Financial Modeling by Leon Shpaner

Lesson 1

- Financial Modeling Introduction
- Graphs & Pivot Tables
- VLOOKUP Function - Working with Historical Prices
- Time Value of Money - NPV, IRR

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Historical Prices (2017 - YTD)

IMAX

What is Financial Modeling?

The task of building an abstract financial representation of real world financial data

Why is it helpful/ necessary?

It helps narrow down large data sets and condense them into one simple spreadsheet that can be used as a template for gaining relevant insight into a company's performance.

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Where can one find the financials (proforma) for a publicly traded company?

- Yahoo Finance
- Wall Street Journal
- The investor relations section of the corporation's website

What tools will we be using?

- Microsoft Excel
- Visual Basic for Applications (VBA)

The following sample historical pricing data was imported directly from Yahoo Finance into Excel

Once any set of data is in Excel it is **EASY** to manipulate it by removing or expanding what is already there.

For example, we can add % changes in prices over time and averages

Adding these statistics involves the use of **formulas**

However, removing irrelevant data can be done by hiding **or** deleting columns and/or rows.

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Date	Open	High	Low	Close	Adj Close	Volume
6/29/2018	22.35	22.4	21.9	22.15	22.15	292,156
6/28/2018	22.25	22.55	22.2	22.2	22.2	319,700
6/27/2018	22.4	22.85	22.2	22.25	22.25	732,800
6/26/2018	22.7	22.8	22.33	22.5	22.5	439,000
6/25/2018	22.65	22.85	22.35	22.7	22.7	571,600
6/22/2018	23.05	23.1	22.43	22.6	22.6	2,449,800
6/21/2018	22.85	23.6	22.65	23	23	448,200
6/20/2018	22.3	23	22.3	22.75	22.75	455,700
6/19/2018	22.1	22.3	21.6	22.15	22.15	319,900
6/18/2018	21.7	22.5	21.7	22.35	22.35	280,800
6/15/2018	21.9	21.95	21.6	21.85	21.85	578,200
6/14/2018	21.9	22	21.7	22	22	261,700
6/13/2018	21.8	22	21.6	21.9	21.9	337,500
6/12/2018	21.6	21.8	21.1	21.7	21.7	564,500
6/11/2018	21.15	21.95	21.15	21.65	21.65	253,200
6/8/2018	21.1	21.45	20.65	21.25	21.25	510,300
6/7/2018	21.5	21.75	20.85	21.2	21.2	778,500
6/6/2018	21.2	21.75	20.7	21.6	21.6	706,800
6/5/2018	20.6	21.25	20.5	21.2	21.2	760,500
6/4/2018	21.05	21.2	20.35	20.6	20.6	619,500
6/1/2018	20.95	21.2	20.65	20.9	20.9	639,200
5/31/2018	21.1	21.45	20.75	20.9	20.9	1,029,100
5/30/2018	21.2	21.3	20.85	21.05	21.05	947,100
5/29/2018	21.3	21.45	20.85	21	21	1,153,800
5/25/2018	21.85	21.88	21.35	21.5	21.5	671,600
5/24/2018	21.95	22.03	21.48	21.8	21.8	672,600
5/23/2018	22.45	22.73	22	22	22	540,500
5/22/2018	22.95	23.1	22.45	22.5	22.5	731,000
5/21/2018	23.05	23.15	22.55	22.95	22.95	716,300
5/18/2018	23.9	23.9	22.85	22.85	22.85	667,300
5/17/2018	24.3	24.3	23.68	23.85	23.85	343,400
5/16/2018	23.9	24.38	23.8	24.2	24.2	371,100

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When looking at the percent change between 2 values, subtract the old value from the new value and divide the result by the old value as shown:

Date	Open	High	Low	Close	Adj Close	Volume	% Change Close	% Change Open	OHLC	HLC
6/29/2018	22.35	22.4	21.9	22.15	22.15	292,156	=(E2-E3)/E3			
6/28/2018	22.25	22.55	22.2	22.2	22.2	319,700				
6/27/2018	22.4	22.85	22.2	22.25	22.25	732,800				
6/26/2018	22.7	22.8	22.33	22.5	22.5	439,000				
6/25/2018	22.65	22.85	22.35	22.7	22.7	571,600				
6/22/2018	23.05	23.1	22.43	22.6	22.6	2,449,800				
6/21/2018	22.85	23.6	22.65	23	23	448,200				
6/20/2018	22.3	23	22.3	22.75	22.75	455,700				
6/19/2018	22.1	22.3	21.6	22.15	22.15	319,900				
6/18/2018	21.7	22.5	21.7	22.35	22.35	280,800				
6/15/2018	21.9	21.95	21.6	21.85	21.85	578,200				
6/14/2018	21.9	22	21.7	22	22	261,700				
6/13/2018	21.8	22	21.6	21.9	21.9	337,500				
6/12/2018	21.6	21.8	21.1	21.7	21.7	564,500				
6/11/2018	21.15	21.95	21.15	21.65	21.65	253,200				
6/8/2018	21.1	21.45	20.65	21.25	21.25	510,300				
6/7/2018	21.5	21.75	20.85	21.2	21.2	778,500				
6/6/2018	21.2	21.75	20.7	21.6	21.6	706,800				
6/5/2018	20.6	21.25	20.5	21.2	21.2	760,500				
6/4/2018	21.05	21.2	20.35	20.6	20.6	619,500				
6/1/2018	20.95	21.2	20.65	20.9	20.9	639,200				
5/31/2018	21.1	21.45	20.75	20.9	20.9	1,029,100				

Historical Prices

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To get the Open, High, Low, Close (OHLC), we take the average of the cells B2:E2 as shown by the excel formula =AVERAGE(B2:E2) below. Then we bring the formula down to the rest of the cells by clicking on the right corner of cell J2. In turn, we do the same procedure for HLC, starting in cell K2

Formula bar: `=AVERAGE(B2:E2)`

	A	B	C	D	E	F	G	H	I	J	K
1	Date	Open	High	Low	Close	Adj Close	Volume	% Change Close	% Change Open	OHLC	HLC
2	6/29/2018	22.35	22.4	21.9	22.15	22.15	292,156	-0.23%	0.45%	=AVERAGE(B2:E2)	
3	6/28/2018	22.25	22.55	22.2	22.2	22.2	319,700	-0.22%	-0.67%		
4	6/27/2018	22.4	22.85	22.2	22.25	22.25	732,800	-1.11%	-1.32%		
5	6/26/2018	22.7	22.8	22.33	22.5	22.5	439,000	-0.88%	0.22%		
6	6/25/2018	22.65	22.85	22.35	22.7	22.7	571,600	0.44%	-1.74%		
7	6/22/2018	23.05	23.1	22.43	22.6	22.6	2,449,800	-1.74%	0.88%		
8	6/21/2018	22.85	23.6	22.65	23	23	448,200	1.10%	2.47%		
9	6/20/2018	22.3	23	22.3	22.75	22.75	455,700	2.71%	0.90%		
10	6/19/2018	22.1	22.3	21.6	22.15	22.15	319,900	-0.89%	1.84%		
11	6/18/2018	21.7	22.5	21.7	22.35	22.35	280,800	2.29%	-0.91%		
12	6/15/2018	21.9	21.95	21.6	21.85	21.85	578,200	-0.68%	0.00%		
13	6/14/2018	21.9	22	21.7	22	22	261,700	0.46%	0.46%		
14	6/13/2018	21.8	22	21.6	21.9	21.9	337,500	0.92%	0.93%		
15	6/12/2018	21.6	21.8	21.1	21.7	21.7	564,500	0.23%	2.13%		
16	6/11/2018	21.15	21.95	21.15	21.65	21.65	253,200	1.88%	0.24%		
17	6/8/2018	21.1	21.45	20.65	21.25	21.25	510,300	0.24%	-1.86%		
18	6/7/2018	21.5	21.75	20.85	21.2	21.2	778,500	-1.85%	1.42%		
19	6/6/2018	21.2	21.75	20.7	21.6	21.6	706,800	1.89%	2.91%		
20	6/5/2018	20.6	21.25	20.5	21.2	21.2	760,500	2.91%	-2.14%		
21	6/4/2018	21.05	21.2	20.35	20.6	20.6	619,500	-1.44%	0.48%		
22	6/1/2018	20.95	21.2	20.65	20.9	20.9	639,200	0.00%	-0.71%		
23	5/31/2018	21.1	21.45	20.75	20.9	20.9	1,029,100	-0.71%	-0.47%		
	5/30/2018	21.2	21.3	20.85	21.05	21.05	947,100	0.24%	0.47%		

Historical Prices

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Let's not forget to adjust the formula in the HLC and the OHLC averages by locking in these absolute references.

Formula bar: `=AVERAGE($C$2:$E$2)`

Date	Open	High	Low	Close	Adj Close	Volume	% Change Close	% Change Open	OHLC	HLC
6/29/2018	22.35	22.4	21.9	22.15	22.15	292,156	-0.23%	0.45%	22.2	=AVERAGE($C$2:$E$2)
6/28/2018	22.25	22.55	22.2	22.2	22.2	319,700	-0.22%	-0.67%	22.3	
6/27/2018	22.4	22.85	22.2	22.25	22.25	732,800	-1.11%	-1.32%	22.3	
6/26/2018	22.7	22.8	22.33	22.5	22.5	439,000	-0.88%	0.22%	22.4	
6/25/2018	22.65	22.85	22.35	22.7	22.7	571,600	0.44%	-1.74%	22.4	
6/22/2018	23.05	23.1	22.43	22.6	22.6	2,449,800	-1.74%	0.88%	22.5	
6/21/2018	22.85	23.6	22.65	23	23	448,200	1.10%	2.47%	22.6	
6/20/2018	22.3	23	22.3	22.75	22.75	455,700	2.71%	0.90%	22.6	
6/19/2018	22.1	22.3	21.6	22.15	22.15	319,900	-0.89%	1.84%	22.5	
6/18/2018	21.7	22.5	21.7	22.35	22.35	280,800	2.29%	-0.91%	22.5	
6/15/2018	21.9	21.95	21.6	21.85	21.85	578,200	-0.68%	0.00%	22.4	
6/14/2018	21.9	22	21.7	22	22	261,700	0.46%	0.46%	22.4	
6/13/2018	21.8	22	21.6	21.9	21.9	337,500	0.92%	0.93%	22.3	
6/12/2018	21.6	21.8	21.1	21.7	21.7	564,500	0.23%	2.13%	22.3	
6/11/2018	21.15	21.95	21.15	21.65	21.65	253,200	1.88%	0.24%	22.2	
6/8/2018	21.1	21.45	20.65	21.25	21.25	510,300	0.24%	-1.86%	22.1	
6/7/2018	21.5	21.75	20.85	21.2	21.2	778,500	-1.85%	1.42%	22.1	
6/6/2018	21.2	21.75	20.7	21.6	21.6	706,800	1.89%	2.91%	22.1	
6/5/2018	20.6	21.25	20.5	21.2	21.2	760,500	2.91%	-2.14%	22.0	
6/4/2018	21.05	21.2	20.35	20.6	20.6	619,500	-1.44%	0.48%	21.9	
6/1/2018	20.95	21.2	20.65	20.9	20.9	639,200	0.00%	-0.71%	21.9	
5/31/2018	21.1	21.45	20.75	20.9	20.9	1,029,100	-0.71%	-0.47%	21.8	

Absolute references are denoted by $ symbols

Sheet tab: Historical Prices

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Before we proceed with more built-in Excel formulas, let us delve into a little bit of VBA (Visual Basic for Applications)

VBA is the back-end programming language of Microsoft Excel and other Microsoft Office programs.

**It is important to ensure that our Microsoft Excel package has the Developer Tab added onto it.**
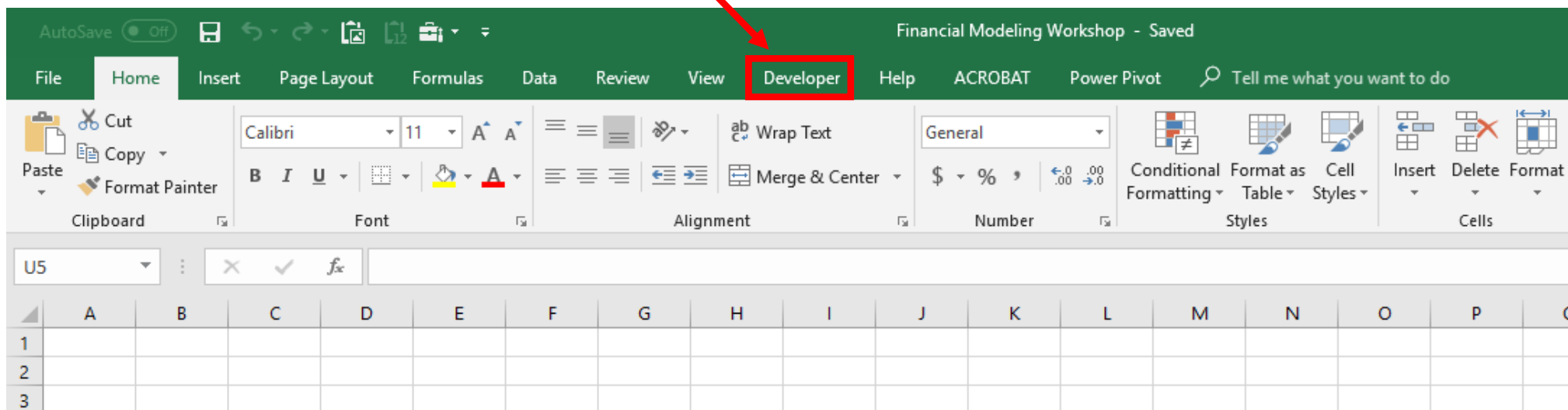
This step is NOT mandatory for entering the visual basic editor, but is necessary if you are recording macros to automate various processes.

