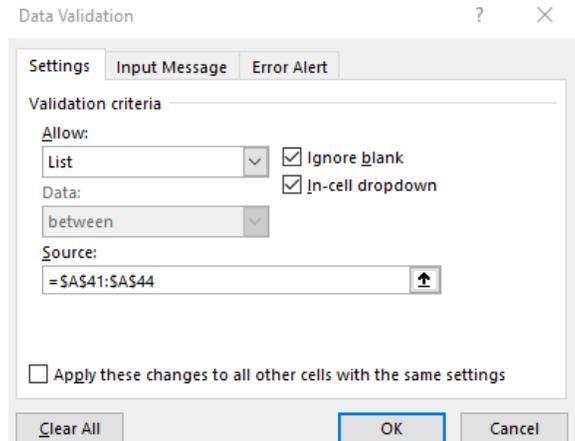


Excel: Managing Data - Macros, Lists, and Validation

Creating Cell Drop Down Menus and Adding a Condition

From time to time you may need to have a list of options for your clients to choose from; this is especially true when creating contracts, invoices, and forms in Excel. For example, you can have a cell activate as a drop down with the options of 1 month, 3 months, 6 months, or 12 months when creating a lease contract. Then you can have the “amount due each month” cell auto-populate with the correct rent amount without having to type the information in yourself.

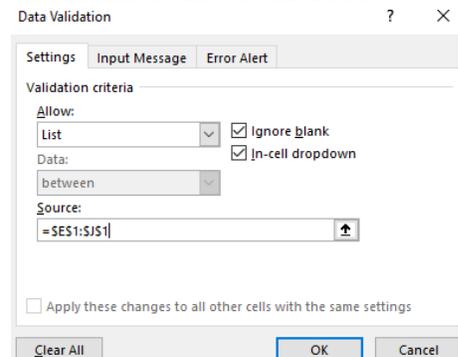
- Click into cell **A41** in the table spreadsheet.
- Type “1 month” in A41, “3 months” in A42, “6 months” in A43, and “12 months” in A44.
- Click in cell **B41**. (We are going to place the list here.)
- Go the **Data Tab** and click **Data Validation**.
- Click **Data Validation** again.
- The Data Validation menu will appear.
- In the **Allow -> List**.
- Then either type the absolute formula $=\$A\$41:\$A\44 or select the cells after clicking in cell A41- A44.
- Make sure **In-cell dropdown** is selected. This will allow us to apply this drop down anywhere on the spreadsheet.
- Click **Ok**.
- Now when you click into cell B44, you will see the droplist. You can choose any of the options.
- Let’s apply a conditional formula (review the breadcrumb conditional formula from a previous workshop).
- In cell **C43** type: $=IF(B41="1 month", "$400 per month", IF(B41="3 months", "$600 per month", IF(B41="6 months", "$900 per month", IF(B41="12 months", "1200 per month", "Write In"))))$
- Now cell C43 will update as the information changes in cell C43! What we are saying with this formula is what lease by month a person signs, the appropriate rent will apply in the cell C43.

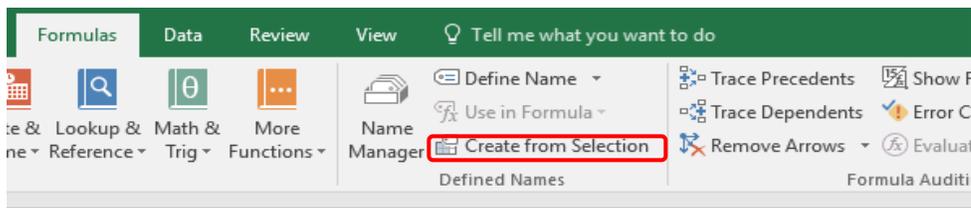


Multi-Layered Lists

You can create multi-layered lists with a drop down to auto-input information into a table or data set.

