

Introduction to Excel

Biological and Physical Sciences

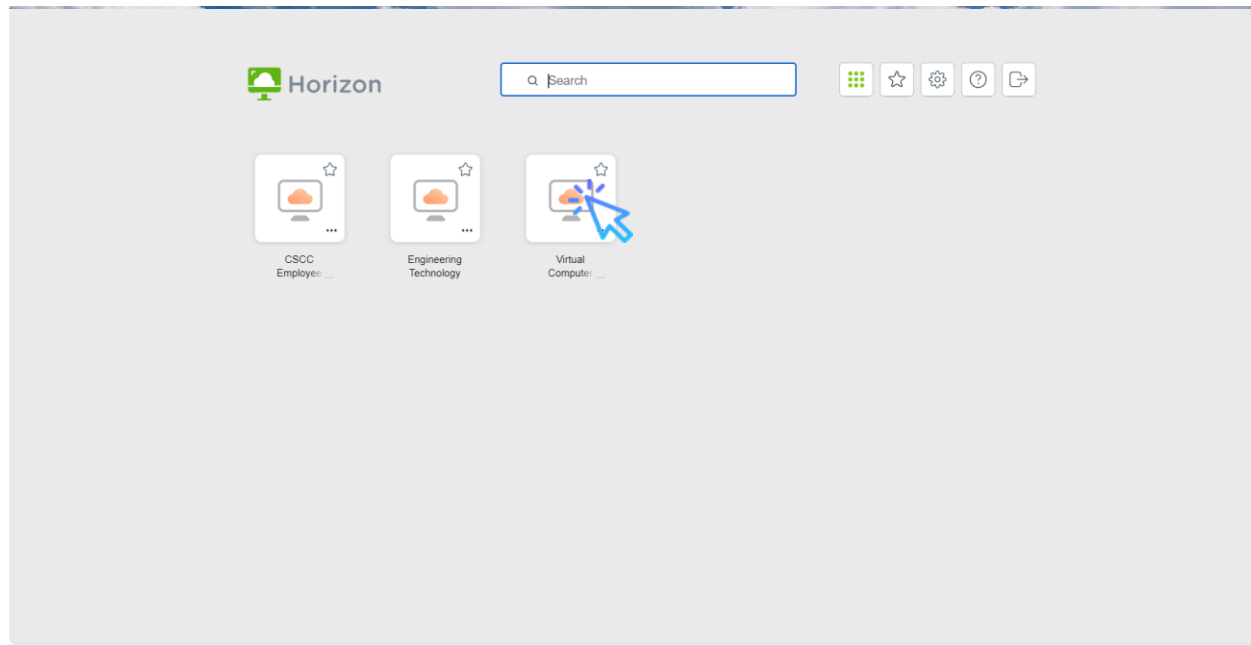
Excel is common for organizing and analyzing data

Engineers commonly use Excel to:

- Organize data into sheets
- Sort data
- Perform data analysis
- Generate graphs
- Solve complex problems

