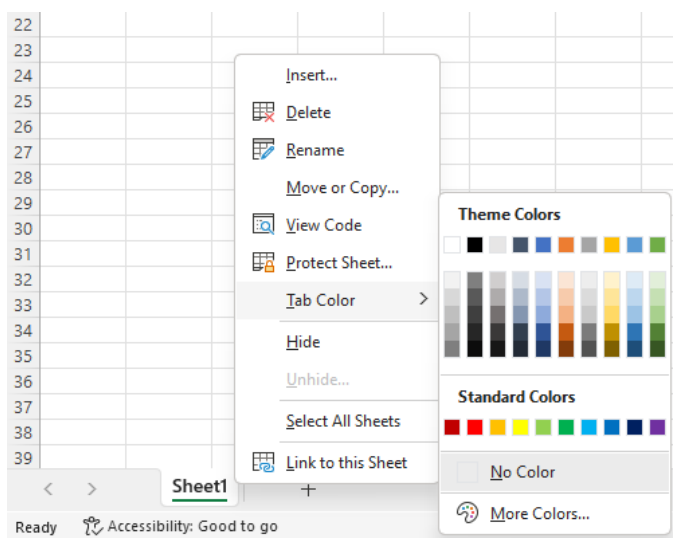Figure 26: Using the activate window

Worksheet Tabs

Figure 27: Sheet Tab Options

We change the background color of each worksheet's tab by right clicking on the worksheet's tab, and choosing a tab color from the menu. Sometimes it is useful to have worksheets that have a common theme be of a certain color to work as a mental shortcut. You may group tabs by time, by function, or by importance, etc.

Topic 7. Saving Workbooks

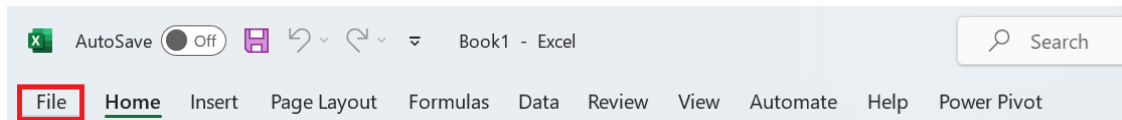To save your workbook, navigate to the `File` tab on the top ribbon as shown in Figure **??**.

Figure 28: Renaming Worksheets

Then, select `Save As`, the `Browse`, and then the directory you wish to save the workbook. In this example, we choose `Documents`. Feel free to choose any other directory if it is more convenient for you. Finally, you should name the file by typing in the desired file name in the green box. Once you are done, select `Save`, and your workbook will be saved as the filename you typed in, at the directory you selected.
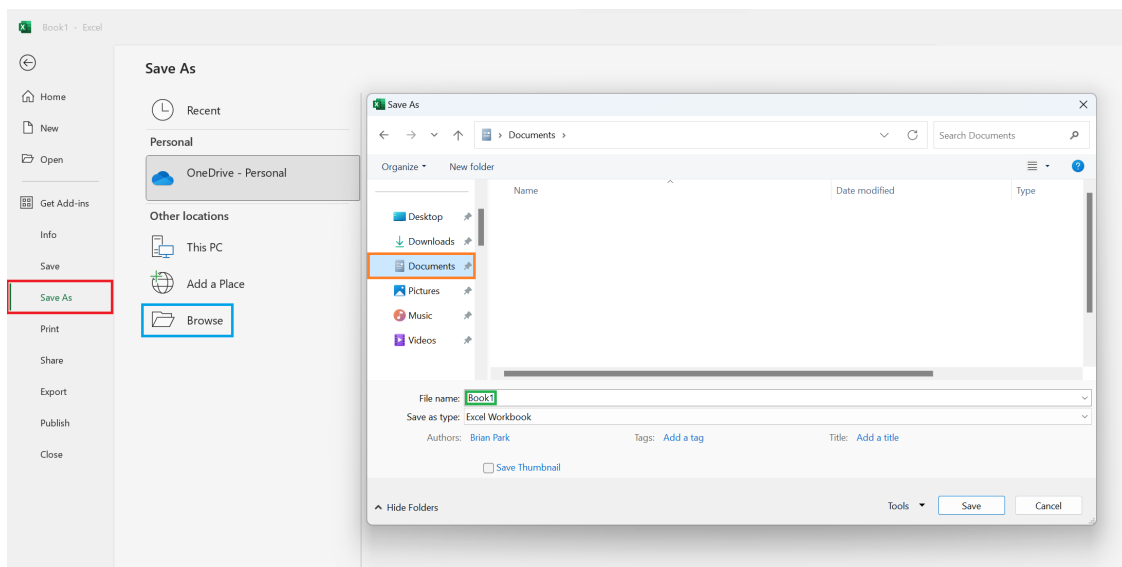

Figure 29: Renaming Worksheets