If you are just writing code (i.e. coding a function), you can enter the VBA environment simply by pressing ALT + F11 on your keyboard

1. **Click on "File"**
2. **Click on "Options."**
3. **Click on "Customize Ribbon"**
4. **Make Sure there is a check mark next to "Developer"**

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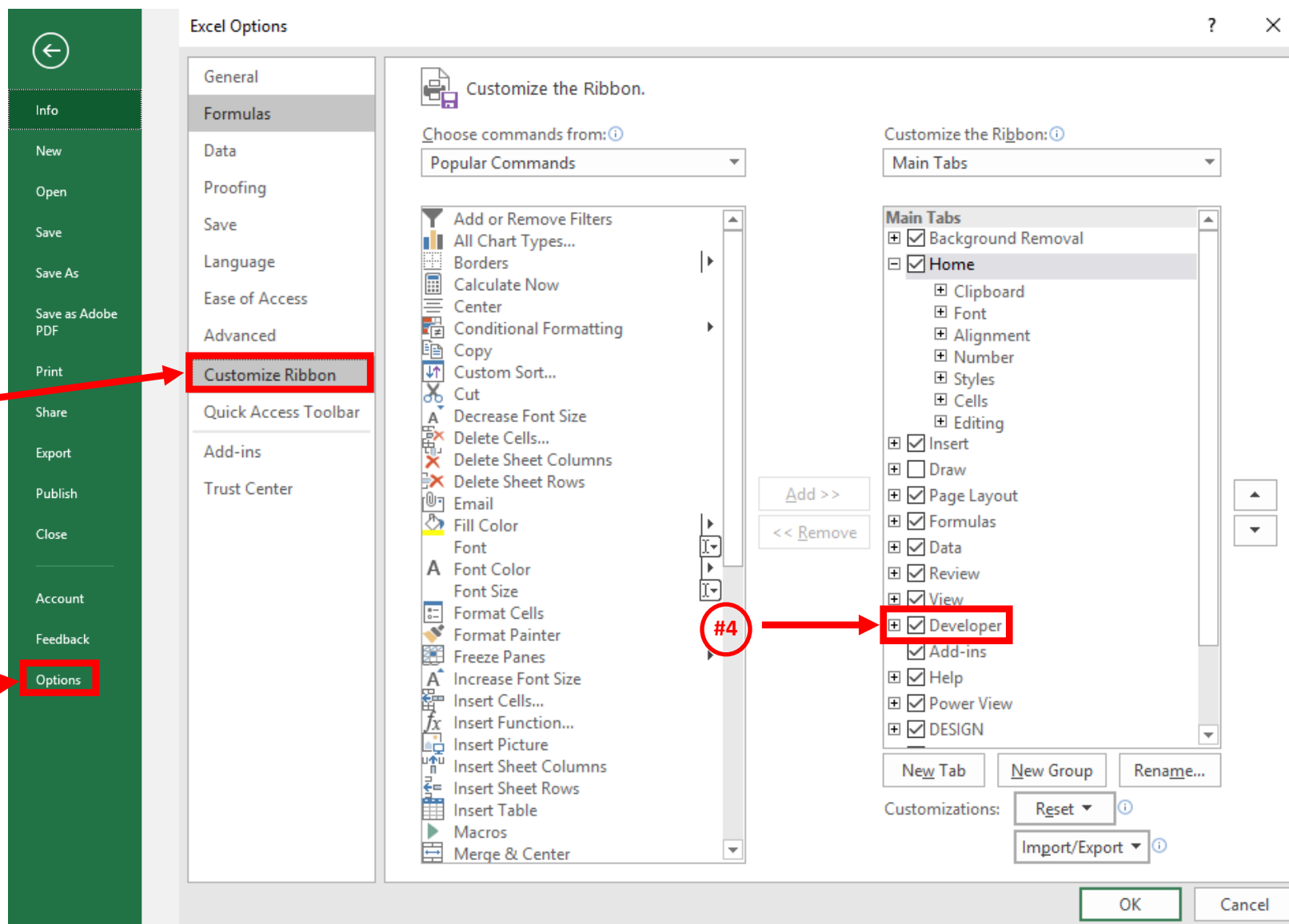
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We're not going to cover the entirety of VBA programming, but will work with the basics
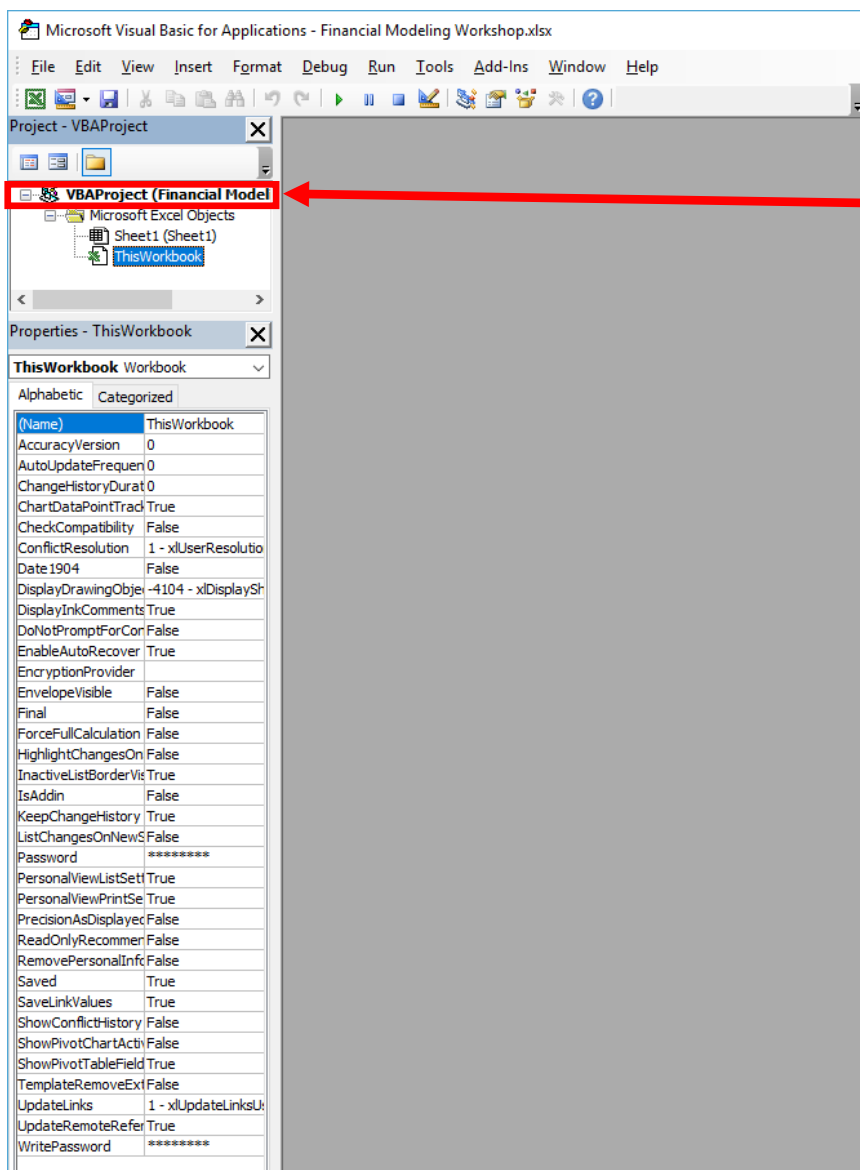
We want to ensure that we are looking at the correct VBAProject.

The project name is the name of the Excel File that you are working within. In this case, it is called: "Financial Modeling Workshop."
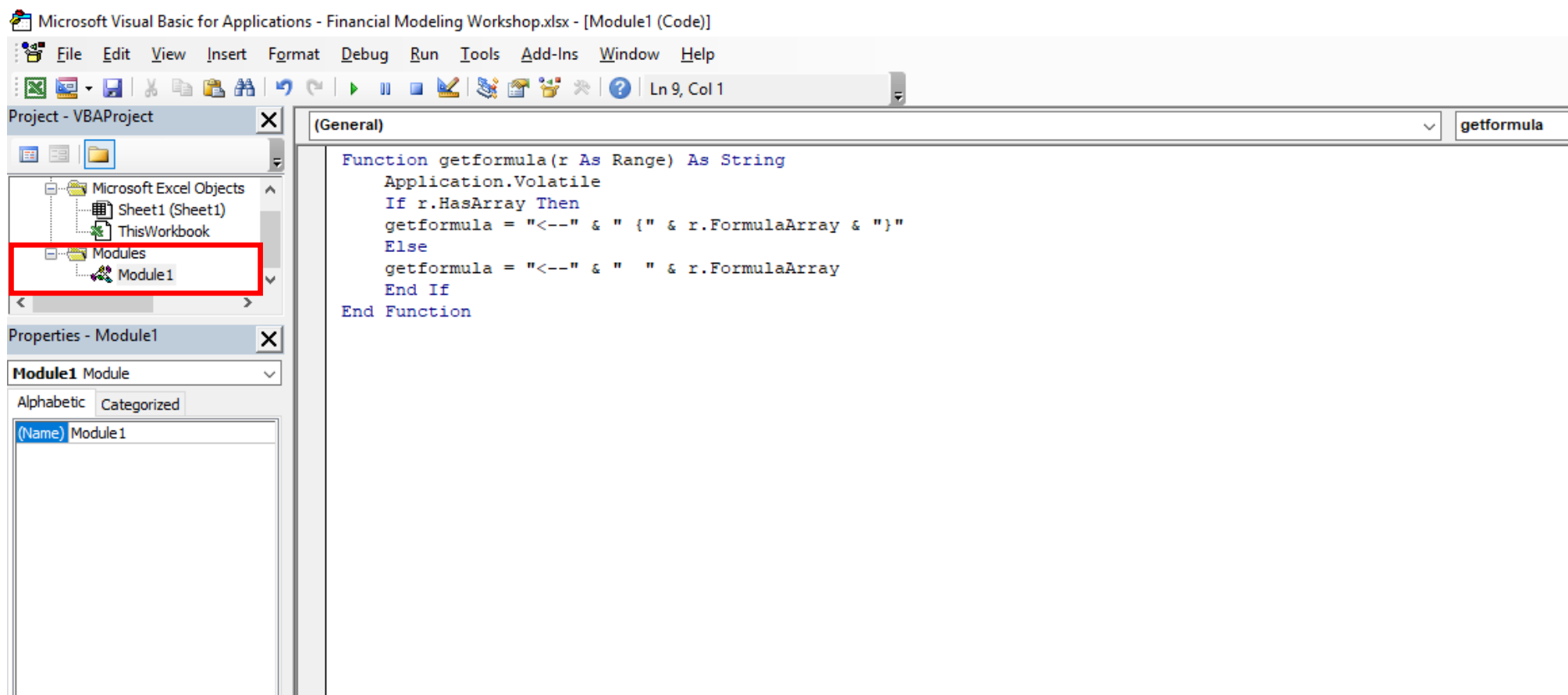
We will begin by inserting a module.
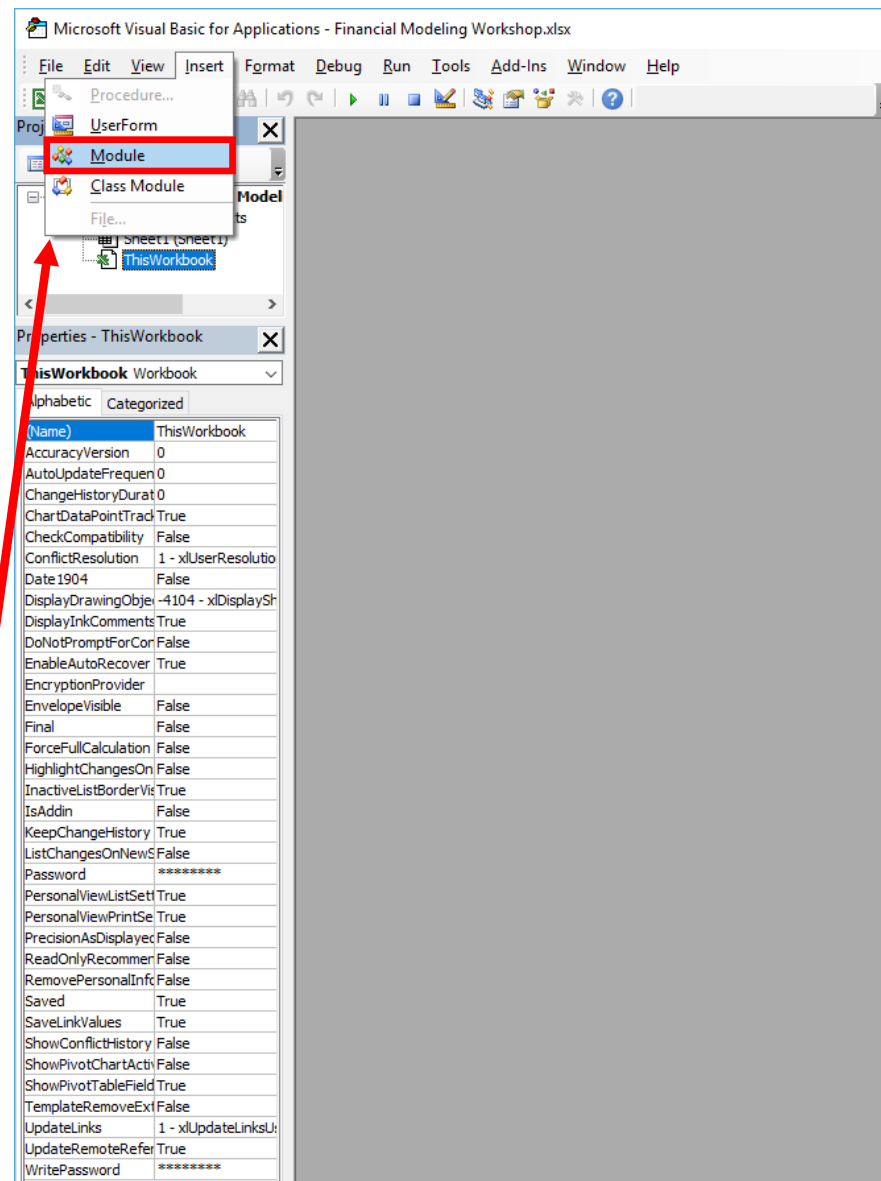
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Let's start by writing a function.

The function most commonly used in Financial Modeling is known as "getformula." It simply tells us what formula we plugged into any given cell, but... excel does not have this built in, so we have to code it.

Microsoft Visual Basic for Applications - Financial Modeling Workshop.xlsx - [Module1 (Code)]

File   Edit   View   Insert   Format   Debug   Run   Tools   Add-Ins   Window   Help

Ln 9, Col 1

Project - VBAProject

- Microsoft Excel Objects
  - Sheet1 (Sheet1)
  - ThisWorkbook
- Modules
  - Module1

Properties - Module1

Module1 Module

Alphabetic   Categorized

(Name) Module1

(General)   getformula

```vba
Function getformula(r As Range) As String
    Application.Volatile
    If r.HasArray Then
    getformula = "<--" & " {" & r.FormulaArray & "}"
    Else
    getformula = "<--" & "  " & r.FormulaArray
    End If
End Function
```

Application.Volatile: this function is recalculated when any given cell in any workbook in the application window changes value
If r.HasArray Then: if, then statement stating that if the range ® has an array, then the formula (getformula) = the following...

