COMPSCI 111 / 111G

Mastering Cyberspace:
An introduction to practical computing

Spreadsheets

IF functions

- **Makes a decision**
  - Different values used in the cell depending on the logical test

- **IF(logical_test , value_if_true, value_if_false)**

Must be either true or false
- value
- condition (test)
- boolean function

This value appears in the cell if the boolean is true

This value appears in the cell if the boolean is false

Example - coffee data

- **Imagine an experiment where we record the number of cups of coffee that we drink, and whether it was morning or afternoon. The table of data might appear as shown below:**

	A	B
1	**Cups of Coffee**	**AM/PM**
2	3	am
3	1	pm
4	2	am
5	1	am
6	3	pm
7	5	am
8	1	pm

- **How can we calculate the average number of coffees that we drink in the morning?**

Example - coffee data

- **Add a new column to store the morning coffee data.**
  - If the contents of column B is the text "am" then use the value stored in column A. Otherwise, leave it blank.

	A	B	C
1	**Cups Of Coffee**	**AM/PM**	**Morning**
2	3	am	3
3	1	pm	
4	2	am	2
5	1	am	1
6	3	pm	
7	5	am	5
8	1	pm	
9	***Average***		2.8

```
=IF(B2="am", A2, "")
```

Exercise - Simple IF

- **Given the wind speed as shown in the table below, write the formula that would appear in cell C2. Note that a Gale Warning is issued when the wind speed exceeds 63 km/hr.**

	A	B	C
1	**Date**	**Wind Speed**	**Warning Issued**
2	1/01/2007	3	
3	2/01/2007	57	
4	3/01/2007	89	Gale Warning
5	4/01/2007	60	
6	5/01/2007	5	
7	6/01/2007	84	Gale Warning
8	7/01/2007	87	Gale Warning
9	8/01/2007	8	

Exercise - IF

IF less than 50 percent of tickets available at a venue were sold, then the venue is too large. To produce the result in cell F7, what formula should you use in this cell?

	A	B	C	D	E	F
1		**Ticket Sales**				
2						
3	**Price**	$10.00				
4						
5	**Event**	**Tickets Available**	**Tickets Sold**	**Remaining**	**Sales**	**Venue too large?**
6	Cycling	4000	2000	2000	$20,000.00	No
7	Weightlifting	2000	750	1250	$7,500.00	Yes
8	Triathlon	1000	100	900	$1,000.00	Yes
9	Football	3000	3000	0	$30,000.00	No
10	Badminton	5000	4500	500	$45,000.00	No
11		15000	10350	4650	$103,500.00	

Example – IF with a Boolean Function

- **Ticket Sales**
  - Check if more than 90% of the tickets were sold, or if less than 50% of the tickets were sold. In either case, a new venue is required next time.

	A	B	C	D	E	F	G
1		**Ticket Sales**					
2							
3	**Price**	$10.00					
4							
5	**Event**	**Tickets Available**	**Tickets Sold**	**Remaining**	**Sales**	**Venue too large?**	**New venue?**
6	Cycling	4000	2000	2000	$20,000.00	No	No
7	Weightlifting	2000	750	1250	$7,500.00	Yes	Yes
8	Triathlon	1000	100	900	$1,000.00	Yes	Yes
9	Football	3000	3000	0	$30,000.00	No	Yes
10	Badminton	5000	4500	500	$45,000.00	No	No
11		15000	10350	4650	$103,500.00		

Looking up values in a table

- **Often have tables of data**
  - We want to look up a value
  - e.g. given ID number, what is the name?

Student ID	Name	Phone
9100983	Andrew	123-4567
2098382	Albert	234-7654
2289483	Adrienne	321-7839
2109374	Ann	567-8932

- **Use a lookup formula**
  - VLOOKUP - looking up values in a vertical table
  - HLOOKUP - looking up values in a horizontal table

VLOOKUP

VLOOKUP(value, table, column, [range])

Value.

