Spreadsheets 2 - Functions and Charts

Lecture 21 - COMPSCI111/111G SS 2016

Today's lecture

▶ IF function recap

▶ VLOOKUP and HLOOKUP

▶ Sorting data

▶ Inserting chart

IF function

▶ Inserts a value in a cell based on the outcome of a logical test (ie. true/false)

▶ Syntax:
```
=IF(logical_test, value_if_true,
value_if_false)
```

▶ Logical tests:
  ▶ Comparison operators: =, <, >, >=, <=
  ▶ Logical functions:
    ▶ AND(a, b)
    ▶ OR(a, b)
    ▶ NOT(a)

IF function

▶ Use an IF function in cell D5 to check whether a child is under the maximum height *and* weight. If they are, write "Yes!", otherwise write "No". Ensure that your formula can be filled down.

	A	B	C	D
1	Max height:	1.2	metres	
2	Max weight:	40	kg	
3				
4	**Name**	**Height**	**Weight**	**Allowed in playground?**
5	Tom	1.45	56	No
6	Charlie	1.10	44	No
7	Ben	1.19	35	Yes!

IF function

▶ Syntax:
```
=IF(logical_test, value_if_true,
value_if_false)
```

▶ `=IF(`**`AND(B5<B1, C5<B2)`**`,`
`value_if_true, value_if_false)`

	A	B	C	D
1	Max height:	1.2	metres	
2	Max weight:	40	kg	
3				
4	**Name**	**Height**	**Weight**	**Allowed in playground?**
5	Tom	1.45	56	No
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7	Ben	1.19	35	Yes!

IF function

▶ Syntax:
```
=IF(logical_test, value_if_true,
value_if_false)
```

▶ `=IF(AND(B5<B1, C5<B2),` **`"Yes!"`**`,` **`"No"`**`)`

	A	B	C	D
1	Max height:	1.2	metres	
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3				
4	**Name**	**Height**	**Weight**	**Allowed in playground?**
5	Tom	1.45	56	No
6	Charlie	1.10	44	No
7	Ben	1.19	35	Yes!

IF function

▶ Syntax:
```
=IF(logical_test, value_if_true,
value_if_false)
```

▶ `=IF(AND(B5<`**`$B$1`**`, C5<`**`$B$2`**`), "Yes!", "No")`

	A	B	C	D
1	Max height:	1.2	metres	
2	Max weight:	40	kg	
3				
4	**Name**	**Height**	**Weight**	**Allowed in playground?**
5	Tom	1.45	56	No
6	Charlie	1.10	44	No
7	Ben	1.19	35	Yes!

Lookup functions

▶ Sometimes we will need to look up values in a table in our spreadsheet
  ▶ For example, matching a student's ID number with their name

▶ Two kinds of look up functions
  ▶ VLOOKUP: used with vertical tables

	A	B
1	**Name**	**Age**
2	Eddie	18
3	Frank	21
4	Josh	24

  ▶ HLOOKUP: used with horizontal tables

	A	B	C	D
6	Timing	1:15	1:20	1:25
7	Score	1	2	4

VLOOKUP

▶ Syntax:
VLOOKUP(value, table, column, range)

▶ **Value**: the cell that you are looking up

▶ **Table**: a range of cells containing the table, usually written as absolute references

▶ **Column**: the column of the table that contains the values we want to retrieve

▶ **Range**: this is a Boolean value; true if the lookup value falls within a range, false if an exact match is required

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Example

▶ Use VLOOKUP to insert the students' surnames in the blank cells, given their ID number

	A	B	C	D	E	F
1	**Students Enrolled**					
2	**ID**	**Surname**		**ID**	**First name**	**Surname**
3	5			5	Debra	Martinez
4	7			6	Ida	Holloway
5	19			7	Flora	Taylor
6				10	Jared	Shelton
7				11	Marianne	Fuller
8				12	Everett	Hill
9				16	Edward	Brown
10				19	Benny	Gibbs

VLOOKUP Example

	A	B	C	D	E	F
1	**Students Enrolled**					
2	**ID**	**Surname**		**ID**	**First name**	**Surname**
3	11	Fuller		5	Debra	Martinez
4	16	Brown		6	Ida	Holloway
5	5	Martinez		7	Flora	Taylor
6				10	Jared	Shelton
7				11	Marianne	Fuller
8				12	Everett	Hill
9				16	Edward	Brown
10				19	Benny	Gibbs

=VLOOKUP(A3, \$D\$3:\$F\$10, 3, false)