As we have seen in our introduction, historical pricing inquiries (HPI) can be pulled from reliable data sources like Yahoo Finance and Wall Street Journal. We're going to go ahead and pull this data for IMAX from WSJ

https://quotes.wsj.com/IMAX/historical-prices

and we're going to:

- graph date vs. close price
- examine different ways we can arrange this data (PIVOT TABLE)

1. **Click Insert**
2. **Click on Recommended Charts**
3. **Click on "All Charts" tab in the pop-up dialog box and select the "Line" graph on the left hand side; click "OK."**

The following graph pops up, and as you can see, when clicking inside the graph, columns A and E are auto-selected to represent that the data is pulled from those two columns.
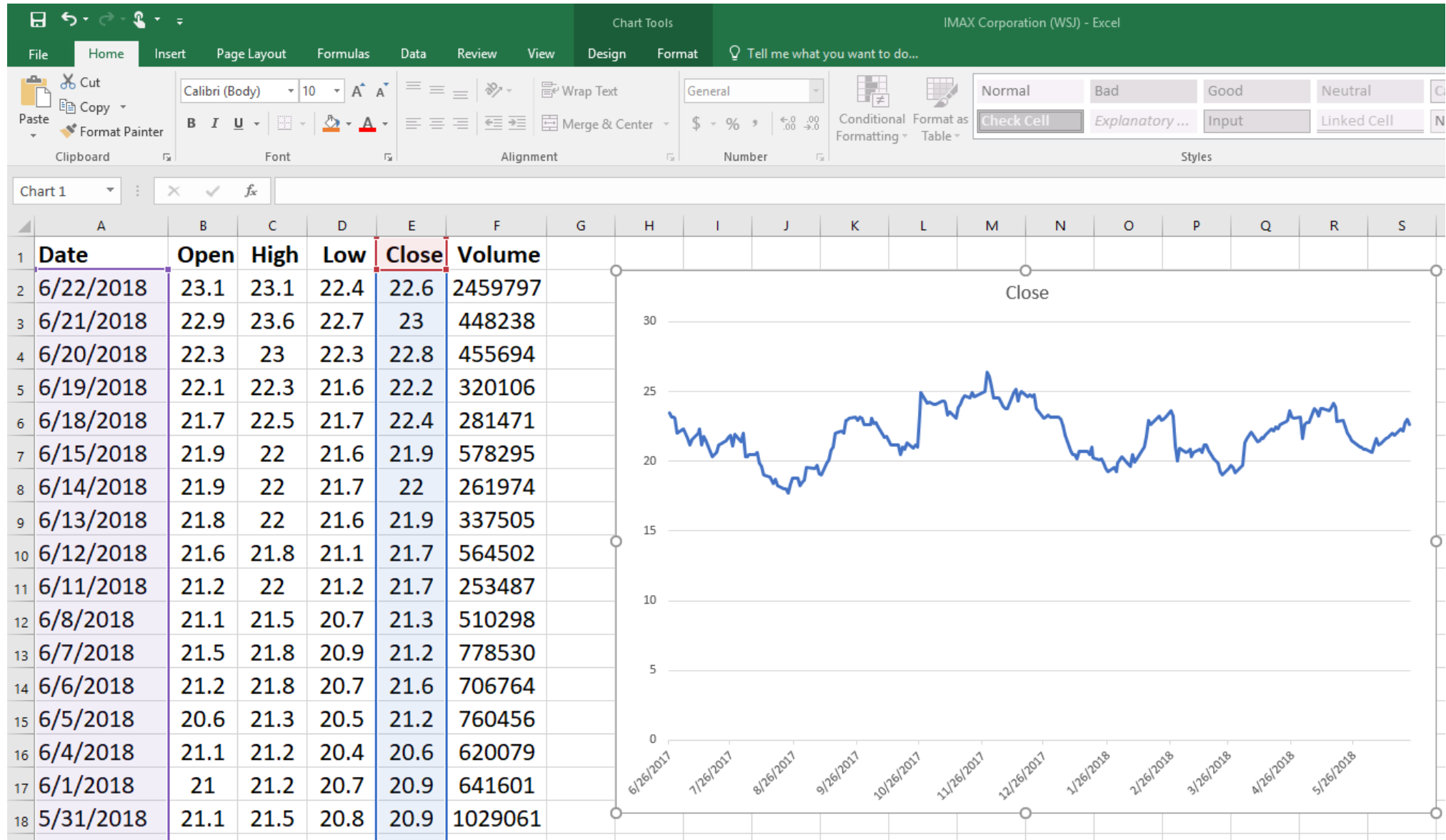
Now, let's rename the graph to "IMAX Historical Prices (One Year), and add the x-axis, and y-axis titles. To add the acis labels, click on the graph, and go to the design tab on the menu above, and select the "Add Chart Element" drop-down menu. There, you will further select "Axis Titles," and respectively add "Primary Horizontal," and "Primary Vertical."
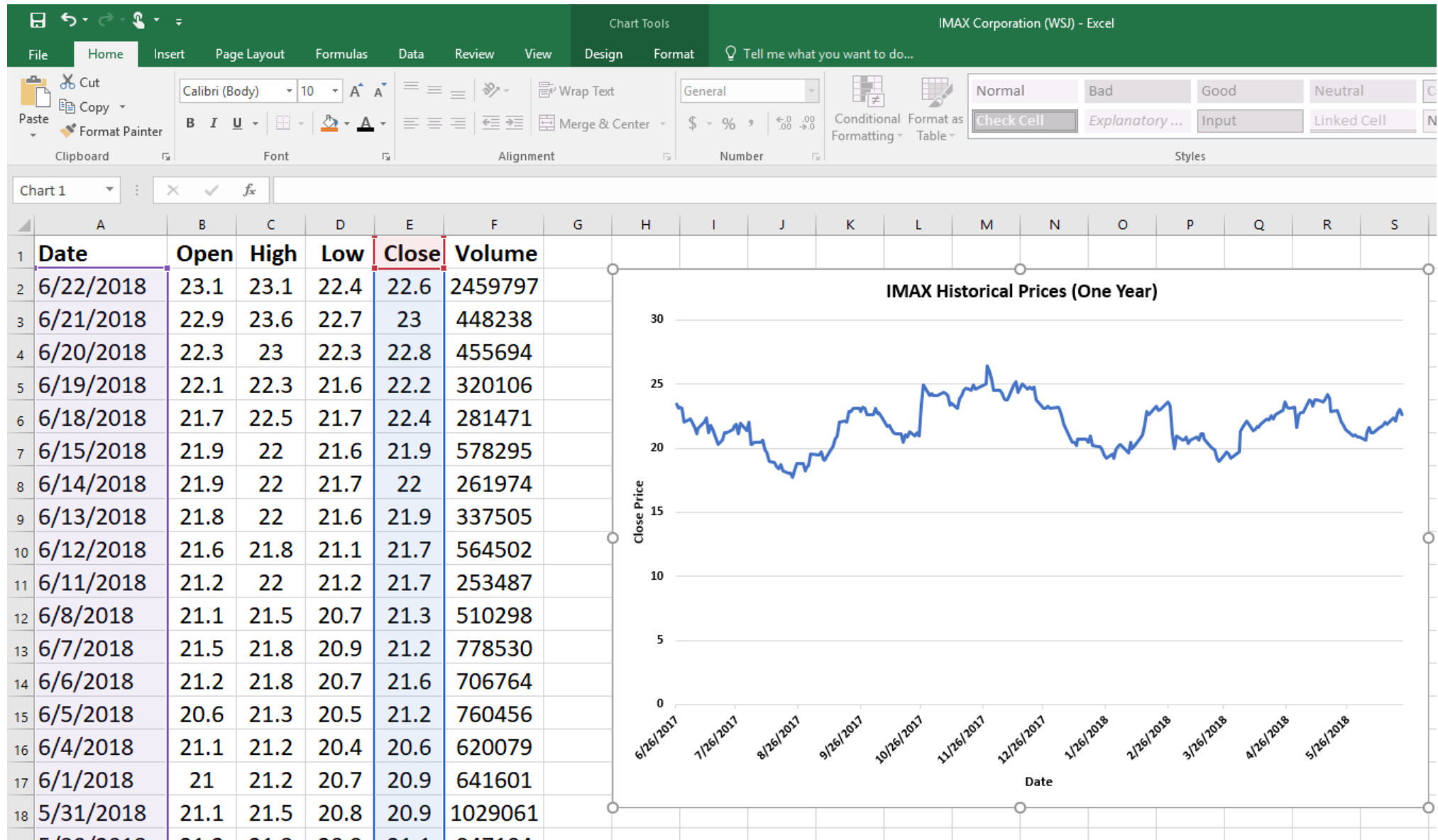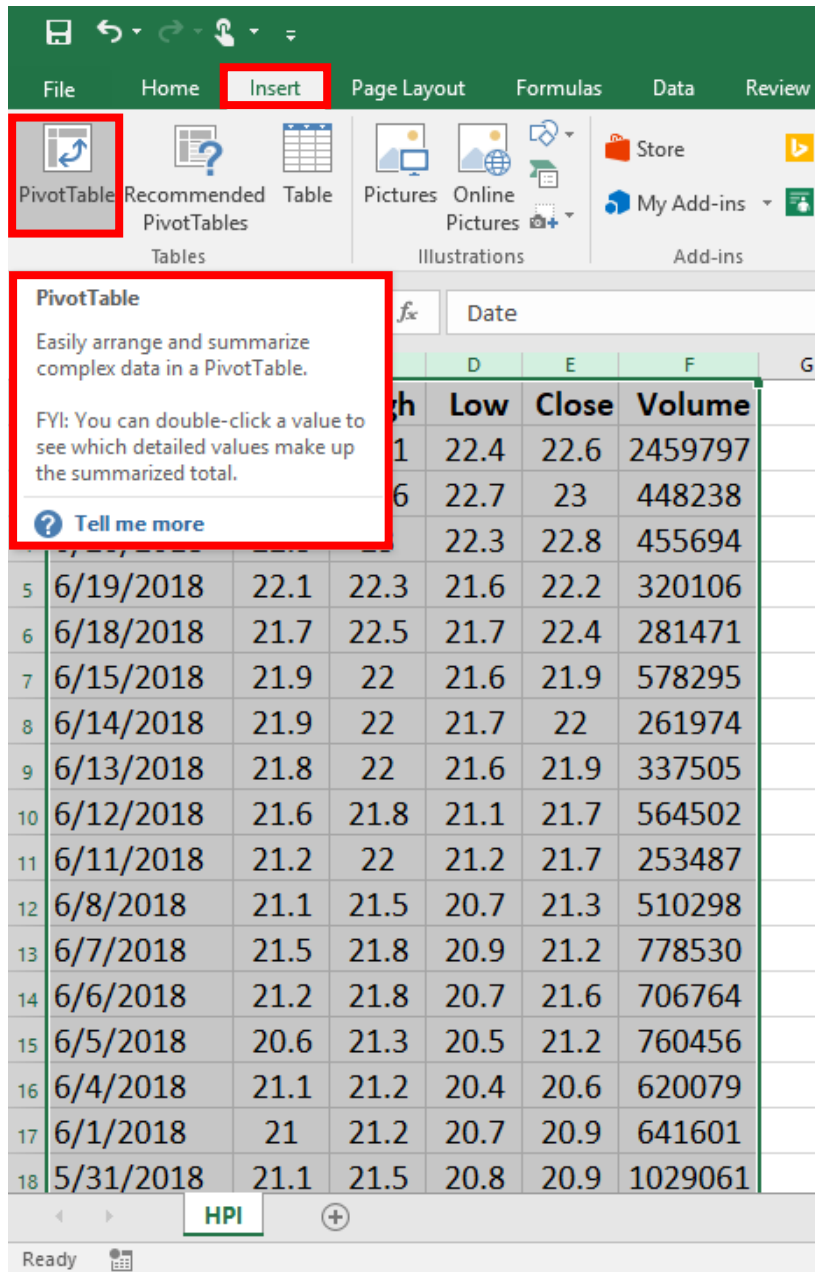
Below are the steps for selecting axis titles:

1. **Click on "Add Chart Element."**
2. **Click on "Axis Titles."**
3. **Select "Primary Horizontal"**
4. **Select "Primary Vertical."**
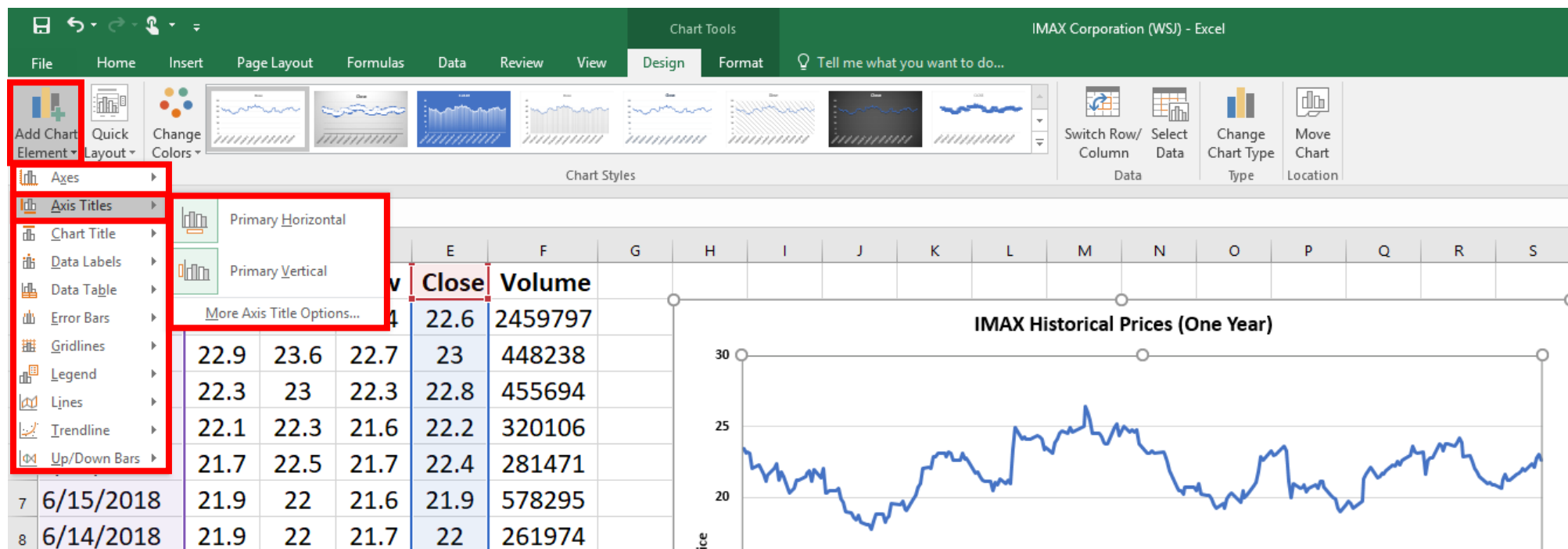
Right click on the graph and select "Format Axis." There you will see multiple options for setting such parameters as minimum, maximum, axis alignment, etc. The data, for instance, auto-defaults to span the range of 6/26/17 – 6/22/17, so we want to adjust the maximum value to capture the entire year (through 6/26/17).

Now that we've explored the graphical aspects of Historical Prices, let's take a look at how we can re-organize this data into a Pivot Table.

This feature is built into excel and is very easy to implement.

The basic steps are outlined below:

1. **Select range of data**

2. **Click on "Insert" tab in excel**

3. **Select Pivot Table**

4. **The resulting dialog box pops open**

As you can see from the Table/Range in the Pivot Table dialog box above, the Table/Range is set to **$A$1:$F$252**, which is exactly the range of data we need. As such, we want to ensure to capture the entire range of data so that the resulting pivot table does not omit anything of value. For our purposes, we want the PivotTable report to be placed in a New Worksheet (so we select the **("New Worksheet" radio button**), but we can also have the data in our existing worksheet
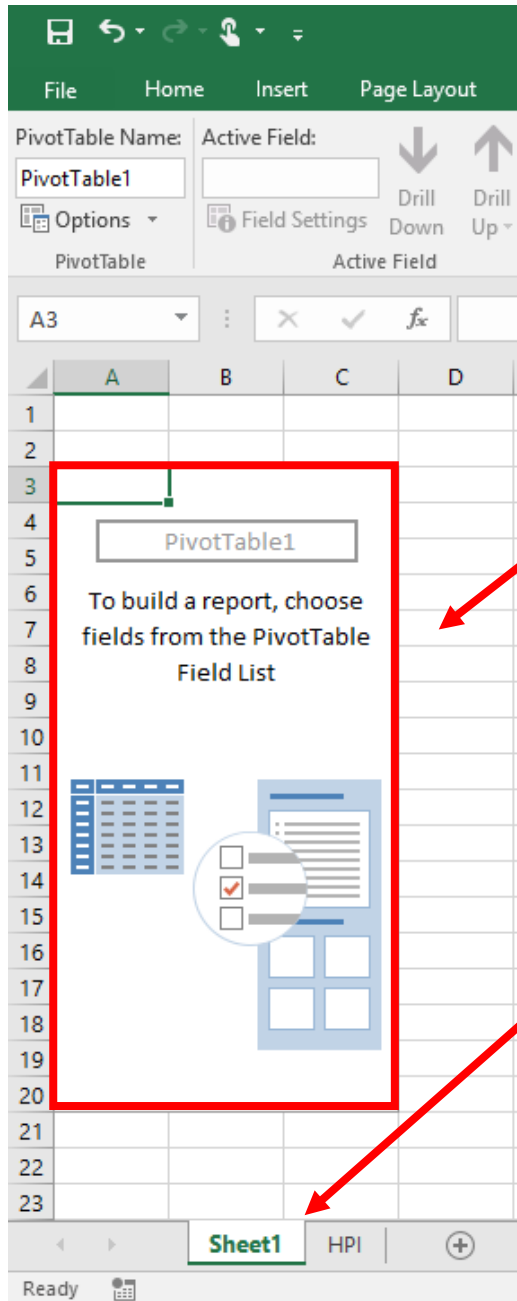
The resulting Pivot Table appears as blank because we have not yet set the parameters, otherwise known as "Pivot Table Fields."