You can access the same version of Excel we have in class from any browser

You can access a virtual machine from mypc.cscs.edu



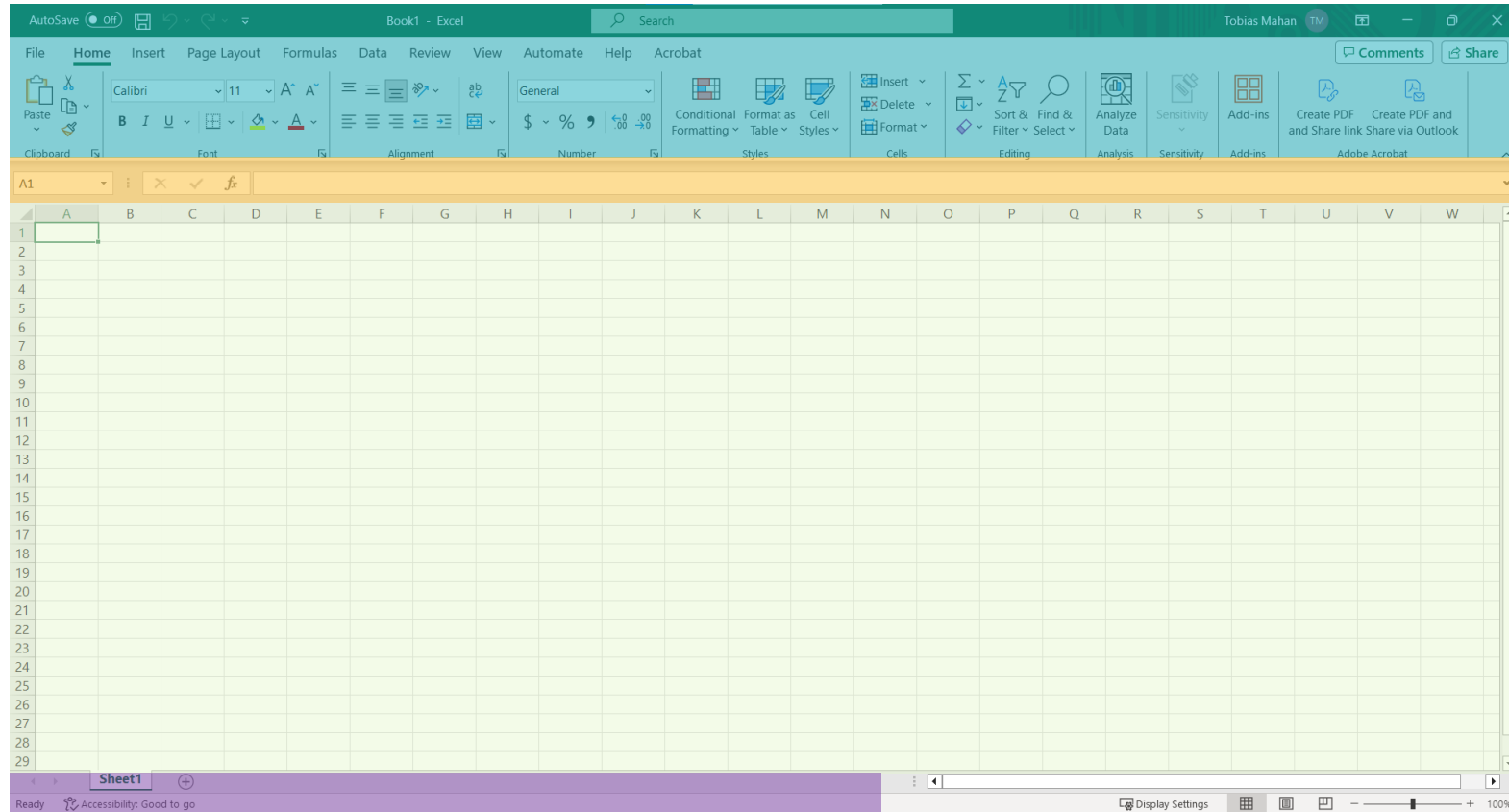
Excel has a layout like many Engineering software

1-Tool bar: contains many useful functions

2-Formula bar: used to enter equations

3-Cells: where data is stored in rows and columns

4-Tabs: Where worksheets are organized



You can enter data into the cells, organized into columns and rows

Column

Row

	A	B	C	D	E	F	G	H
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

You can enter data into the cells, organized into columns and rows

What value is in C5?

What value is in E5?

What value is in E7?

	A	B	C	D	E	F
1	-13	-10	2	-6	2	-18
2	13	-20	6	11	-7	13
3	14	-18	18	-18	-8	-19
4	17	-7	-18	-4	15	9
5	-2	-7	13	4	12	-3
6	8	1	-10	2	0	-15
7	9	9	-2	16	-8	-5
8	9	-3	20	14	5	2
9	3	-17	15	-8	-10	-10
10	-16	-10	-7	-18	14	-18
11	-17	-15	17	-19	16	-14
12	0	9	-18	14	5	-19
13	12	-3	18	-2	-17	-12
14	-20	-19	11	5	11	-9

You can write formulas in cells

	A	B	C	D
1	-14	-5	16	-10
2	-17	-19	4	5
3	-17	-13	11	0
4	-12	11	0	-14
5		=B4+C2		

	A	B	C	D
1	-14	-5	16	-10
2	-17	-19	4	5
3	-17	-13	11	0
4	-12	11	0	-14
5		15		
6				

You can write formulas in cells

What value is in $A1+C2$?