=VLOOKUP(value, table, column, range)

HLOOKUP

▶ Same syntax as VLOOKUP, except it is used to look up values in horizontal tables

▶ Write a formula for C6 that finds the cost of tickets on a day in A6:A8 and multiplies the cost with the number of tickets

	A	B	C	D	E	F	G	H
1	**Day**	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2	**Price**	$11	$11	$11	$15	$14	$13	$15
3								
4	**Tickets purchased**							
5	**Day**	**Tickets sold**	**Total cost**					
6	Mon	13	$143					
7	Thu	29	$435					
8	Sun	50	$750					

HLOOKUP

▶ Same syntax as VLOOKUP, except it is used to look up values in horizontal tables

	A	B	C	D	E	F	G	H
1	**Day**	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2	**Price**	$11	$11	$11	$15	$14	$13	$15
3								
4		**Tickets purchased**						
5	**Day**	**Tickets sold**	**Total cost**					
6	Mon	13	$143					
7	Thu	29	$435					
8	Sun	50	$750					

=HLOOKUP(A6,$B$1:$H$2,2,FALSE)*B6

=HLOOKUP(value, table, column, range)

Exercise

▶ Write a formula in E3 that uses the table in cells A1 to B5 to find the person's grade and place it in the cell. Your formula must be able to be filled to the right

	A	B	C	D	E	F	G
1	**Score**	**Grade**		**Name**	**Tommy**	**Ben**	**Jemma**
2	0	Fail		**Score**	41	91	77
3	40	Pass		**Grade**	Pass	Perfect	Good
4	70	Good					
5	90	Perfect					

Sorting data

▶ Excel can sort data using columns; Data → Sort
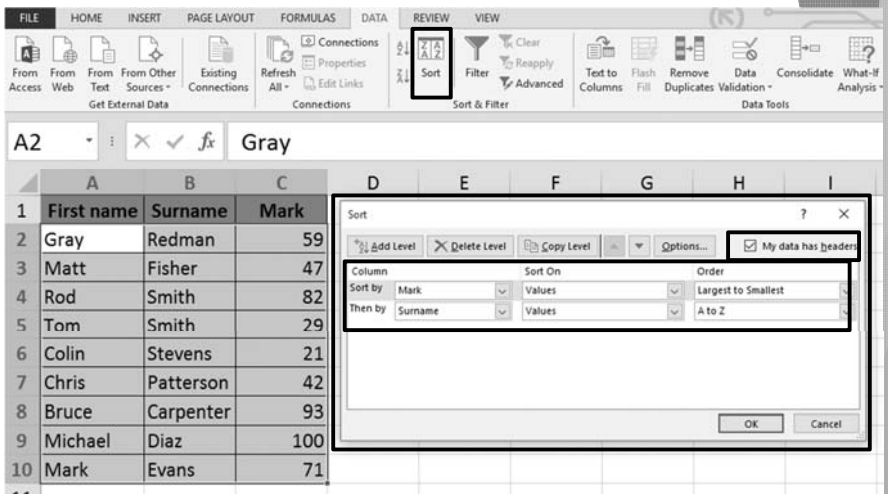
Sorting data

▶ When we click 'OK' the data is sorted

|	A	B	C
1	**First name**	**Surname**	**Mark**
2	Michael	Diaz	100
3	Bruce	Carpenter	93
4	Rod	Smith	82
5	Mark	Evans	71
6	Gray	Redman	59
7	Matt	Fisher	47
8	Chris	Patterson	42
9	Tom	Smith	29
10	Colin	Stevens	21

Inserting a chart

▶ Once you have sorted data, you can create a Chart to insert in your spreadsheet
  ▶ We'll use the data from the previous slide

▶ Decide on what is the best chart to use to present your data

▶ We also need to decide on the dependent and independent variable
  ▶ Independent goes on the x-axis
  ▶ Dependent goes on the y-axis