Please also note that this Pivot Table was inserted into a new Worksheet auto-labeled as "Sheet1." We may choose to rename it later on. This will not affect the Pivot Table data.

Suppose we want to summarize the HPI close price data by month and year as opposed to the standardized day to day variable data-set we've extracted from the Wall Street Journal.

We will thus select our fields accordingly.
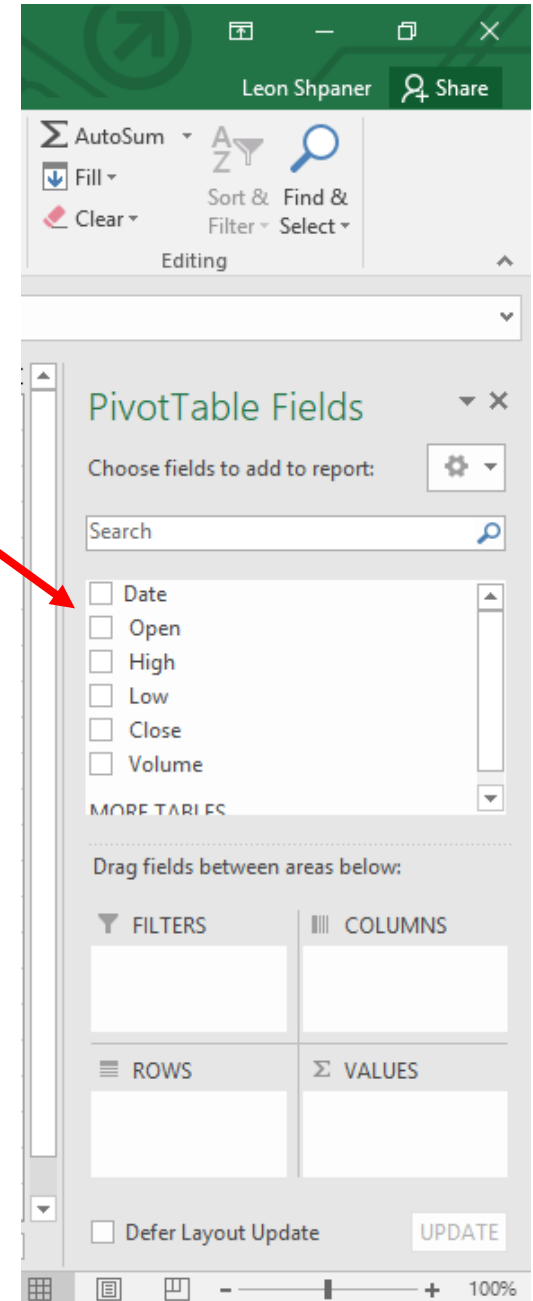
1. Let's go ahead and put a check mark next to "Date." Notice how Quarters and Years are auto-selected as a result, because they are all tied in We will uncheck quarters because we don't want to see the quarterly data. **2. Let's now go ahead and put a check mark next to "Close"** since close price is a variable of interest to us.

3. Now, let's take "Years" from the "Rows" field list and drag it to columns.
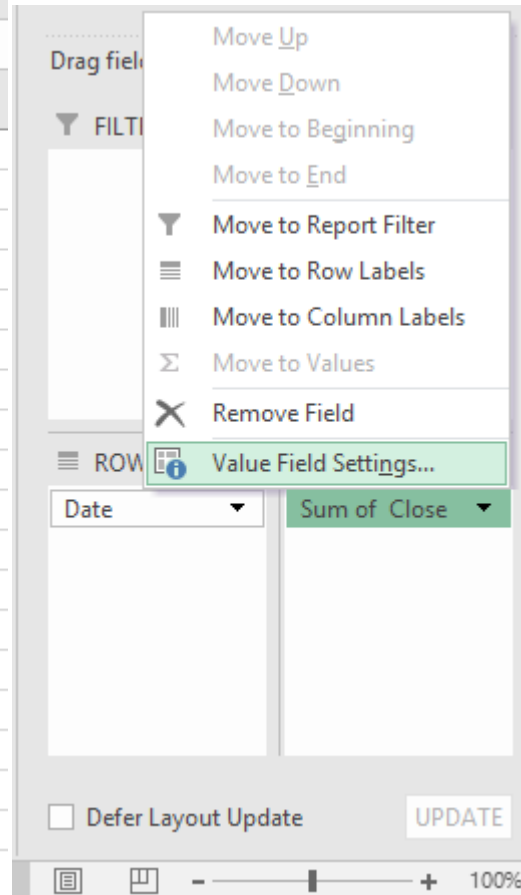
The resulting pivot table looks like this

The data is now arranged precisely as we want it – with closing prices organized by months. There's one problem, though: The pivot table automatically summed the data as opposed to giving us the average close price for the month and year. This is an easy fix. We will adjust it manually. **1. Let's do a drop down on "Sum of Close" in the "Values" area and select "Value Field Settings." 2. Then proceed to change the calculation from "Sum" to "Average."**

1. The resulting pivot table now looks like this, with average values as opposed to summed values:

Average of Close	Column Labels		
Row Labels	2017	2018	Grand Total
Jan		20.62857143	20.62857143
Feb		21.57631579	21.57631579
Mar		20.23571429	20.23571429
Apr		22.16904762	22.16904762
May		22.725	22.725
Jun	22.98	21.79375	22.07619048
Jul	21.4425		21.4425
Aug	19.15652174		19.15652174
Sep	21.44		21.44
Oct	22.07727273		22.07727273
Nov	24.47857143		24.47857143
Dec	24.21		24.21
Grand Total	22.11526718	21.51916667	21.83027888

2. A simple rounding of decimal points (down to 2 decimals) gives us a better looking data set:

Average of Close	Column Labels		
Row Labels	2017	2018	Grand Total
Jan		20.63	20.63
Feb		21.58	21.58
Mar		20.24	20.24
Apr		22.17	22.17
May		22.73	22.73
Jun	22.98	21.79	22.08
Jul	21.44		21.44
Aug	19.16		19.16
Sep	21.44		21.44
Oct	22.08		22.08
Nov	24.48		24.48
Dec	24.21		24.21
Grand Total	22.12	21.52	21.83

Source Name: Close

Custom Name: Average of Close

Summarize Values By | Show Values As

Summarize value field by

Choose the type of calculation that you want to use to summarize data from the selected field

- Sum
- Count
- **Average**
- Max
- Min
- Product

[Number Format]   [OK]   [Cancel]

Number

Category:
- General
- Number
- Currency
- Accounting
- Date
- Time
- Percentage
- Fraction
- Scientific
- Text
- Special
- Custom

Sample
20.24

Decimal places: 2

☐ Use 1000 Separator (,)

Negative numbers:
-1234.10
1234.10
(1234.10)
(1234.10)

Number is used for general display of numbers. Currency and Accounting offer specialized formatting for monetary value.

[OK]   [Cancel]

We can also switch (move around) data in the different areas. For instance, we now have **"Years"** in columns and **"Date"** in Rows.

Let's switch them around see what happens.
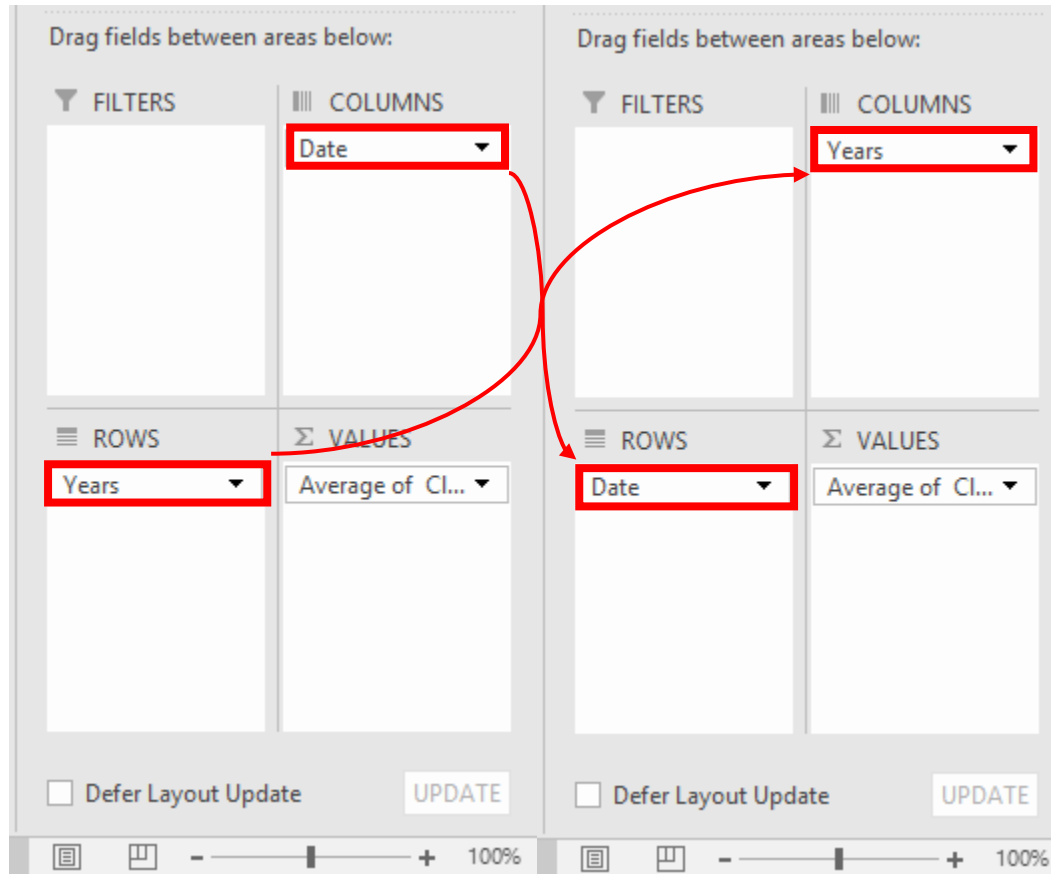
The resulting Pivot Table now looks like this:

Average of Close	Column Labels												
Row Labels	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
2017							22.98	21.44	19.16	21.44	22.08	24.48 24.21	22.12
2018		20.63	21.58	20.24	22.17	22.73	21.79						21.52
Grand Total		20.63	21.58	20.24	22.17	22.73	22.08	21.44	19.16	21.44	22.08	24.48 24.21	21.83

As we have seen in our introduction, historical pricing inquiries (HPI) can be pulled from reliable data sources like Yahoo Finance and Wall Street Journal.

We're going to go ahead and pull this data for IMAX from WSJ

https://quotes.wsj.com/IMAX/historical-prices

and we're going to see what happens when some of this data is missing and piece it back together using the VLOOKUP formula

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Imax Corp.
IMAX (U.S.: NYSE)

REAL TIME 12:01 PM EDT 06/25/18	Volume 150,694	1D **5D** 1M 3M YTD 1Y 3Y $ %
$**22.425**USD	65 Day Avg Vol 695,003	
-0.175 -0.77% ▼	1 Day Range 22.40 - 22.85	
	52 Week Range 17.575 - 26.70 (08/23/17 - 11/28/17)	

Jun 19 Jun 20 Jun 21 Jun 22 Jun 25

$23
$22
$21

Select data range from exactly one year back
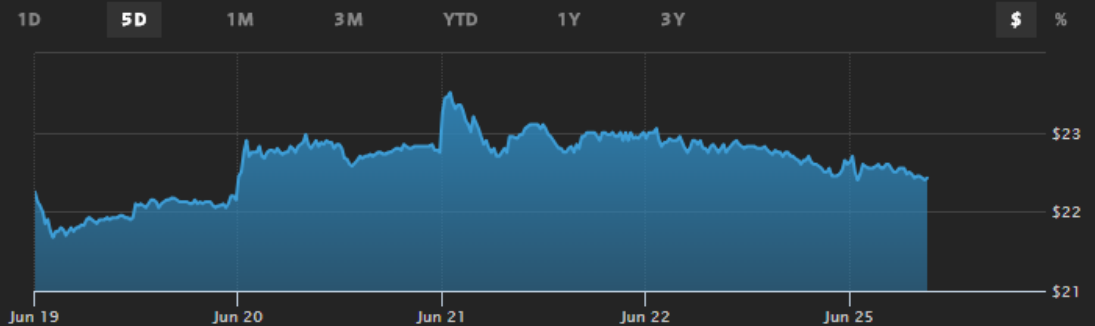
ADVANCED CHARTING

COMPARE ▾

Open 22.65   Prior Close 22.60 (06/22/18)

1 Day   IMAX -0.77% ▼   DJIA -1.62% ▼   S&P Mid Cap 400 -1.60% ▼   Leisure/Arts/Hospitality -0.25% ▼

OVERVIEW » RESEARCH & RATINGS » HISTORICAL PRICES

ALL SECTIONS ☰

06/25/2017 to 06/25/2018   GO   ← **Click "Go."**

Click "Download A Spreadsheet." ⟶ DOWNLOAD A SPREADSHEET ⤓

DATE	OPEN	HIGH	LOW	CLOSE	VOLUME
06/22/18	23.05	23.10	22.425	22.60	2.46 M
06/21/18	22.85	23.60	22.65	23.00	448,238
06/20/18	22.30	23.00	22.30	22.75	455,694
06/19/18	22.10	22.30	21.60	22.15	320,106

So upon downloading the historical prices based upon the date range of 06/25/2017 - 06/25/2018, we get the following spreadsheet directly exported into excel. Highlighting Column A automatically brings up Excel's built in summary statistics dashboard at the very bottom of the screen, and we can instantly see that the count is 253. What this tells us, simply put, is that this column of data contains **253 cells**. Without the header cell, **A1**, it's 252 dates from (6/25/17 – 6/25/2018). So this is our master list of data because it holds the original integrity of the report. Let's now say, for example, that some of the data in this list was breached/ lost and several rows went missing. How would we tackle the problem of finding these missing rows? That's precisely when the **Vlookup function** comes in handy. Let's look at what happens when we receive this data partially (with only 216 rows of data). Let's find out what happened to the 36 missing rows of data.

Let's say, for whatever reason, you received this data only partially, but need to piece it back together in its entirety.

First and foremost, let's notice that the data set in column A is counted at 217 cells. What happened to the other 36 cells?

Also, let's draw attention to the fact that it's not just the cells that are missing. In fact, 36 entire rows of data are missing as well.

We know this to be true because if only cells were missing, blanks would show up in the midst of the data-set.

What do we know about the data?

1. Dates in column A are in reverse chronological order
2. The rest of the columns B-F are quantitative variables tied in with column A.

So if we have the dates, we can find the corresponding info? Well, almost...

We are going to tell excel to search the data up and down until an exact match is found. VLOOKUP tells excel to vertically lookup values in one data set, and find it in another.

1. We're going to go back to the HistoricalPrices (2) workbook and add columns G-L and label them to reference that the data is coming from the HPI workbook. This is the workbook that contains only the partial data.