What value is in $B3*A1$?

What value is in $A2-B3*C1$?

	A	B	C	D
1	-14	-5	16	-10
2	-17	-19	4	5
3	-17	-13	11	0
4	-12	11	0	-14
5		15		
6				

Remember your Order of Operations: PEMDAS

Parentheses
(Outer second(Inner first))

First

Exponentials

Second

Multiplication and
Division

Third

Addition and
Subtraction

Last

Let's try some more complex formulas

What value is in $A1+C2*B4$?

What value is in $(A1+C2)*B4$?

What value is in $(A1+C2)*(C1-D14)$?

	A	B	C	D
1	-14	-5	16	-10
2	-17	-19	4	5
3	-17	-13	11	0
4	-12	11	0	-14
5		15		
6				

Relative Cell Referencing

- We can quickly create references using the fill handle
- You can find the fill handle between the in the bottom right corner of the cell
- Use the fill handle to quickly reference cells
 - Pull the fill handle down to reference the cell above
 - Pull the fill handle right to reference the cell to the left

You can quickly and easily do multiple calculations

	A	B
1	14	=5*A1
2	17	
3	17	
4	8	
5	4	
6		

	A	B	C
1	14	70	
2	17	85	
3	17	85	
4	8	40	
5	4	20	
6			

	A	B
1	14	70
2	17	=5*A2
3	17	85
4	8	40
5	4	20
6		

Absolute references can be created by adding in anchors

- By default, cell references are relative
- You can “lock in” references using \$
- You can lock in the column, row, or both

Anchoring is necessary when you want to calculate with constants

	A	B	C	D	E
1	Length (m)	Width (m)	Volume (m ³)		Depth (m)
2	15	7	=A2*B2*E\$2		15
3	20	9			
4	15	9			
5	18	9			
6	17	5			
7	20	5			
8	15	7			
9	15	7			
10	16	6			
11	15	6			

	A	B	C	D	E
1	Length (m)	Width (m)	Volume (m ³)		Depth (m)
2	15	7	1575		15
3	20	9	=A3*B3*E\$2		
4	15	9	2025		
5	18	9	2430		
6	17	5	1275		
7	20	5	1500		
8	15	7	1575		
9	15	7	1575		
10	16	6	1440		
11	15	6	1350		
12					

We can create absolute references and mixed absolute references

`=A2*C3`

Absolute reference

- Locked in both row and column

`=A2*C$3`

`=A2*$C3`

Mixed Absolute reference

- Locked in either row or column

We can reference between sheets in the same workbook

	A
1	Diameter (in)
2	

	A
1	Diameter (in)
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	

	A
1	Diameter (in)
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	

	A	B	C	D	E
1	Diameter (in)	Volume (in ³)			
2		=PI()*A2^2/4*CONVERT(Anchoring!\$E\$2,"m","in")			
3					
4		7421.085008			
5		11595.44533			
6		16697.44127			
7		22727.07284			
8		29684.34003			
9		37569.24286			
10		46381.7813			
11		56121.95538			
12		66789.76508			
13		78385.2104			

Pro tip: That fill handle can be used to generate continuous data!

We can reference between sheets in the same workbook

`=PI()*A2^2/4*CONVERT(Anchoring!E2,"m","in")`

PI() returns the value of pi, accurate to 15 digits

Convert allows you to convert a value from one unit to another

This is an absolute reference to Cell E2 on the sheet named Anchoring

Excel can be used to sort data based on multiple factors

- Data can be sorted using the Sort function, which can be found under the Data tab
- Precedence for sorting conditions goes from top to bottom

	A	B	C
1	First name	Last name	Group number
2	Muhammad	Surname	2
3	Fatma	Familyname	3
4	Stanley	Yelnats	2
5	Hiroto	Example	2
6	Valentina	Arengie	1
7	Emma	Random	1
8	Umar	Placeholder	3
9	Lucas	Sacul	2
10	Maryam	Lorem-Ipsum	1
11	Priya	Noun	3
12	Nathan	Newword	1
13	Mia	Iranoutofideas	3