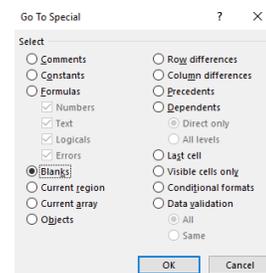
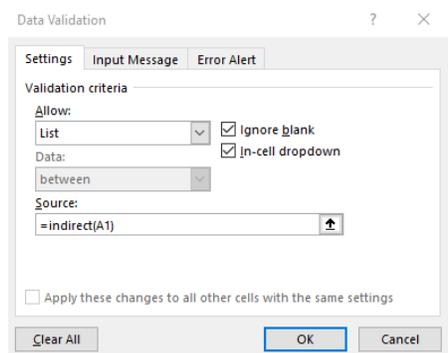
- Go to the **Cell List** spreadsheet.
- Let’s create list by region and another list of states by region.
- Click the letter **A** to highlight all of column A.
- Go to the **Data** tab -> **Data Validation** -> **Data Validation**.
- Change **Allow** to **List** and **Source: Highlight the cells that has the region information (E1 – J1)**
- Click **Ok**.
- Now click into Cell **A2** and you can see the drop down list.
This list will apply to the entire column since we highlighted the column when creating the list
- To add the corresponding states to the region in column B, highlight all columns and rows that contain the data you need – include blank cells in columns if some columns don’t have as long a list. For this example, **highlight cells E1 – J9**. This should highlight all cells that has data.
- Go to the **Formulas** tab -> **Create from Selection**





	West	Southwest	East	Northeast	South	Midwest
	California	Texas	Virginia	Maine	Florida	Wisconsin
	Oregon	New Mexico	West Virginia	New Hampshire	Georgia	Illinois
	Washington	Arizona	Kentucky	Vermont	Alabama	Minnesota
	Hawaii	Utah	Ohio	New York	Mississippi	Michigan
	Alaska	Colorado	Maryland	Massachusetts	South Carolina	
		Nevada	Delaware	Rhode Island		
			North Carolina	Connecticut		
			Tennessee			

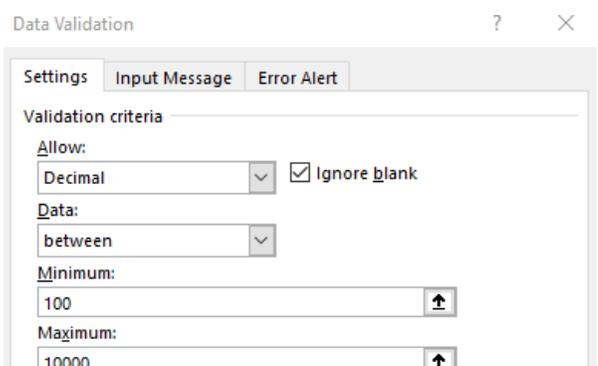
- In the **Create Names from Selection** box, put a check mark **Only in Top Row**.
- As a sidenote, look at your NameBox on the top left corner when you click in any cell that is highlighted. It should change to the corresponding Region. Hopefully, this is a reminder from the first Basic Excel workshop.
- Click on **B** to highlight all of column B.
- Go to the **Formulas** tab -> **Data Validation** -> **Data Validation**.
- Change **Allow** to **List**.
- In the **Source** type the formula: `=indirect(A1)` *This is telling Excel to go back to the list in cell A1 to correspond to the data in column B.
- **Click OK**.
- You more than likely will get an error **"The Source currently evaluates to an error. Do you want to continue?"** Click **Yes**.
- Click in cell **A2**, and choose **West**.
- Click in cell **B2**, and the list should only show states in the West.
- Now, to remove the blank spaces in the list of States, highlight all the state data, **without the header information. No: West, Southwest, East, etc. (Only cells E2 – J9)**
- Go to the **Home** tab -> **Find and Select** -> **Go to Special**
- In the Go To Special select **Blanks**.
- **Click OK**.
- **Right click** in any of the highlighted blank cells -> **Delete**.
- Select **Shift cells up**.
- Now test the state drop downs to see if you get any blank spaces at the end of the lists. They should now be removed.



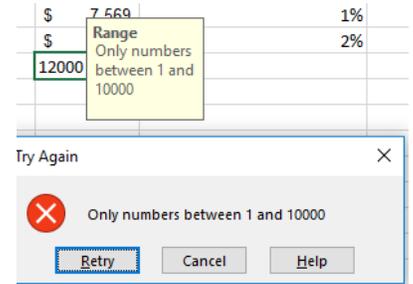
Working with Data with Controls

Data Validation allows you to control the data that goes into each cell. It also allows you to force your data entry clients to format date the way you want.