2. We're going to enter the VLOOKUP function in cell G2:

=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

The value we want to look up (find)

The range of data where the lookup value is located

The column # in the range that has the value you are looking for

We want to specify FALSE for an exact match, otherwise, if we omit or put in TRUE, we only get an approximate match

SUM	⌄	⋮	✕ ✓	ƒx	=VLOOKUP(A2,'HPI (partial)'!A$1:F$217,2,FALSE)

	A	B	C	D	E	F	G
1	Date	Open	High	Low	Close	Volume	Open (HPI partial)
2	6/25/2018	22.65	22.85	22.35	22.7	571611	=VLOOKUP(A2,'HPI (partial)'!A$1:F$217,2,FALSE)

In cell G2, we are telling Excel to vertically lookup cell A2 (which is the first value on this sheet) in workbook 'HPI (partial) that spans the range of A$1:F$217 (we want to absolute reference this range with the $ sign in the middle to lock in the ROWS ONLY), where the open price is located in column #2, and we want an EXACT match! Closing the parenthesis and pressing enter returns the value of 22.65, which is the exact match. Let's bring this formula in cell G2 down to the bottom, to populate column G with the full range of data. However, in this process, we find that some of the values in column G are returned as #N/A. What this tells us is exactly where the data is missing. We can leave the formula as is, but prefer to clean up the #N/A's for aesthetic reasons, and amend the formula to replace these errors as hyphens (-). In so doing, we modify the VLOOKUP function to the following:

=IFERROR(VLOOKUP(A2,'HPI(partial)'!A$1:F$217,2,FALSE), "-")

If there is an error…   Return values as hyphens

Now that the formula is modified to account for #N/A errors, as a shortcut to the process, we apply the same formula across columns G-L, remembering to ONLY change the column index numbers (as this corresponds to our respective columns of interest within the partial list we are looking up the values from).

Once we run the formula across columns G-L, we can proceed to do a dropdown filter on row 1, choosing column G as a baseline, unselecting all, and re-selecting ONLY the hyphens. One the filter is applied, this shows us (in columns A-F) exactly the data that was missing from our partial list. The dashboard at the bottom of he screen also shows us that 36 records were found. In our original problem, we were missing exactly 36 rows of data! We are done!

Left screenshot — HistoricalPrices (2)

G1 = Open (HPI partial)

	Date	Open	High	Low	Close	Volume	Open (HPI partial)
2	6/25/2018	22.65	22.85	22.35	22.7	571611	22.65
3	6/22/2018	23.05	23.1	22.425	22.6	2459797	23.05
4	6/21/2018	22.85	23.6	22.65	23	448238	22.85
5	6/20/2018	22.3	23	22.3	22.75	455694	22.3
6	6/19/2018	22.1	22.3	21.6	22.15	320106	-
7	6/18/2018	21.7	22.5	21.7	22.35	281471	-
8	6/15/2018	21.9	21.95	21.6	21.85	578295	-
9	6/14/2018	21.9	22	21.7	22	261974	-
10	6/13/2018	21.8	22	21.6	21.9	337505	-
11	6/12/2018	21.6	21.8	21.1	21.7	564502	-
12	6/11/2018	21.15	21.95	21.15	21.65	253487	-
13	6/8/2018	21.1	21.45	20.65	21.25	510298	-
14	6/7/2018	21.5	21.75	20.85	21.2	778530	-
15	6/6/2018	21.2	21.75	20.7	21.6	706764	-
16	6/5/2018	20.6	21.25	20.5	21.2	760456	-
17	6/4/2018	21.05	21.2	20.35	20.6	620079	-
18	6/1/2018	20.95	21.2	20.65	20.9	641601	-
19	5/31/2018	21.1	21.45	20.75	20.9	1029061	21.1
20	5/30/2018	21.2	21.3	20.85	21.05	947104	21.2
21	5/29/2018	21.3	21.45	20.85	21	1154800	21.3
22	5/25/2018	21.85	21.875	21.35	21.5	671646	21.85
23	5/24/2018	21.95	22.025	21.475	21.8	672656	21.95
24	5/23/2018	22.45	22.725	22	22	541724	22.45
25	5/22/2018	22.95	23.1	22.45	22.5	731018	22.95
26	5/21/2018	23.05	23.15	22.55	22.95	716658	23.05
27	5/18/2018	23.9	23.9	22.85	22.85	667451	23.9
28	5/17/2018	24.3	24.3	23.675	23.85	343757	24.3

HistoricalPrices (2) | HPI (partial)

Ready

Right screenshot — HistoricalPrices (2) filtered

G1 = Open (HPI partial)

	Date	Open	High	Low	Close	Volume	Open (HPI partial)
6	6/19/2018	22.1	22.3	21.6	22.15	320106	-
7	6/18/2018	21.7	22.5	21.7	22.35	281471	-
8	6/15/2018	21.9	21.95	21.6	21.85	578295	-
9	6/14/2018	21.9	22	21.7	22	261974	-
10	6/13/2018	21.8	22	21.6	21.9	337505	-
11	6/12/2018	21.6	21.8	21.1	21.7	564502	-
12	6/11/2018	21.15	21.95	21.15	21.65	253487	-
13	6/8/2018	21.1	21.45	20.65	21.25	510298	-
14	6/7/2018	21.5	21.75	20.85	21.2	778530	-
15	6/6/2018	21.2	21.75	20.7	21.6	706764	-
16	6/5/2018	20.6	21.25	20.5	21.2	760456	-
17	6/4/2018	21.05	21.2	20.35	20.6	620079	-
18	6/1/2018	20.95	21.2	20.65	20.9	641601	-
94	2/12/2018	20.25	21.05	20.15	20.8	972831	-
95	2/9/2018	20	20.3	19.55	20.15	742147	-
96	2/8/2018	20.5	20.575	19.9	19.95	786891	-
97	2/7/2018	19.65	20.6	19.35	20.45	1224607	-
98	2/6/2018	19.4	19.85	19.06	19.6	915097	-
99	2/5/2018	20.25	20.44	19.8	19.8	911927	-
100	2/2/2018	19.95	20.775	19.85	20.3	1198374	-
101	2/1/2018	19.85	20.45	19.6	20.1	781948	-
102	1/31/2018	19.4	20.025	19.3	19.85	1470131	-
103	1/30/2018	19.5	19.6	19	19.25	1183142	-
168	10/25/2017	21.35	21.35	20.65	21	790822	-
169	10/24/2017	21.05	21.4	20.75	21.2	687540	-
170	10/23/2017	21.25	21.35	20.85	20.95	566498	-
171	10/20/2017	21.05	21.4	20.95	21.3	498152	-

HistoricalPrices (2) | HPI (partial)

Ready | 36 of 252 records found

Present Value: the value (today) of a set of anticipated cash flows (future)

Cash flow at any given time (t)

$$PV = \frac{CF_t}{(1 + \textcircled{r})^t}$$

The higher the risk (r), the higher the discount rate

The denominator = (1 + the discount rate, r) all to the power of time, t

Net Present Value: The present value of acquiring the asset – the cost of acquiring the asset (negative cash flow) at t = 0.

Usually <0, because it is the cost of acquiring the asset

Cash flow at initial time (t=0)

Cash flow at any given time (t)

$$NPV = \sum_{t=0}^{N} \frac{CF_t}{(1+r)^t} = CF_0 + \sum_{t=1}^{N} \frac{CF_t}{(1+r)^t}$$

Present Value = PV

Though the concept of *opportunity cost* is omnipresent in the study of Micro Economics, ceteris paribus, the exact financial cost of any endeavor must be met with the value(s) of the ensuing alternative(s).

Going further, if we are to look at the value of an investment, we must look at its return and stack it up against other feasible investment alternatives. From a purely technical standpoint, adjusting the discount rate, r, will obviously affect the net present value.

If a disciplined investor was to consider two different investments with an equal amount of risk and forego one investment's rate of return for another, this is the cost of capital of the investment decision, or, once again, opportunity cost.

As we cover valuation, we will see that some returns do not stack up against the company's cost of capital, thereby increasing risk, and ultimately decreasing valuation.

Finance, as opposed to theoretical economics delves deeper into opportunity costs, and quantifies these costs as real dollar figures.

In the ensuing excel demo, we will show how NPV is calculated step by step.

In this example, assuming the cash flow is static at time t, we can also use **Excel's PV function** to calculate NPV; however, in the ensuing example, Excel's PV function CANNOT be used to calculate NPV when the cash flows vary across time t.

	A	B	C	D
G8			f_x	
1	**CALCULATE PRESENT VALUE**			
2				
3	**Discount Rate** 0.03			
4				
5	**Year**	**Cash Flow**	**Present Value**	**Formula**
6	1	$ 100.00	$ 97.09	<-- =B6/(1+$B$3)^A6
7	2	$ 100.00	$ 94.26	<-- =B7/(1+$B$3)^A7
8	3	$ 100.00	$ 91.51	<-- =B8/(1+$B$3)^A8
9	4	$ 100.00	$ 88.85	<-- =B9/(1+$B$3)^A9
10	5	$ 100.00	$ 86.26	<-- =B10/(1+$B$3)^A10
11				<--
12	**NPV**		$ 457.97	<-- =SUM(C6:C10)
13	**NPV (Excel Function)**		$457.97	<-- =NPV(B3,B6:B10)
14	**PV**		$457.97	<-- =PV(B3,5,-100)

In the example below, an initial investment of $250.00 is made at t = 0. From t = 1 through 5, cash flow increases by $100.00/ year. We calculate Present Value for each year starting in cell C6, by using the classic formula **=B6/(1+$B$3)^A6** = $PV = \dfrac{CF_t}{(1+r)^t}$

	A	B	C	D
	K6	f_x		
1	CALCULATE PRESENT VALUE			
2				
3	Discount Rate	0.03		
4				
5	Year	Cash Flow	Present Value	Formula
6	0	$ (250.00)	$ (250.00)	<-- =B6/(1+$B$3)^A6
7	1	$ 100.00	$ 97.09	<-- =B7/(1+$B$3)^A7
8	2	$ 200.00	$ 188.52	<-- =B8/(1+$B$3)^A8
9	3	$ 300.00	$ 274.54	<-- =B9/(1+$B$3)^A9
10	4	$ 400.00	$ 355.39	<-- =B10/(1+$B$3)^A10
11	5	$ 500.00	$ 431.30	<-- =B11/(1+$B$3)^A11
12				<--
13	NPV		$ 1,096.85	<-- =SUM(C6:C11)
14	NPV (Excel Function)		$ 1,096.85	<-- =B6+NPV(B3,B7:B11)
15				

In this example, we get the IRR by using Excel's built-in IRR function **=IRR(values, [guess]).** IRR (the internal rate of return) is the rare of return where **NPV = 0.** The higher the IRR, the healthier the investment.

	A	B	C	D
	I8		f_x	
1	CALCULATE PRESENT VALUE			
2				
3	Discount Rate 0.03			
4				
5	Year	Cash Flow	Present Value	Formula
6	0	$ (250.00)	$ (250.00)	<-- =B6/(1+$B$3)^A6
7	1	$ 100.00	$ 97.09	<-- =B7/(1+$B$3)^A7
8	2	$ 200.00	$ 188.52	<-- =B8/(1+$B$3)^A8
9	3	$ 300.00	$ 274.54	<-- =B9/(1+$B$3)^A9
10	4	$ 400.00	$ 355.39	<-- =B10/(1+$B$3)^A10
11	5	$ 500.00	$ 431.30	<-- =B11/(1+$B$3)^A11
12				<--
13	NPV		$ 1,096.85	<-- =SUM(C6:C11)
14	NPV (Excel Function)		$ 1,096.85	<-- =B6+NPV(B3,B7:B11)
15	IRR		75%	<-- =IRR(B6:B11)

The Wall Street Journal is an excellent resource for data mining, albeit, not all reports are downloadable into excel (only the Historical Prices are). For this reason, we must copy and paste the income statement, balance sheet, and statement of cash flow separately into Excel in order to build an all-encompassing pro-forma statement. However, in so doing, we build an automated process (macro) that takes the pasted data and arranges it in such a way that helps our efforts and is aesthetically sound.

What is a pro-forma statement?

Pro- Forma Financial Analysis

Latin term literally translating to: "for the sake of form"

- Income Statement
- Balance Sheet
- Statement of Cash Flows

Fiscal year is January-December. All values USD Thousands.	2013	2014	2015	2016	2017
Income Statement					
Sales/Revenue	287,937.00	290,541.00	373,805.00	377,334.00	380,767.00
Income Tax - Current Domestic	1,068.00	3,495.00	10,862.00	1,396.00	6,898.00
Net Income After Extraordinaries	44,733.00	38,600.00	55,075.00	28,788.00	2,344.00
Net Income Available to Common	44,115.00	39,310.00	55,075.00	28,788.00	2,344.00
EPS (Basic)	0.66	0.58	0.79	0.43	0.04
EPS (Basic) Growth	-	-12.85%	37.34%	-45.57%	-90.70%
EBIT	64,854.00	65,066.00	95,864.00	66,257.00	46,571.00
Balance Sheet					
Assets					
Fiscal year is January-December. All values USD Thousands.	2013	2014	2015	2016	2017
Accounts Receivables, Net	73,074.00	76,051.00	97,981.00	96,349.00	130,546.00
Accounts Receivables, Gross	73,961.00	76,998.00	99,695.00	97,599.00	132,513.00
Total Equity	319,585.00	426,687.00	677,157.00	626,554.00	603,610.00
Liabilities & Shareholders' Equity	481,145.00	621,533.00	931,020.00	857,334.00	866,612.00
Cash Flow					
Fiscal year is January-December. All values USD Thousands.	2013	2014	2015	2016	2017
Net Income before Extraordinaries	44,115.00	42,169.00	64,624.00	39,320.00	12,518.00
Depreciation, Depletion & Amortization	36,685.00	32,930.00	40,887.00	45,953.00	66,245.00
Net Financing Cash Flow / Sales	-1.52%	17.99%	54.90%	-33.33%	-15.11%
Exchange Rate Effect	-163	-54	842	106	-267
Net Change in Cash	8,210.00	76,957.00	210,946.00	-112,690.00	-46,034.00
Free Cash Flow	42,017.00	46,501.00	40,428.00	62,594.00	61,223.00

As we discussed in our introduction, we can obtain the financials of any publicly traded company via:

- **Yahoo Finance**
- **The Wall Street Journal**
- **The investor relations section of the corporation's website**

Piecing together a pro-forma from the investor relations section of the company's website can prove to be quite cumbersome.

- **Some companies don't have exportable excel files**
- **Makes the workload more tedious and time consuming**
- **It confuses certain line items that are available in other reliable sources**

First, let's examine the financials for IMAX via Yahoo Finance:

https://finance.yahoo.com/quote/IMAX/financials?p=IMAX

IMAX Corporation (IMAX)
NYSE - NYSE Delayed Price. Currency in USD

☆ Add to watchlist

22.90 +0.25 (+1.10%)
At close: July 6 4:02PM EDT

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Quote Lookup

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Learn more about your feedback.

Show: **Income Statement** | Balance Sheet | Cash Flow

Annual | Quarterly

Income Statement

All numbers in thousands

Revenue

Total Revenue

Cost of Revenue

Gross Profit

Let's go ahead and click on the first financial report "income statement," highlight the relevant information from top to bottom, and subsequently copy and paste it into a blank excel spreadsheet which we will later save as a macro-enabled workbook.

1. Highlight "Columns A-D."
2. Right click into the resulting highlighted area and click "Format Cells."
3. Go to the "Fill tab" of the pop-up dialog box, select "No color," and click "OK."
4. Now Select All cells by clicking on the top left corner OR by hitting CTRL + A on your keyboard.
5. Once all cells are selected, hover your mouse pointer between any 2 columns until the pointer

appears like this: ⟷ and proceed to double click. All columns will thus automatically adjust and resize (*except for column A –*

because there are some cells that are merged – so let's take care of that problem. Select (Highlight) Column A and unselect "Wrap Text" on the "Home" tab.