Excel can be used to sort data based on multiple factors

Sort

+ Add Level **- Delete Level** Copy Level ^ v Options... ☒ My data has headers

Column	Sort On	Order
Sort by	Group number	Cell Values Smallest to Largest
Then by	Last name	Cell Values A to Z

	A	B	C
1	First name	Last name	Group number
2	Valentina	Arengie	1
3	Maryam	Lorem-Ipsum	1
4	Nathan	Newword	1
5	Emma	Random	1
6	Hiroto	Example	2
7	Lucas	Sacul	2
8	Muhammad	Surname	2
9	Stanley	Yelnats	2
10	Fatma	Familyname	3
11	Mia	Iranoutofideas	3
12	Priya	Noun	3
13	Umar	Placeholder	3

Cancel

Sort

+ Add Level - Delete Level Copy Level ^ v Options... ☒ My data has headers

Column	Sort On	Order
Sort by	Last name	Cell Values A to Z
Then by	Group number	Cell Values Smallest to Largest

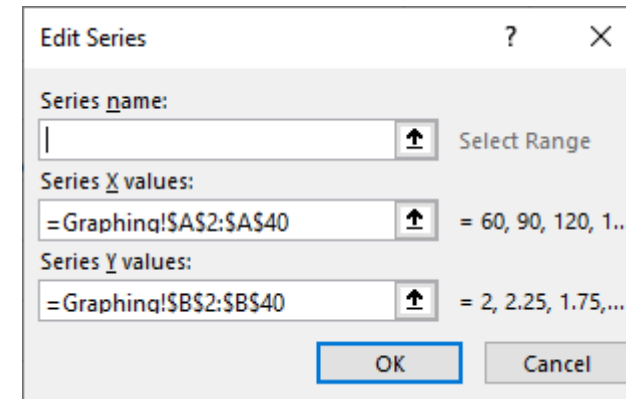
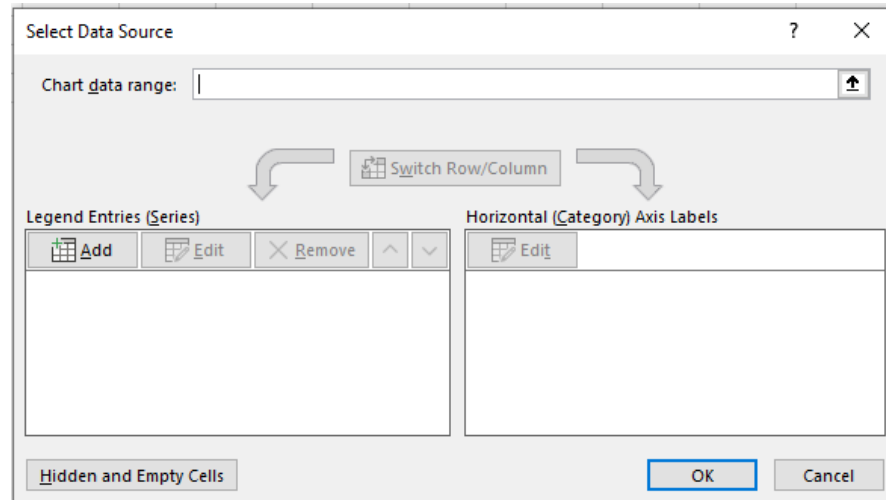
	A	B	C
1	First name	Last name	Group number
2	Valentina	Arengie	1
3	Hiroto	Example	2
4	Fatma	Familyname	3
5	Mia	Iranoutofideas	3
6	Maryam	Lorem-Ipsum	1
7	Nathan	Newword	1
8	Priya	Noun	3
9	Umar	Placeholder	3
10	Emma	Random	1
11	Lucas	Sacul	2
12	Muhammad	Surname	2
13	Stanley	Yelnats	2