- Go to the **Macro** spreadsheet.
- Click on the letter **F** to highlight the entire column
- Go to the **Data** tab -> **Data Validation** -> **Data Validation**

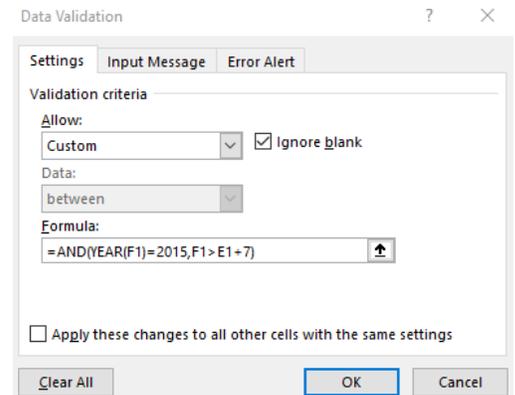


- Change **Allow** to **Decimal**.
- Change minimum to 100 and maximum to 10000.
- Click on the **Input Message** tab.
- This is where we can add a “comment-like” message when we hover over any cell in column F – in Title: **Range Input Message: Only numbers between 1 and 10000**.
- Click on the **Error Alert** tab. This is where you can customize the error messages your data entry people will see if they type something wrong. In title: **Try Again – Error Message: Only numbers between 1 and 10000**.
- **Click Ok.**
- Go to cell F30 and type 12000. You should get the error message we just assigned.
- In the same cell, type 5000. It should work now.
- ***Look at all the data options you have in the Data Validation -> Allow options. You can customize and format numbers, decimals, dates, time, etc.



Data Controls with Formulas

- Go to the **Date** spreadsheet.
- Let’s assume we are going to put dates into column F that is at least 7 days from the days in column E. You typically will see this when your business provides shipping and handling.
- Click on the letter F to highlight all of column F.
- Go to the **Data** tab -> **Data Validation** -> **Data Validation**.
- In the **Allow** -> **Custom**.
- In the **Formula** box, type: =AND(YEAR(F1)=2015,F1>E1+7)
***In a previous workshop, we discussed AND/OR and date formulas. We are just combining two.
- Click **Ok**. ***You may get the error “A named range you specified cannot be found” – Click **OK**.
- Now type 1/16/2015 in cell F2. You should get an error because it is not at least seven days after 1/15/2015.
- Now type 1/25/2015. It should work!



Forecast Spreadsheets

Typically investors and accountants will use the forecast feature when looking at stock or other investment information. In this case, let’s forecast Google Stock by month.

- Go to: <https://finance.yahoo.com/quote/GOOG/history?p=GOOG>
- Change **Frequency** to **Monthly**
- Click **Apply**

- Now click **Download Data**. This will export the data into Excel.

Time Period: Mar 10, 2016 - Mar 10, 2017 Show: Historical Prices

Frequency: Monthly Apply

Currency in USD Download Data

Date	Open	High	Low	Close	Adj Close*	Volume
Mar 10, 2017	843.28	844.89	839.50	843.16	843.16	1,392,388
Mar 01, 2017	828.85	842.00	822.40	838.68	838.68	7,731,700
Feb 01, 2017	799.68	833.45	791.19	823.21	823.21	25,683,600
Jan 01, 2017	778.81	841.95	775.80	796.79	796.79	33,197,900
Dec 01, 2016	757.44	804.38	737.03	771.82	771.82	32,097,300
Oct 31, 2016	782.89	795.63	727.54	758.04	758.04	42,642,200
Sep 30, 2016	774.25	816.68	769.50	784.54	784.54	33,956,300

- Highlight columns A and E - the Date and Close information.
- Go to the **Data** tab -> **Forecast Sheet**
- You should get a preview pop-up window with a chart forecasting GoogleStock.
- At the bottom of the Create Forecast Worksheet change **Forecast End to 1/1/2018**.
- **Click Options**
- In the Options menu, you can set data to manipulate the data in the forecast:
 - **Confidence Interval:** is important to predict forecast accuracy. Typically, the closer to 0% the more confidence you have in the prediction. That is why it is at 95%; Excel is giving you more of a spread. Try lowering the Confidence Interval and notice the spread shrink.
 - **Seasonality:** is the number or periods in which you are looking for data. In our example, we are looking at Google stock by months so the seasonality is 12. You can change that here if you are looking for a different period.
 - **Include Forecast Statistics:** this will add more statistical information when you create a worksheet on the data by adding a table using the statistics function FORECAST.ETS.STAT that will include measures and errors when analyzing the data. In other words, forecast by smoothing.
 - **Fill Missing Points Using:** Excel will average out any missing points that is missing from the data. That is why Interpolation is selected. If you do not want that information forecasted, select **Zero** in our example, leave it Interpolation.
 - **Aggregate Duplicates Using:** Excel will default average out data in the same time-period. You can change that here to a different algorithm here.
- Click **Create**.
- Now the forecasted data will appear in a new sheet. Typically, you are going to look at the future numbers at the end of the inserted table.