6. Unselect "Merge & Center."
7. Now go back and select all cells (as in step 4 above) and repeat step 5.
8. Highlight "Columns "B-D."
9. Center the content of those columns in one click by clicking on center alignment.
   Change the number format to accounting, but remember, in so doing, you are also changing the dates on row 3 to dollar figures. We want to change that format back to "date," otherwise, we are calculating that towards revenue and that's serious overstatement of revenue, and that is a BIG NO-NO!
10. Let's go ahead and re-center the alignment on "Columns B-D" for aesthetic reasons, and...

We are all set!

In Excel, click on "View," then "Macros," and click on "Record Macro."
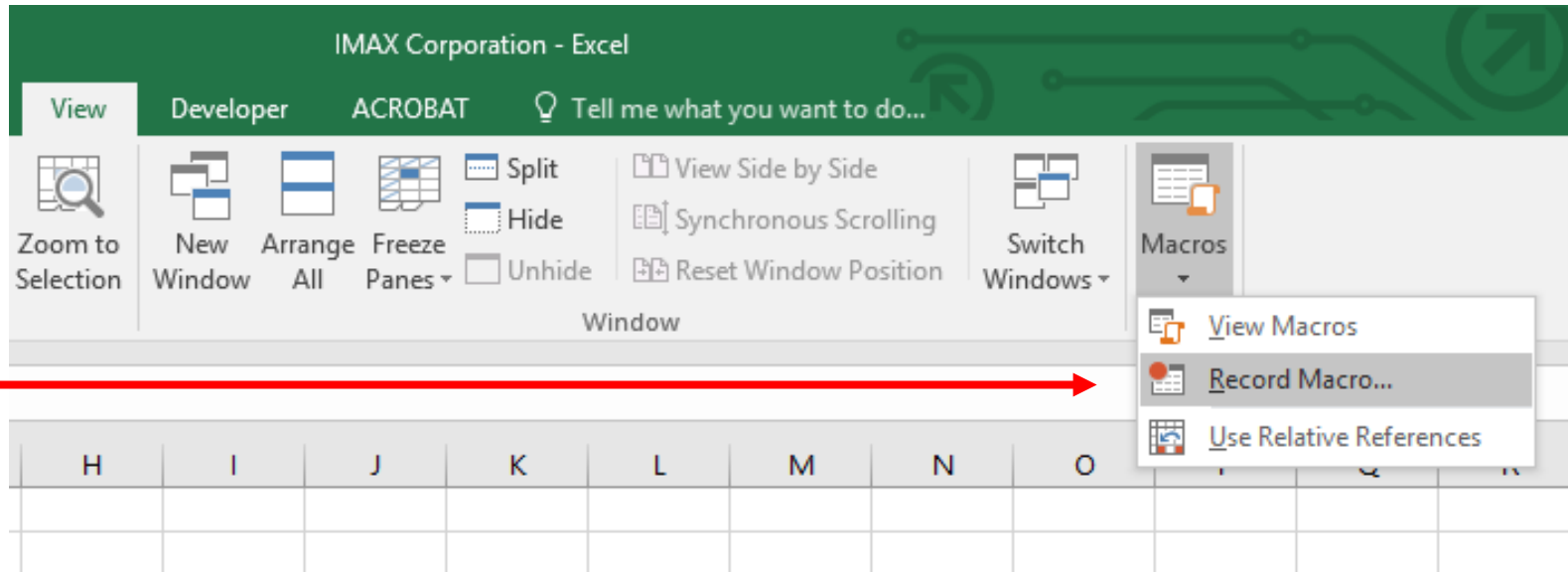
Macro name:

ProFormaAlign

Shortcut key:

Ctrl+

Store macro in:

This Workbook

Description:

custom format for proforma

OK   Cancel

① Ensure that you name your macro such that it DOES NOT contain any spaces

② Make sure that you have your steps mapped out such that you do not make any mistakes in the process (i.e., accidentally click or type somewhere that was not intended).

Write-up an optional description

Click "OK"

Once you are finished going through the process of recording a macro, go back to "View," "Macros," and ensure to click on "Stop Recording."

To view the resulting script, go back to the process in the diagram above.

        This time, ensure to click "View Macros." The resulting dialog box pops up:

1.   **Click "Edit."**

This takes us to the VBA Editor. On the back end, the script for the macro was written as such:


```
Microsoft Visual Basic for Applications - IMAX Corporation.xlsm - [Module4 (Code)]

File   Edit   View   Insert   Format   Debug   Run   Tools   Add-Ins   Window   Help

                                                                      Ln 54, Col 25

Project - VBAProject                    (General)                              ProFormaAlign

    Sheet6 (WSJ Bal
    Sheet7 (WSJ Inc        Sub ProFormaAlign()
    Sheet8 (ProForm        '
    Sheet9 (Valuatio       ' ProFormaAlign Macro
    ThisWorkbook           ' custom format for proforma
  Modules                  '
    Module1
    Module2                '
    Module3                    Columns("A:E").Select
    Module4                    With Selection.Interior
                                   .Pattern = xlNone
                                   .TintAndShade = 0
                                   .PatternTintAndShade = 0
Properties - Module4           End With
                               Cells.Select
Module4 Module                 Cells.EntireColumn.AutoFit
                               Columns("A:A").Select
Alphabetic  Categorized        With Selection
(Name) Module4                     .HorizontalAlignment = xlGeneral
                                   .WrapText = False
                                   .Orientation = 0
                                   .AddIndent = False
                                   .IndentLevel = 0
                                   .ShrinkToFit = False
                                   .ReadingOrder = xlContext
                               End With
                               With Selection
                                   .HorizontalAlignment = xlGeneral
                                   .VerticalAlignment = xlCenter
                                   .WrapText = True
                                   .Orientation = 0
                                   .AddIndent = False
                                   .IndentLevel = 0
                                   .ShrinkToFit = False
                                   .ReadingOrder = xlContext
                                   .MergeCells = False
                               End With
                               With Selection
```

Yahoo Finance periodically updates its site, so when we originally started this process, IMAX Corporation only had financial statements going back to 2014. Now, we have data going back to 2013.
Great, right? More data means better forecasting!
But... REMEMBER, our original macro only accounted for "Columns A-D," therefore, we must edit the macro to account for A NEW RANGE in COLUMNS "A-E."
All we have to do now is simply view our macro, click on edit, do a search and fix the range. How do we do that?

We know that our original data spanned the range of "Columns A-D." So now, all we have to do is go into the VBA editor, and change any ranges that end with :D to :E. We can do that via searching CTRL + F (find) and replace.
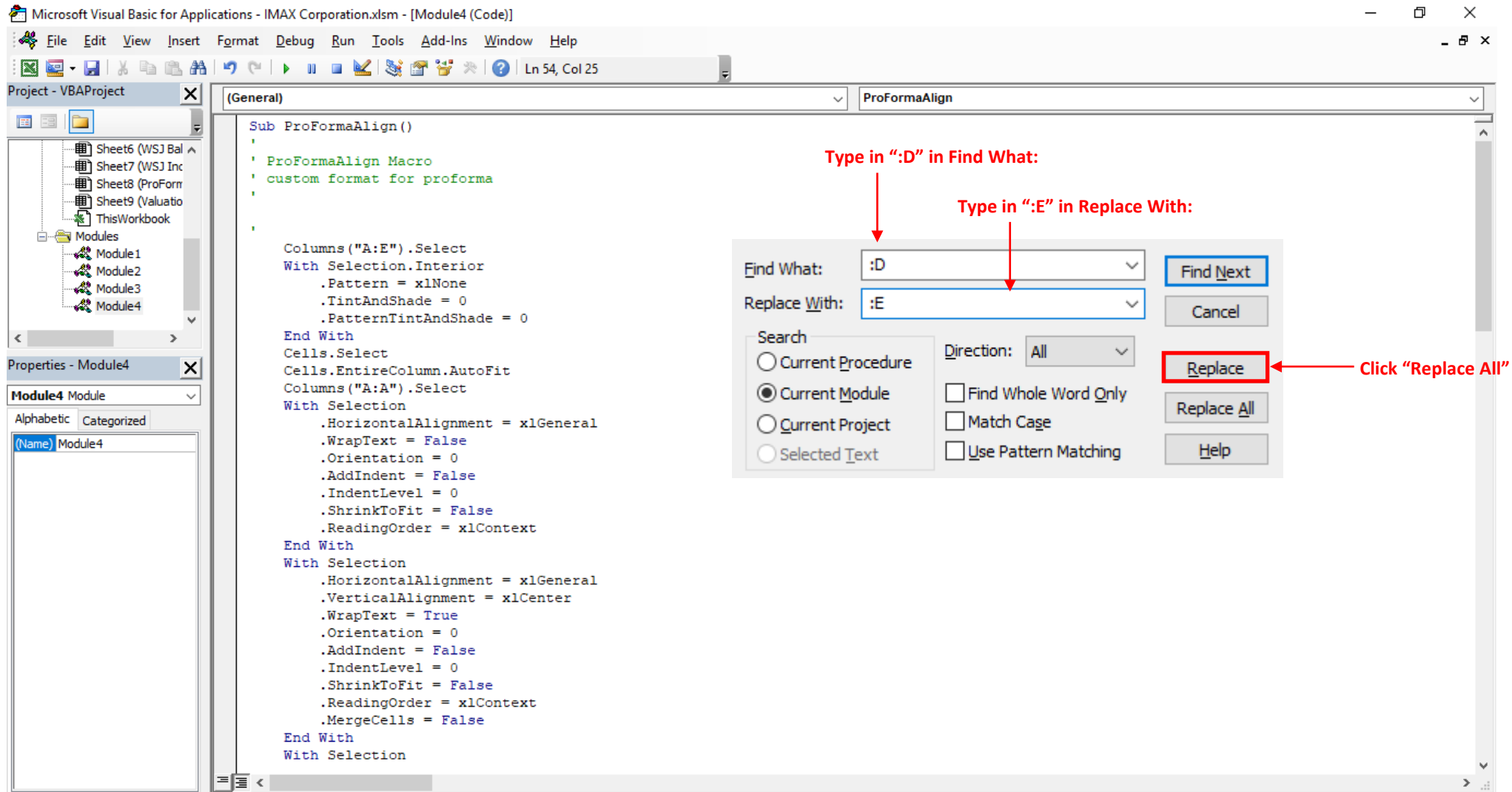
Let's save the file as a macro enabled workbook and copy and paste the remaining pro-forma statements into our excel file into separate sheets. So, in effect, we will have 3 sheets:

1. Income Statement
2. Balance Sheet
3. Cash Flow

We will now run the macro on #2 and #3, respectively. The script for the macro created in this exercise is pasted below for your reference.

```vba
Sub ProFormaAlign()
'
' ProFormaAlign Macro
' custom format for proforma
'

'
    Columns("A:E").Select
    With Selection.Interior
        .Pattern = xlNone
        .TintAndShade = 0
        .PatternTintAndShade = 0
    End With
    Cells.Select
    Cells.EntireColumn.AutoFit
    Columns("A:A").Select
    With Selection
        .HorizontalAlignment = xlGeneral
        .WrapText = False
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = 0
        .ShrinkToFit = False
        .ReadingOrder = xlContext
    End With
    With Selection
        .HorizontalAlignment = xlGeneral
        .VerticalAlignment = xlCenter
        .WrapText = True
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = 0
        .ShrinkToFit = False
        .ReadingOrder = xlContext
        .MergeCells = False
    End With
    With Selection
        .HorizontalAlignment = xlGeneral
        .VerticalAlignment = xlCenter
        .WrapText = True
        .Orientation = 0
```

```vba
        .AddIndent = False
        .IndentLevel = 0
        .ShrinkToFit = False
        .ReadingOrder = xlContext
        .MergeCells = False
    End With
    With Selection
        .HorizontalAlignment = xlGeneral
        .VerticalAlignment = xlCenter
        .WrapText = True
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = 0
        .ShrinkToFit = False
        .ReadingOrder = xlContext
        .MergeCells = False
    End With
    With Selection
        .HorizontalAlignment = xlGeneral
        .VerticalAlignment = xlCenter
        .WrapText = True
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = 0
        .ShrinkToFit = False
        .ReadingOrder = xlContext
        .MergeCells = False
    End With
    Selection.UnMerge
    Cells.Select
    Cells.EntireColumn.AutoFit
    Columns("B:E").Select
    With Selection
        .HorizontalAlignment = xlCenter
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = -1
        .ShrinkToFit = False
        .ReadingOrder = xlContext
        .MergeCells = False
    End With
```

```vba
    Selection.Style = "Currency"
    Range("B3:E3").Select
    Selection.NumberFormat = "m/d/yyyy"
    Selection.Font.Bold = True
    With Selection.Font
       .ColorIndex = xlAutomatic
       .TintAndShade = 0
    End With
    Columns("B:E").Select
    With Selection
       .HorizontalAlignment = xlLeft
       .Orientation = 0
       .AddIndent = False
       .IndentLevel = 0
       .ShrinkToFit = False
       .ReadingOrder = xlContext
       .MergeCells = False
    End With
    With Selection
       .HorizontalAlignment = xlCenter
       .Orientation = 0
       .AddIndent = False
       .IndentLevel = 0
       .ShrinkToFit = False
       .ReadingOrder = xlContext
       .MergeCells = False
    End With
    With Selection
       .HorizontalAlignment = xlLeft
       .Orientation = 0
       .AddIndent = False
       .IndentLevel = 0
       .ShrinkToFit = False
       .ReadingOrder = xlContext
       .MergeCells = False
    End With
End Sub
```

Income Statement

- **A company's performance measured by revenues and expenses**

- **In Economics:**

   Profit = TR – TC = $\pi = TR - TC$

- **In Finance/ Accounting:**

- **Profit = Revenue – Cost**

- **Operating Income (or Loss) = Total Revenue – Total Operating Expenses**

- **EBIT = Earnings Before Interest and Taxes**

- **Net Income from Continuing Operations = Total Other Income (and/or Expenses) Net + EBIT – Income Tax Expense**

Balance Sheet

- **Assets = Liabilities + Shareholder's Equity**

- **Cash Flow Statement:**

- **Cash from Operating Activities**

- **Cash from Investing Activities**

- **Cash from Financing Activities**

- **In The ensuing slides, we are going to compute Free Cash Flow (FCF) and use the discounted cash flow model (DCF) to valuate a company.**

- **Before we compute the FCF, let's remember that financing activities of the cash flow statement can be disregarded.**