OK Cancel

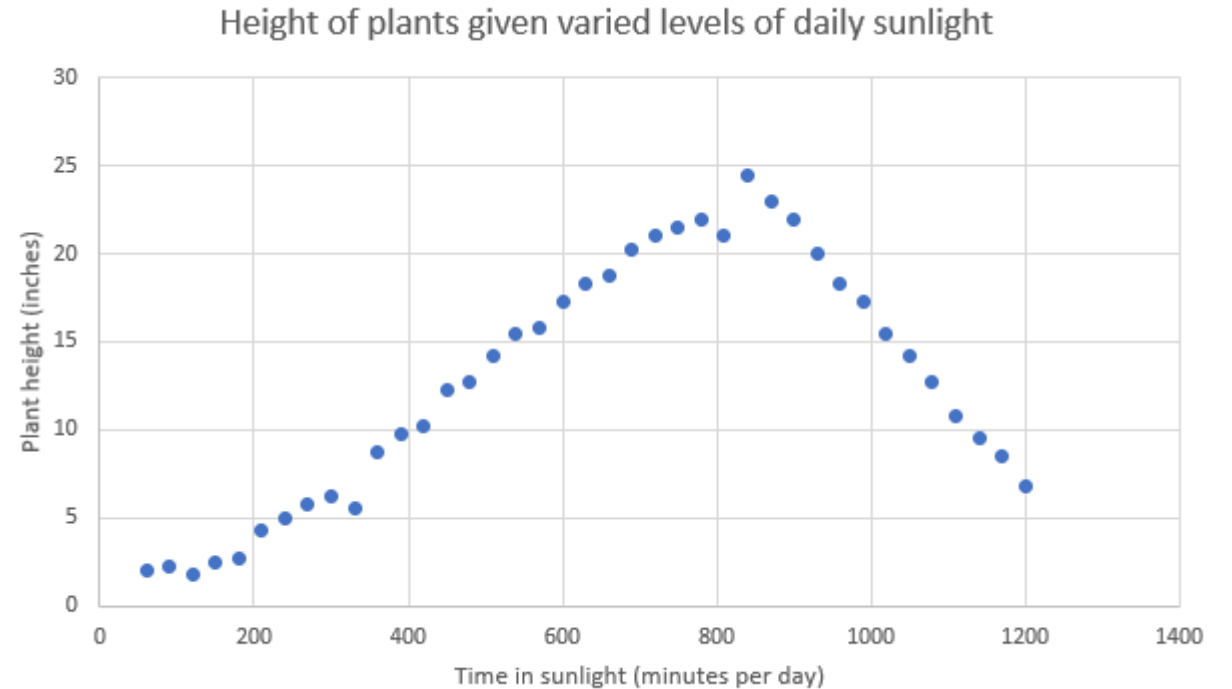
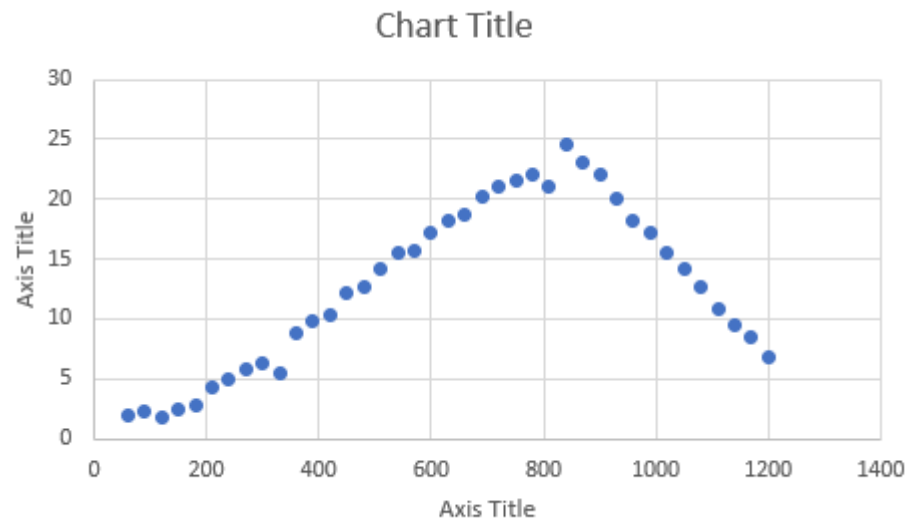
Excel is great for generating graphs

- In our class, we will often create scatter plots, which you can find under Charts in the Insert tab
- After inserting a blank graph, you need to add each Series
- Make sure to insert the Axis Titles and Chart Title

Excel is great for generating graphs



Excel is great for generating graphs



Thank you!

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