Forecast Statistical Formulas

- Forecast formulas are typically used as part of Excel's financial modeling set of functions that calculate the statistical value of a forecast. In other words, based on past earnings and expenses, you can forecast the future amounts.
- For this example, follow the instructor's lesson in exporting a company's balance sheet from Mergent Online in Excel. (This is a library database)
- Click in cell C16
- The formula we will use is =FORECAST(B16,B4:B15,C4:C15)
- What this formula calculate is the forecasting the expenses for the month of January 2020.

	A	B	C
1	Google		
2			
3	Past Dates	Earnings	Expenses
4	Jan-20	150.2	27.5
5	Feb-20	90.5	20.2
6	Mar-20	148.4	24.8
7	Apr-20	150	27.8
8	May-20	160.2	27.9
9	Jun-20	143.2	25.9
10	Jul-20	174.3	26.1
11	Aug-20	192.5	32
12	Sep-20	184.6	41.2
13	Oct-20	124.9	28.7
14	Nov-20	166.6	32.5
15	Dec-20	154.9	31.9
16	Jan-20	140.2	
17			

Trends

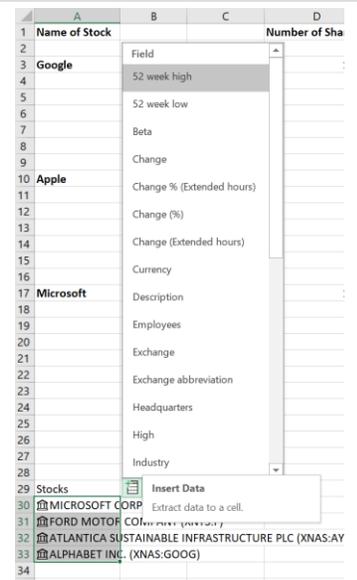
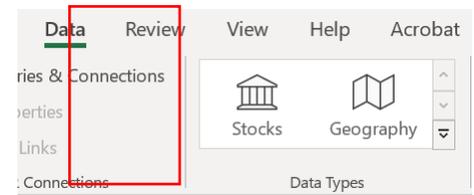
Going back to the formulas class, the trend formula will calculate the linear trend line to known arrays. (Arrays exercises in the formulas class) What this formula attempts is to calculate future trends or predict future data such as revenue or earnings of a company. For this exercise, let's predict the earnings from Jan 20 – Mar 20.

- Add in Jan, Feb, and Mar 2020 in the spreadsheet.
- In cell B17, type =TREND(B4:B16,A4:A16,A17:A19,TRUE)

	A	B	C	D	E
1	Google				
2					
3	Past Dates	Earnings	Expenses		
4	Jan-20	150.2	27.5		
5	Feb-20	90.5	20.2		
6	Mar-20	148.4	24.8		
7	Apr-20	150	27.8		
8	May-20	160.2	27.9		
9	Jun-20	143.2	25.9		
10	Jul-20	174.3	26.1		
11	Aug-20	192.5	32		
12	Sep-20	184.6	41.2		
13	Oct-20	124.9	28.7		
14	Nov-20	166.6	32.5		
15	Dec-20	154.9	31.9		
16	Jan-20	140.2	32.5		
17	Jan-20	=TREND(B4:B16,A4:A16,A17:A19,TRUE)			
18	Feb-20	140.0477			
19	Mar-20	142.901			

Stocks!

- Finding and auto-updating stock information in Excel 365 is really easy.
- Go to the Stocks spreadsheet
- Highlight cells A30 – A33.
- In the Data Tab, click the Stocks button.
- This will automatically link the stocks to Excel and will auto update when the market is open.
- At the top right of the highlight, there is a button called “Insert Data”
- Choose 52 week High, 52 week Low, Beta, Change, Currency, Ticker Symbol, Industry, P/E
- *Note: if you are using an older version of Excel, you will need to bring in stock information through the File -> Options -> Data Tab -> Stocks



Portfolio Slope

The Slope formula is used to calculate the beta of a particular stock or even a portfolio of stocks. Let's find the beta of the stocks above.