Inserting a chart

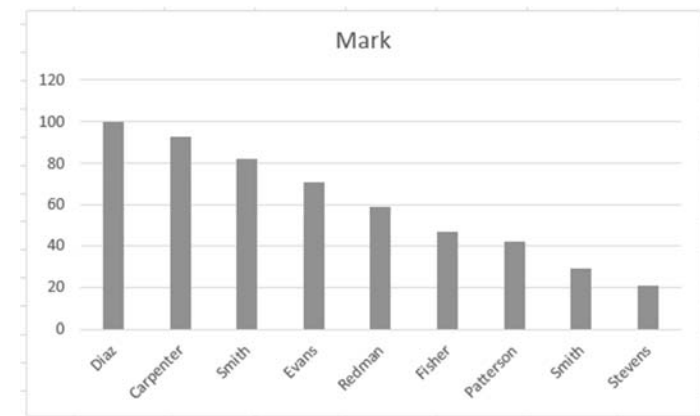▶ Clicking on the 2D Column chart icon gives me a preview of my chart
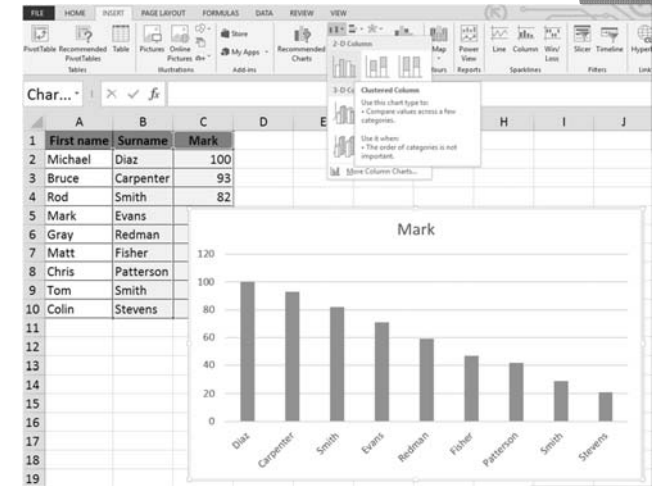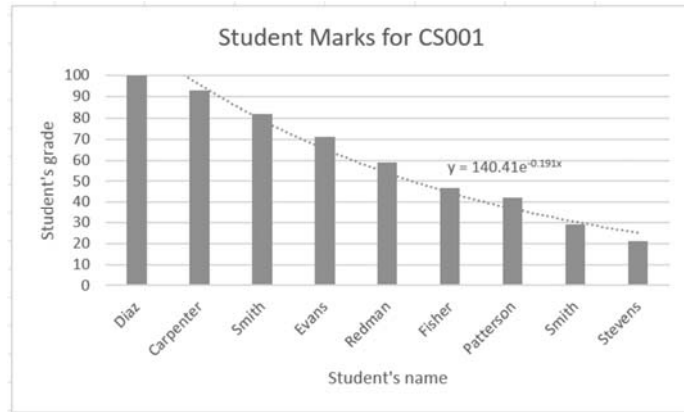

Inserting a chart
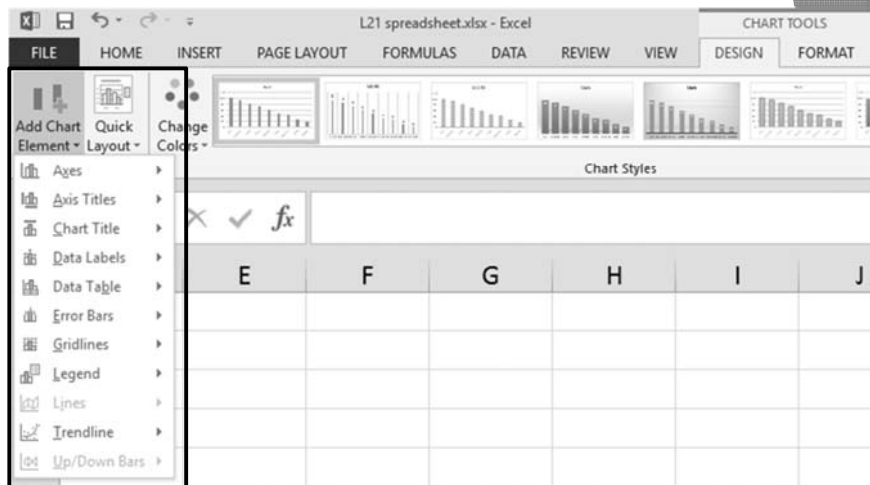
Inserting a chart

▶ The chart that Excel generated had a few things missing

Inserting a chart

▶ Added axis title, adjusted scale, added trendline and equation

Student Marks for CS001

$y = 140.41e^{-0.191x}$

(Chart: Student's grade vs Student's name — Diaz, Carpenter, Smith, Evans, Redman, Fisher, Patterson, Smith, Stevens)

Summary

▶ Looked at three functions:
  ▶ IF
  ▶ VLOOKUP
  ▶ HLOOKUP

▶ Discussed more Excel features:
  ▶ Sorting data
  ▶ Inserting and modifying charts