- **FCF = Operating activities – Capital Expenditures (CAPEX)**

Income Statement

All numbers in thousands

	Formula (Column C)	Year 2014	Year 2015	Year 2016	Year 2017
			Actual		
Revenue					
Total Revenue		$290,541.00	$ 373,664.00	$ 376,059.00	$ 380,767.00
Cost of Revenue		$117,153.00	$ 153,417.00	$ 174,056.00	$ 195,521.00
Gross Profit	--> =C6-C7	**$173,388.00**	**$ 220,247.00**	**$ 202,003.00**	**$ 185,246.00**
% Change (Revenue Growth)			**29%**	**1%**	**1%**
Conservative Revenue Growth Forecast	--> =AVERAGE(D9:F9)	**10%**			
Optimistic Revenue Growth Forecast	--> =D9-E9-F9	**27%**			
Operating Expenses					
Research Development		$ 16,096.00	$ 12,730.00	$ 16,315.00	$ 20,855.00
Selling General and Administrative		$ 93,260.00	$ 115,345.00	$ 124,745.00	$ 110,400.00
Non Recurring		-	-	-	-
Others		$ (141.00)	$ (141.00)	$ (1,275.00)	-
Total Operating Expenses		$229,151.00	$ 283,963.00	$ 316,874.00	$ 332,442.00
Operating Income or Loss	--> =C6-C17	**$ 61,390.00**	**$ 89,701.00**	**$ 59,185.00**	**$ 48,325.00**
Income from Continuing Operations					
Total Other Income/Expenses Net		$ (5,110.00)	$ (5,025.00)	$ (3,653.00)	$ (19,017.00)
Earnings Before Interest and Taxes		$ 61,390.00	$ 89,701.00	$ 59,185.00	$ 48,325.00
Interest Expense		$ (924.00)	$ (1,661.00)	$ (1,805.00)	$ (1,942.00)
Income Before Tax	--> =C20+C21	$ 56,280.00	$ 84,676.00	$ 55,532.00	$ 29,308.00
Income Tax Expense		$ 14,466.00	$ 20,052.00	$ 16,212.00	$ 16,790.00
Minority Interest		$ 43,912.00	$ 53,266.00	$ 64,542.00	$ 75,864.00
Net Income From Continuing Ops	--> =(C20+C21)-C24	**$ 41,814.00**	**$ 64,624.00**	**$ 39,320.00**	**$ 12,518.00**
Non-recurring Events					
Discontinued Operations		$ 355.00	-	-	-
Extraordinary Items		-	-	-	-
Effect Of Accounting Changes		-	-	-	-
Other Items		-	-	-	-
Net Income					
Net Income		**$ 39,736.00**	**$ 55,844.00**	**$ 28,788.00**	**$ 2,344.00**
Preferred Stock And Other Adjustments		-	-	-	-
Net Income Applicable To Common Shares		**$ 39,310.00**	**$ 55,075.00**	**$ 28,788.00**	**$ 2,344.00**

Balance Sheet

All numbers in thousands

Period Ending

Current Assets

Cash And Cash Equivalents	$106,503.00	$ 317,449.00	$ 204,759.00	$ 158,725.00
Short Term Investments	-	-	-	-
Net Receivables	$108,115.00	$ 136,688.00	$ 134,753.00	$ 260,040.00
Inventory	$ 17,063.00	$ 38,753.00	$ 42,121.00	$ 30,788.00
Other Current Assets	$ 8,174.00	$ 9,064.00	$ 15,208.00	-
Total Current Assets	**$244,801.00**	**$ 508,452.00**	**$ 403,467.00**	**$ 457,102.00**
Long Term Investments	$ 3,384.00	$ 2,198.00	$ 3,389.00	-
Property Plant and Equipment	$183,424.00	$ 218,267.00	$ 245,415.00	$ 276,781.00
Goodwill	$ 39,027.00	$ 39,027.00	$ 39,027.00	$ 39,027.00
Intangible Assets	$ 27,551.00	$ 28,950.00	$ 30,416.00	$ 31,211.00
Accumulated Amortization	-	-	-	-
Other Assets	$123,346.00	$ 133,735.00	$ 135,620.00	$ 62,491.00
Deferred Long Term Asset Charges	$ 23,058.00	$ 25,766.00	$ 20,779.00	$ 30,708.00
Total Assets	**$621,533.00**	**$ 930,629.00**	**$ 857,334.00**	**$ 866,612.00**

Current Liabilities

Accounts Payable	$ 26,145.00	$ 23,455.00	$ 19,990.00	$ 24,235.00
Short/Current Long Term Debt	$ 4,710.00	$ 29,276.00	$ 27,316.00	$ 25,357.00
Other Current Liabilities	$ 8,366.00	$ 9,423.00	$ 6,606.00	-
Total Current Liabilities	**$ 79,047.00**	**$ 78,947.00**	**$ 71,715.00**	**$ 124,375.00**
Long Term Debt	$ 4,710.00	$ 29,276.00	$ 27,316.00	$ 25,357.00
Other Liabilities	$111,089.00	$ 145,249.00	$ 131,749.00	$ 113,270.00
Deferred Long Term Liability Charges	$ 5,568.00	$ 6,180.00	$ 5,065.00	-
Minority Interest	$ 43,912.00	$ 53,266.00	$ 64,542.00	$ 75,864.00
Negative Goodwill	-	-	-	-
Total Liabilities	**$194,846.00**	**$ 253,472.00**	**$ 230,780.00**	**$ 263,002.00**

Stockholders' Equity

Misc. Stocks Options Warrants	-	-	-	-
Redeemable Preferred Stock	-	-	-	-
Preferred Stock	-	-	-	-

	$344,862.00	$ 448,310.00	$ 439,213.00	$ 445,797.00
Common Stock				
Retained Earnings	$ (6,259.00)	$ 19,930.00	$ (47,366.00)	$ (87,592.00)
Treasury Stock	$ 44,172.00	$ 155,651.00	$ 170,165.00	$ 169,541.00
Capital Surplus	-	-	-	-
Other Stockholder Equity	$ 44,172.00	$ 155,651.00	$ 172,104.00	$ 174,674.00
Total Stockholder Equity	$382,775.00	$ 623,891.00	$ 562,012.00	$ 527,746.00
Net Tangible Assets	**$316,197.00**	**$ 555,914.00**	**$ 492,569.00**	**$ 457,508.00**
Net Debt	**$ (97,083.00)**	**$(258,897.00)**	**$(150,127.00)**	**$(108,011.00)**

IMAX CORPORATION
CONSOLIDATED BALANCE SHEETS
(In thousands of U.S. dollars)

The Balance Sheet from IMAX's corporate website is more comprehensive and itemized. It balances out, where Total Assets = Total Liabilities + Shareholder's Equities

	As at December 31, 2017	2016
Assets		
Cash and cash equivalents	$158,725	$204,759
Accounts receivable, net of allowance for doubtful accounts of $1,613 (December 31, 2016 — $1,250)	130,546	96,349
Financing receivables (notes 4 and 19(c))	129,494	122,125
Inventories (note 5)	30,788	42,121
Prepaid expenses	7,549	6,626
Film assets (note 6)	5,026	16,522
Property, plant and equipment (note 7)	276,781	245,415
Other assets (notes 8 and 19(e))	26,757	33,195
Deferred income taxes (note 9)	30,708	20,779
Other intangible assets (note 10)	31,211	30,416
Goodwill	39,027	39,027
Total assets	**$866,612**	**$857,334**
Liabilities		
Bank indebtedness (note 11)	$ 25,357	$ 27,316
Accounts payable	24,235	19,990
Accrued and other liabilities (notes 6, 12, 13, 14(c), 19(b), 19(d), 20 and 22)	100,140	93,208
Deferred revenue	113,270	90,266
Total liabilities	**263,002**	**230,780**
Commitments and contingencies (notes 12 and 13)		
Non-controlling interests (note 21)	**1,353**	**4,980**
Shareholders' equity		
Capital stock (note 14) common shares — no par value. Authorized — unlimited number. 64,902,201 — issued and 64,695,550 — outstanding (December 31, 2016 — 66,224,467 — issued and 66,159,902 — outstanding)	445,797	439,213
Less: Treasury stock, 206,651 shares at cost (December 31, 2016 — 64,565)	(5,133)	(1,939)
Other equity	175,300	177,304
Accumulated deficit	(87,592)	(47,366)
Accumulated other comprehensive loss	(626)	(5,200)
Total shareholders' equity attributable to common shareholders	527,746	562,012
Non-controlling interests (note 21)	74,511	59,562
Total shareholders' equity	602,257	621,574
Total liabilities and shareholders' equity	$866,612	$857,334

Cash Flow

All numbers in thousands

Period Ending

Net Income	--> =C33	$ 39,736.00	$ 55,844.00	$ 28,788.00	$ 2,344.00
Operating Activities, Cash Flows Provided By or Used In					
Depreciation		$ 21,379.00	$ 25,430.00	$ 29,629.00	$ 66,807.00
Adjustments To Net Income		$ 7,056.00	$ 21,616.00	$ 33,473.00	$ 25,356.00
Changes In Accounts Receivables		$ (4,318.00)	$ (22,521.00)	$ (1,414.00)	-
Changes In Liabilities		$ 6,916.00	$ 25,425.00	$ (18,093.00)	-
Changes In Inventories		$ (7,603.00)	$ (21,070.00)	$ (3,825.00)	-
Changes In Other Operating Activities		$ 11,362.00	$ (17,892.00)	$ (7,542.00)	$ (9,141.00)
Total Cash Flow From Operating Activities		$ 86,905.00	$ 84,205.00	$ 77,872.00	$ 85,366.00
Investing Activities, Cash Flows Provided By or Used In					
Capital Expenditures		$ (56,942.00)	$ (71,731.00)	$ (58,188.00)	$ (66,777.00)
Investments		$ (1,993.00)	$ (2,000.00)	$ (1,911.00)	$ (1,606.00)
Other Cash flows from Investing Activities		-	-	-	-
Total Cash Flows From Investing Activities		$ (61,853.00)	$ (78,796.00)	$ (64,886.00)	$ (73,597.00)
Financing Activities, Cash Flows Provided By or Used In					
Dividends Paid		-	-	-	-
Sale Purchase of Stock		$ 10,834.00	$ 35,609.00	$ 13,113.00	$ 16,668.00
Net Borrowings		$ 4,710.00	$ 24,957.00	$ (2,000.00)	$ (2,000.00)
Other Cash Flows from Financing Activities		$ 39,478.00	$178,405.00	$ (18,381.00)	$ (20,931.00)
Total Cash Flows From Financing Activities		$ 51,959.00	$204,695.00	$(125,782.00)	$ (57,536.00)
Effect Of Exchange Rate Changes		$ (54.00)	$ 842.00	$ 106.00	$ (267.00)
Change In Cash and Cash Equivalents		$ 76,957.00	$210,946.00	$(112,690.00)	$ (46,034.00)

As you can see from the Balance Sheet summary alone, the pro-forma from Yahoo Finance does not balance out (assets ≠ liabilities + shareholder's equity). So for this reason, let's look at The Wall Street Journal as a potential source of pro-forma data.

Much like we did with the financials pulled from Yahoo Finance, we will start with the income statement for IMAX on the Wall Street Journal website and copy and paste it into a blank workbook in excel:

https://quotes.wsj.com/IMAX/financials

Once again, we will record a macro (automated process) that will create a script on the back-end (in VBA).

Steps:

1. Let's name our macro: "WSJProForma."
2. Let's add the following description: "re-format of WSJ ProForma."
3. Select All Data in range: (Column A – Column K).
4. Unselect "Wrap Text."
5. With the data still selected, click on "Unmerge Cells."
6. Get rid of the border surrounding the data set (you want to ensure to remove all borders in columns A-K).
7. Insert a blank column in front of Column B (where the header is marked as 2017).
8. Repeat step 7 (above) 4 times until 4 blank columns are created in front of 2017. You can do this by pressing down CTRL+Y on your keyboard 3 more times as a shortcut. The reason for creating 4 more columns to the front of 2017 is so that we can proceed to re-arrange the years in chronological order.
9. Highlight column J (where the header is marked as year 2013), copy the data, and paste the data into column A. Do the same for columns I – F, until all of the dates are re-arranged in chronological order.
10. If there is any data in column K: such as "5 year-trend, etc.," ensure to delete it. You can do this by deleting column K in its entirety. Data in column K is what was left over from the copying and pasting of original data.
11. Go back to Column A, highlight it, and align it to the left.
12. This concludes the steps for this macro. Ensure to go back to the View tab on top of the Excel menu, go to "Macros," and click on "Stop Recording."

The script for this macro should look like this:

```vba
Sub WSJProForma()
'
' WSJProForma Macro
' re-format of WSJ ProForma
'
'
    With Selection
        .WrapText = False
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = -1
        .ShrinkToFit = False
        .ReadingOrder = xlContext
    End With
    Selection.UnMerge
    Selection.Borders(xlDiagonalDown).LineStyle = xlNone
    Selection.Borders(xlDiagonalUp).LineStyle = xlNone
    Selection.Borders(xlEdgeLeft).LineStyle = xlNone
    Selection.Borders(xlEdgeTop).LineStyle = xlNone
    Selection.Borders(xlEdgeBottom).LineStyle = xlNone
    Selection.Borders(xlEdgeRight).LineStyle = xlNone
    Selection.Borders(xlInsideVertical).LineStyle = xlNone
    Selection.Borders(xlInsideHorizontal).LineStyle = xlNone
    Columns("B:B").Select
    Selection.Insert Shift:=xlToRight, CopyOrigin:=xlFormatFromLeftOrAbove
    Selection.Insert Shift:=xlToRight, CopyOrigin:=xlFormatFromLeftOrAbove
    Selection.Insert Shift:=xlToRight, CopyOrigin:=xlFormatFromLeftOrAbove
    Selection.Insert Shift:=xlToRight, CopyOrigin:=xlFormatFromLeftOrAbove
    Columns("A:A").EntireColumn.AutoFit
    Columns("J:J").Select
    Selection.Cut
    Range("B1").Select
    ActiveSheet.Paste
    Columns("I:I").Select
    Selection.Cut
    Range("C1").Select
    ActiveSheet.Paste
    Columns("H:H").Select
    Selection.Cut
    Range("D1").Select
    ActiveSheet.Paste
    Columns("G:G").Select
    Selection.Cut
    Range("E1").Select
    ActiveSheet.Paste
    Columns("K:K").Select
    Selection.Delete Shift:=xlToLeft
    Columns("A:A").Select
    With Selection
        .HorizontalAlignment = xlGeneral
        .WrapText = False
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = 0
        .ShrinkToFit = False
        .ReadingOrder = xlContext
        .MergeCells = False
    End With
End Sub
```

After the macro has been recorded, there is one last step to do manually, and that is to remove blank rows from our statements. The reason why we cannot include this process as apart of our macro is because when new data is brought in, rows fluctuate more than columns, and too many adjustments would have to be done on the back-end later , essentially rendering the macro useless. It would take more work adjusting the script after it is run, so for this reason we will leave this part out of the script and just do it manually. Let's look at the balance sheet as an example:
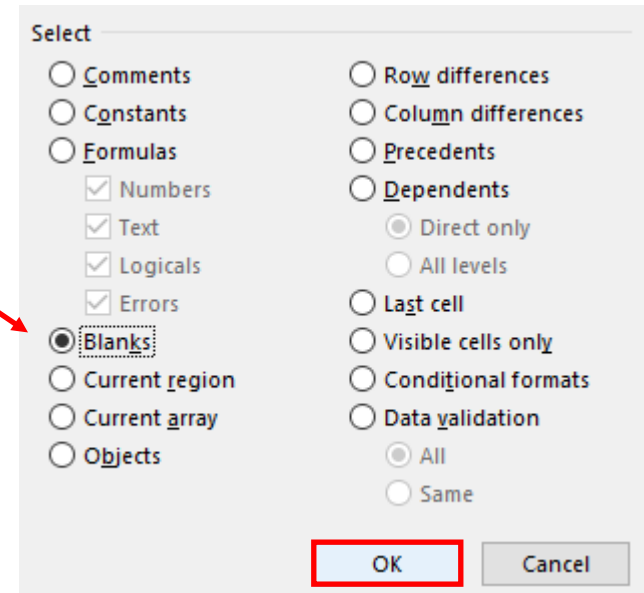
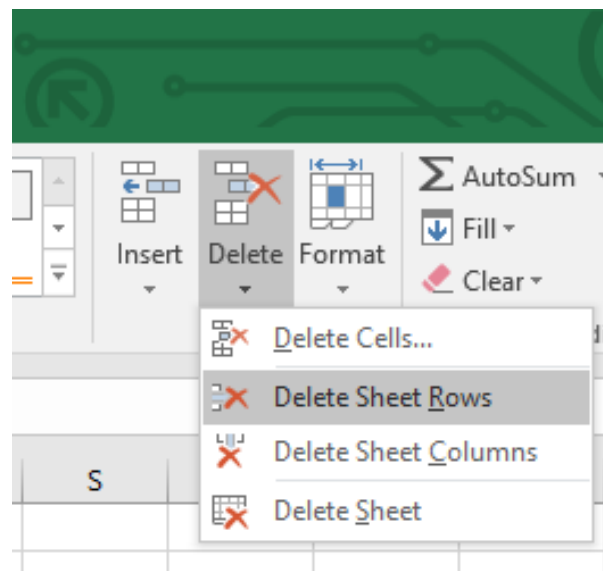Select all data (Columns A-F), enter CTRL + G on your keyboard. This takes you to the Go to: dialog box:

A new dialog box pops up. Select the "Blanks" radio button.
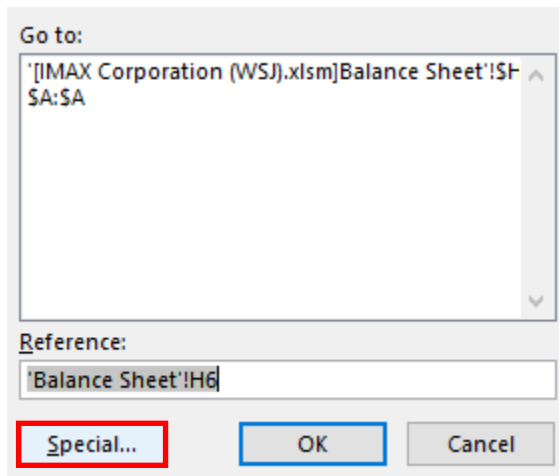
Click Special

Finally, go to the "Home" tab on top of Excel, click on Delete, and select "Delete Sheet Rows."