- We will use the 52-week high and low information.
- In cell C37, type: =SLOPE(C30:C33,B30:B33)
- This should give you the beta of the stocks found.

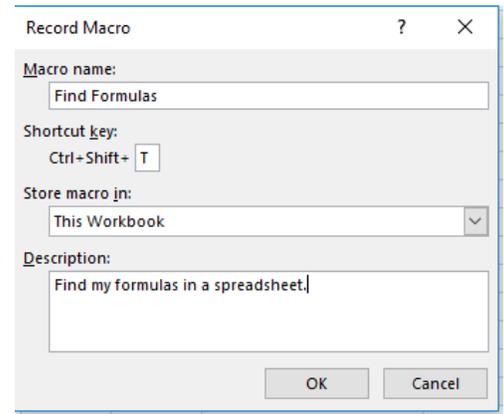
29	Stocks			
30	MICROSOFT CORP	\$ 232.86	\$ 132.52	
31	FORD MOTOR CO	\$ 9.58	\$ 3.96	
32	ATLANTICA SUSTAINABLE INFRASTRUCTURE PLC (XNAS:AY)	\$ 32.50	\$ 17.74	
33	ALPHABET INC. (XNAS:GOOG)	\$ 1,733.18	\$ 1,013.54	
34				
35				
36				
37		=SLOPE(C30:C33,B30:B33)		

Macros

Macros in Excel are in short, a recording of keystrokes. Beyond simple recording, you can use macros to automate tasks that you will use over and over. In this exercise, we will find all cells that contain formulas with the understanding that we may use this feature in different spreadsheets or over and over.

*From the previous workshop, bring out the Developer Tab from the **File-> Options -> Ribbon -> Developer**

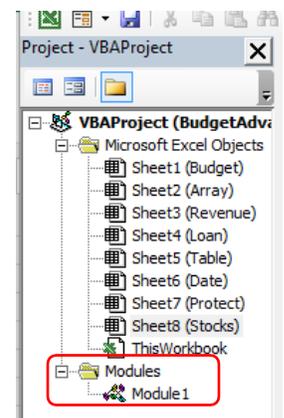
- Open the **Stocks Spreadsheet**
- Click on Cell **B1**
- In the Developer Tab, click on the **Record Macro** button.
- Change the Macro Name to “FindFormulas” – no spaces
- Change the Shortcut Key to Cntl + Shift + T (press Shift +T) to add it as a shortcut.
- For now, keep This Workbook
- Put in a description on what the Macro will do in the “Description” box.
- Press **OK**
- Go the **Home Tab** and click on the **Find & Select** button.
- Add a color to the cells by clicking on the Paint Bucket button in the Home Tab. Add a color.
- Go back to the **Developer Tab** and click **Stop Recording**.
- Click anywhere on a blank cell, and all your cells that contain formulas will be highlighted in a color.
- Undo the cell coloring by pressing **Cntl + A** and select **No Fill** from the paint bucket button from the Home Tab.
- Now on the spreadsheet, press **Cntl + Shift + T** – this will run your macro!
- Now try the Macro on a **Loan** spreadsheet. It should highlight your cells with formulas.



Microsoft Visual Basic for Applications Environment

Again, you do not need to know a lot about VBA code, but it is a good idea to at least get familiar with the VBA environment.

- To quickly get to the VBA environment, you just need to press **Alt + F11** or you can **Click on the Macro button in the Developer Tab**.
- On the left side of the screen, you will see the Project – VBAProject menu that will contain your spreadsheets and macros.
- All your macros are saved in the folder titled: **Modules**
- Since we have one macro, you will see **Module 1** when you click on the Modules folder.
- Double click on Module 1 and the VBA code for the macro we created above will appear.
- The code on the right is code to run the macro to find formulas on a spreadsheet and change the cells to a color. *Any text in green in the code are just comments and they will not affect anything.



```

Sub FindFormulas ()
'
' FindFormulas Macro
' Find my formulas in a spreadsheet.
'
' Keyboard Shortcut: Ctrl+Shift+T
'
Selection.SpecialCells(xlCellTypeFormulas, 23).Select
With Selection.Interior
    .Pattern = xlSolid
    .PatternColorIndex = xlAutomatic
    .ThemeColor = xlThemeColorAccent5
    .TintAndShade = 0.799981688894314
    .PatternTintAndShade = 0
End With
End Sub

```

- The instructor will discuss with the code means, but you can always add code to VBA scripts to make the macro more customized.
- In this example: type **Range ("B3")**. **Select** between "End With" and "End Sub"
- What this is going to do is move your cursor to cell B3 after the macro is run.
- Press ALT+F11 and run the macro on the **Stocks spreadsheet**.
- Your cursor will end up in cell B3

```

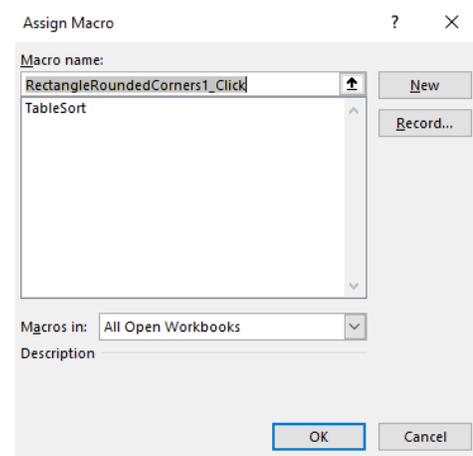
    .PatternTintAndShade
End With
Range ("B3") .Select
End Sub

```

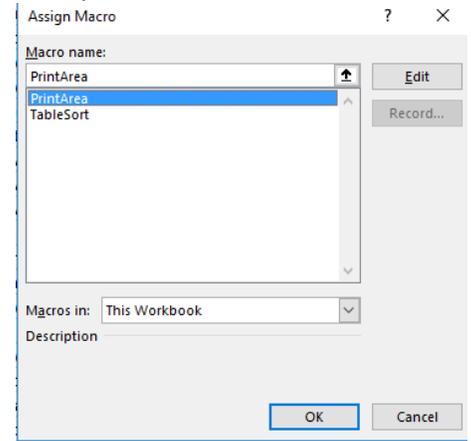
Macros as Buttons

There are two ways to create buttons in Excel that will run a macro in the background that will make tasks that much easier to process. In most cases, you will set up buttons when you must send the spreadsheet over to data entry clients so they do not mess up data on your spreadsheet. One method is to create a button from a shape or insert a picture or you can assign a button already made in the Developer Tab.

- Go back to the **Table spreadsheet**.
- Go to the Developer Tab and click on **Record Macro**.
- Macro Name: SortTable
- Shortcut Key: Ctrl + Shift + Y
- Click **OK**.
- Highlight cells A4-A36, and in the Home Tab, click Sort A-Z
- Go back to the Developer Tab and click: **Stop Recording**.
- Now press the undo button on the top left of the screen to unsort the data.
- Go to the **Insert Tab -> Shapes -> Insert a rectangle**
- In the rectangle, type Sort by Name
- Right-click in the rectangle and select **Assign Macro**



- So far, we only have one macro assigned to this worksheet, so click on **TableSort** and change Marcos In to This Workbook. (Since this macro is designed for this spreadsheet, that is why we are choosing this option)
- Click **OK**.
- Click outside the button to deselect the object.
- Now when you move your mouse over the button, it should change to a finger ready to press. Press the button, and it should sort your data. (*You can easily insert a picture and turn that into a button what a macro. Most businesses will do this with a logo.)
- Excel already has pre-designed buttons that do tasks to help build surveys.
- In this example, let's create a macro to print a spreadsheet and then create a button to press to quickly print.
- Go to the **Developer Tab -> Record Macro. (Name the macro PrintArea with Ctrl+Shift+G)**
- Print the spreadsheet like you normally do: File -> Print -> Print.
- Go back to the **Developer Tab -> Stop Recording.**
- Click on the **Insert Button in the Developer Tab and Select the Button command.**
- You can draw a button on the spreadsheet just like drawing a shape.
- When you draw a button, the Assign Macro menu will appear.
- Now we should have two macros.
- Click on the **PrintArea and click Ok.**
- Now press the button, and it should print the spreadsheet.
- You can rename the button to "Print" to add what the button will do.



OneDrive

Microsoft provides free online storage and document creation directly on the browser with an account. (Outlook, Hotmail, Xbox, MSN, etc.) If you have a Microsoft account – including your student Outlook account – you already have a OneDrive account. Login by going to www.onedrive.com and use your Microsoft login or Microsoft email username and password. (If you are using a Windows 10 PC, Onedrive is already on your File Explorer.)

With OneDrive, you can also share single documents or entire folders with specific people or with the public.