Click "OK."

In this section we are going to cover the key components of valuation, and effectively set up the valuation worksheet. Based upon the cash flow statement,

free cash flow = operating activities – capital expenditures.

FCF = free cash flow = Cash flow that is available (left over) after operations and fixed investments are taken care of

$$Enterprise\ Value = EV = \sum_{t=1}^{N} \frac{FCF_t}{(1+WACC)^t} \longrightarrow \frac{free\ cash\ flow\ at\ time\ (t)}{(1+Weighted\ average\ cost\ of\ capital)^t}$$

$$where\ WACC = discount\ rate$$

$$= \sum_{t=1}^{N} \frac{FCF_t}{(1+WACC)^{t-0.5}} + \frac{Terminal\ value}{(1+WACC)^{N-0.5}}$$

$$= \sum_{t=1}^{N} \frac{FCF_t}{(1+WACC)^{t-0.5}} + \frac{Terminal\ value}{(1+WACC)^{N-0.5}}$$

$$where\ WACC = \frac{E}{V}R_e + \frac{D}{V}R_d(1-T_c)$$

$$and\ V = (E+D) = (Equity+Debt)$$

Rearranging the terms gives us the following:

$$= \left[\sum_{t=1}^{N} \frac{FCF_t}{(1+WACC)^t} + \frac{Terminal\ Value}{(1+WACC)^N} \right](1+WACC)^{0.5}$$

$$= \left[\sum_{t=1}^{N} \frac{FCF_t}{(1+\frac{E}{E+D}R_e + \frac{D}{E+D}R_d(1-T_c))^t} + \frac{Terminal\ Value}{(1+\frac{E}{E+D}R_e + \frac{D}{E+D}R_d(1-T_c))^N} \right](1+\frac{E}{E+D}R_e + \frac{D}{E+D}R_d(1-T_c))^{0.5}$$

Terms:

Equity: looking at the share price in consideration of buying or selling shares and/or looking at the company's equity as a whole when looking at acquiring the company

Debt: when the company's liabilities are substantial, this factors into a lower valuation based on higher risk.

WACC: weighted average cost of capital: Debt and equity are proportionally weighted in determining the cost of capital, and ultimately risk. The higher the WACC, the higher the risk.

$$WACC = \frac{E}{E+D}R_e + \frac{D}{E+D}R_d(1-T_c)$$

Where:
R_e **= cost of equity**
R_d **= cost of debt**
E = market value of the firm's equity
D = market value of the firm's debt
V = E + D = total market value of the firm's financing (equity and debt)
E/V = percentage of financing that is equity
D/V = percentage of financing that is debt
T_c **= corporate tax rate**

Equity (market cap): share price (x) shares outstanding

Ex. (=23.8 (x) 65,380.00) → shares outstanding is found on the income statement of the last fiscal year = $1,556,044.00 (in thousands)

Debt: the formal way of calculating this is to subtract the sum of cash and short term investments from short-term debt and current portion of long-term debt

However, we will simplify this process to look at the long-term debt and capitalized leases on the company's balance sheet and average the last 3 years' worth of data:

Fiscal year is January-December. All values USD Thousands.	Debt	2013	2014	2015	2016	2017
Long-Term Debt		-	$ 4,710.00	$ 27,667.00	$ 27,316.00	$ 23,357.00
Latest 3-year Average	**$ 26,113.33**					

To calculate the cost of equity in WACC, we will use the CAPM (capital asset pricing model).

However, please note that while there are other methods of valuation and modeling such as the Gordon Model, we are refraining from such complexities and keeping our model simple using the principle of Occam's Razor.

CAPM (Capital Asset Pricing Model)

Developed by William F. Sharpe, Jack Treynor, John Lintner, and Jan Mossin.

- Exceptional tool for making decisions in portfolio investments.

William F. Sharpe is a professor of Finance (Emeritus) at UCLA

https://economics.ucla.edu/2017/05/25/william-f-sharpe/

- **Developed Sharpe Ratio for investment performance analysis**
- **Received 1990 Nobel Prize in Economics**

CAPM (Capital Asset Pricing Model)

(risk-free rate of return) + beta of asset (x) (Expected Return of market – risk free rate of return)

We use the CAPM to calculate the

Cost of Equity

$$= \frac{E(R_i) - R_f}{\beta_i} = E(R_m) - R_f$$

$$= E(R_i) = R_f + \beta_i(E(R_m) - R_f)$$

$E(R_i)$ = *expected return of capital asset*

R_f = *risk free rate of return* R_f = https://fred.stlouisfed.org/series/DGS10/

β_i = *beta of asset (sensitivity)* β_i = https://finance.yahoo.com/quote/IMAX/key-statistics?p=IMAX

$E(R_m)$ = *expected return of market* $E(R_m)$ = https://finance.yahoo.com/quote/SPY/performance/

We can get the risk free rate of return by taking the average of the 10-year Treasury Bond yields; an excellent resource for this endeavor is the St. Louis Federal Reserve: https://fred.stlouisfed.org/series/DGS10/. Select a 10-year date range, and download the report into Excel

The average rate is 2.44%

The beta of the asset can be found on Yahoo Finance: **https://finance.yahoo.com/quote/IMAX/key-statistics?p=IMAX**

IMAX Corporation (IMAX)
NYSE - Nasdaq Real Time Price. Currency in USD

22.83 -0.02 (-0.11%)
As of 3:54PM EDT. Market open.

| Buy | Sell |

| Summary | Chart | Conversations | Statistics | Profile | Financials | Options | Holders | Historical Data | Analysis | Sustainability |

Currency in USD

Valuation Measures		Trading Information	
Market Cap (intraday) [5]	1.46B	Stock Price History	
Enterprise Value [3]	1.34B	Beta	0.99
Trailing P/E	137.35	52-Week Change [3]	10.65%
Forward P/E [1]	21.51	S&P500 52-Week Change [3]	13.82%
PEG Ratio (5 yr expected) [1]	0.67	52 Week High [3]	26.70

β_i = *beta of asset (sensitivity) = 0.99*

The expected return of the market $(E(R_m))$ can be measured by looking at the average of the S&P 500 via Yahoo Finance as such:

Performance Overview

2.52%	14.28%	11.86%
Year-to-Date Return (Mkt)	1-Year Total Return (Mkt)	3-Years Total Return (Mkt)

Trailing Returns (%) Vs. Benchmarks

Return	SPY	Category
YTD	2.52%	7.50%
1-Month	0.58%	-0.25%
3-Month	3.55%	3.20%
1-Year	14.28%	13.45%
3-Year	11.86%	10.14%
5-Year	13.30%	15.76%
10-Year	10.06%	7.33%
Last Bull Market	0.00%	0.00%
Last Bear Market	0.00%	0.00%

$E(R_m) =$ **Average = 8.02**

<u>**Cost of Debt**</u> **= interest expense/debt**

= latest fiscal year's interest expense from income statement
latest 3 year average of long term debt from balance sheet

For IMAX = $\dfrac{\$1,942.00}{\$26,113.33} = \mathbf{0.07}$

$$\boldsymbol{Weight\ of\ Equity} = \frac{\boldsymbol{E}}{\boldsymbol{E+D}} = \frac{\mathbf{\$1,556,044.00}}{(\mathbf{\$1,556,044.00 + \$26,113.33})}$$

$$\boldsymbol{Weight\ of\ Debt} = \frac{\boldsymbol{D}}{\boldsymbol{E+D}} = \frac{\mathbf{\$26,113.33}}{(\mathbf{\$1,556,044.00 + \$26,113.33})}$$

$$\boldsymbol{Tax\ Rate} = \frac{income\ tax\ expense}{income\ before\ tax}$$

We pull this data on the company's income statement:

	2013	2014	2015	2016	2017	Average Tax Rate
Income Before Tax	$63,810.00	$57,351.00	$87,078.00	$57,853.00	$ 30,011.00	
Income Tax Expense	$16,629.00	$14,466.00	$20,052.00	$16,212.00	$ 16,790.00	
5 Year Tax Rate	26%	25%	23%	28%	56%	32%
Latest 2 Year Tax Rate						41.984%

WACC & CAPM
AUTHOR: LEON SHPANER

EQUITY	in thousands	Formula
Shares Outstanding	65,380.00	<-- =ProForma!F47
Share price	23.8	<-- 23.8
Equity value ("market cap")	**$ 1,556,044.00**	<-- =B3*B2
DEBT	**$ 26,113.33**	<-- =ProForma!H114
Cost of Equity (based on CAPM)	**7.94**	<-- =B11+(B10*B22)
Risk-Free Rate of Return + Beta of Asset * (Expected Return of the Market - Risk-Free Rate of Return)		
Beta	0.99	<-- 0.99
10 year Treasury Rate	0.02	<-- ='10 year Treasury Rate'!B2622*0.01
Expected Market Return		
S&P500 Rate of Return	SPY	<-- SPY
YTD	2.52	<-- 2.52
1-Month	0.58	<-- 0.58
3-Month	3.55	<-- 3.55
1-Year	14.28	<-- 14.28
3-Year	11.86	<-- 11.86
5-Year	13.3	<-- 13.3
10-Year	10.06	<-- 10.06
Average	8.02	<-- =AVERAGE(B14:B20)
Market Premium	8.00	<-- =B21-B11
Cost of Debt	**0.07**	<-- =B25/B26
Interest Expense	1,942.00	<-- =ProForma!F23
Latest 3 Year Average Debt	$ 26,113.33	<-- =B6
Weight of Equity (E/(E+D))	0.98349511	<-- =B4/(B4+B6)
Weight of Debt (D/(E+D))	0.01650489	<-- =B6/(B4+B6)
Tax Rate	0.419844502	<-- ='Tax Rate'!H6
WACC	**7.811097432**	<-- =(B28*B8)+(B29*B24)*(1-B31)

Building on the previous section, let's further breakdown the Enterprise Value formula.

$$EV = \left[\sum_{t=1}^{N} \frac{FCF_t}{(1+WACC)^t} + \frac{Terminal\,Value}{(1+WACC)^N} \right] (1+WACC)^{0.5}$$

$$EV = \left[\sum_{t=1}^{N} \frac{FCF_t}{(1+\frac{E}{E+D}R_e + \frac{D}{E+D}R_d(1-T_c))^t} + \frac{Terminal\,Value}{(1+\frac{E}{E+D}R_e + \frac{D}{E+D}R_d(1-T_c))^N} \right] (1+\frac{E}{E+D}R_e + \frac{D}{E+D}R_d(1-T_c))^{0.5}$$

Use Excel's NPV function

The reason we take $(1+WACC)^{0.5}$ is due to the underlying assumption that incoming cash flows continuously at any given year, and as such, it would be a misguided effort to calculate this value at year end.

Effectively, the formula breaks down to $= NPV(rate,\,value\,range) * (1+WACC)^{0.5}$ in Excel.

Enterprise Value = $4,622,473.15 <-- = NPV(B6,D11:H11)*(1+B6)^0.5

Based upon the WACC we calculated in the previous section, we are going to create our valuation workbook as follows:

IMAX Corporation - Valuation
Free cash flow (FCF) year ending 31 Dec. 2017
Growth rate of FCF, years 1-5 (optimistic)
Long-term FCF growth rate (pessimistic)
Long-term FCF growth rate (more pessimistic)
WACC

The reason why we have to re-forecast our long-term pessimistic growth rate is because if it is not less than the WACC, we will effectively calculate a terminal value of less than "0." The company CANNOT reinvest beyond the discount rate (past 100%)

	2018	**2019**	**2020**	**2021**	**2022**	Formula
FCF (Forecast)	$ 77,336.29	$ 97,690.44	$ 123,401.60	$ 155,879.69	$ 196,905.69	<-- =G$9*(1+$B$3)
Terminal value					$ 5,748,961.66	<-- =H9*(1+B5)/(B6-B5)
Total	$ 77,336.29	$ 97,690.44	$ 123,401.60	$ 155,879.69	$ 5,945,867.36	<-- =SUM(H9:H10)

$$Terminal\ Value = \frac{FCF_t\ (x)(1+g)}{(WACC - g)}; where\ t = 5 \rightarrow last\ year = 5$$

$$Terminal\ Value = \frac{Last\ year\ of\ forecasted\ cash\ flow\ (x)\ (1\ +\ long\ term\ growth\ rate)}{WACC\ -\ long\ term\ growth\ rate}$$

Enterprise value	$ 4,622,473.15	<-- =NPV(B6,D11:H11)*(1+B6)^0.5
Add back initial cash and marketable securities	$ 158,725.00	<-- =ProForma!F58
Subtract out 2017 financial liabilities	$ 263,002.00	<-- =ProForma!F119
Equity Value	$ 4,518,196.15	<-- =B13+B14-B15
Per Share (1 million shares outstanding)	4.52	<-- =B16/1000000

We will use the ROIC approach to:

- compute normalized earnings and/or cash flow instantaneously
- Map out the variables of these calculations and reference them back to the Pro Forma
- Estimate pessimistic cash flows
- Estimate optimistic cash flows

ROIC: return on investment capital

$$ROIC = \frac{EBIT\ (1 - tax\ rate)}{Total\ Assets}$$

Normalized Return assets (pre − tax)

$$= \frac{EBIT}{Total\ Assets}$$

This method takes into account historic averages, market cap, and makes assumptions based upon other variables to drive calculations.
We discussed equity and cost of equity while covering WACC and CAPM, but let us refresh here:

$$Equity = market\ cap = \frac{share\ price}{shares\ outstanding}$$

Cost of Equity = Risk Free Rate of Return+ Beta*(Expected Return of Market (-) Risk-Free Rate of Return)

= US Treasury Rate + Beta*(Market Premium)

FCFE = free cash flow to equity = Net Income – (CAPEX – Depreciation) (x) (1 – Debt Ratio)

To gain a more visual insight into IMAX's performance, we will graph sales vs. free cash flow from 2013 – 2018:

	2013	**2014**	**2015**	**2016**	**2017**
Revenue	$287,937.00	$290,541.00	$373,805.00	$377,334.00	$380,767.00
FCF	$42,017.00	$46,501.00	$40,428.00	$62,594.00	$61,223.00

Sales vs. FCF