This is the value we already have written down. We want to use this value to look up a corresponding value in a table.

Range of cells.

This is the table we are using to look up the value in.

Usually we want to use absolute references for the table.

Number.

This specifies which column in the table contains the data we want.

Boolean value.

True if we want to match a range of values

False if we want an exact match.

Example

	A	B	C	D	E	F	G	H
1								
2		**Students Enrolled**			***ID***	***UPI***	***Name***	
3		**ID**	**Name**		199444	jhub001	Jacob	
4		800526	Ethan		303114	mkop032	Michael	
5		952348	William		465336	jjis012	Joshua	
6		303114	Michael		769866	mwen003	Matthew	
7		973748			800526	eupt008	Ethan	
8					812069	acut017	Andrew	
9					887268	dden011	Daniel	
10					952348	whur034	William	
11					973748	jfir002	Joseph	
12					997073	ccau005	Christopher	
13								

=VLOOKUP(value, table, column, range)

False

1 2 3

Example

- **Use a VLOOKUP to find the description for a recorded wind speed**

	A	B	C	D	E	F	G
23					**Beaufort Scale**		
24					Speed (km/hr)	Beaufort number	Description
25	**Day**	**Wind Spd**	**Description**		0	0	Calm
26	Mon	27	Moderate breeze		1	1	Light air
27	Tues	5	Light air		7	2	Light breeze
28	Wed	0	Calm		12	3	Gentle breeze
29	Thurs	15	Gentle breeze		20	4	Moderate breeze
30	Fri	20	Moderate breeze		30	5	Fresh breeze
31	Sat	40	Strong breeze		40	6	Strong breeze
32	Sun	78	Strong gale		51	7	Near gale
33					63	8	Gale
34					76	9	Strong gale
35					88	10	Storm
36					103	11	Violent storm
37					118	12	Hurricane

=VLOOKUP(value, table, column, range)

Exercise: ThinkGeek T-Shirts

http://www.thinkgeek.com/

Exercise

- **What formulae should be used in cells D15, E15, F15 and F26?**

	A	B	C	D	E	F
1	**T-Shirt Sizes**				**T-Shirt Prints**	
2	**Size**	**Price**			**Code**	**Description**
3	S	$ 10.99			1001	2 + 2 = 5
4	M	$ 11.99			1010	geek inside
5	L	$ 12.99			1011	<BODY>
6	XL	$ 13.99			1100	man woman
7	XXL	$ 14.99			1101	obey gravity
8	XXXL	$ 15.99			1110	I'm blogging this
9					1111	Arrrrrggh...
10						
11						
12						
13				**Invoice**		
14	**Code**	**Size**	**Number**	**Description**	**Price**	**Cost**
15	1010	M	1	geek inside	$ 11.99	$ 11.99
16	1010	L	1	geek inside	$ 12.99	$ 12.99
17	1011	S	3	<BODY>	$ 10.99	$ 32.97
18	1110	XL	1	I'm blogging this	$ 13.99	$ 13.99
19	1001	XL	1	2 + 2 = 5	$ 13.99	$ 13.99
20	1101	M	2	obey gravity	$ 11.99	$ 23.98
21	1111	M	1	Arrrrrggh...	$ 11.99	$ 11.99
22						
23						
24						
25						
26					Total	$ 121.90

D15:

E15:

F15:

F26:

HLOOKUP

- **Same as VLOOKUP, but for horizontal tables**

HLOOKUP(value, table, *row*, [range])

Value.

This is the value we already have written down. We want to use this value to look up a corresponding value in a table.

Range of cells.

This is the table we are using to look up the value in.

Usually we want to use absolute references for the table.

Number.

This specifies which row in the table contains the data we want.

Boolean value.

True if we want to match a range of values

False if we want an exact match.

Exercise

- **What formula would be used in cell C7?**
  - Use a HLOOKUP

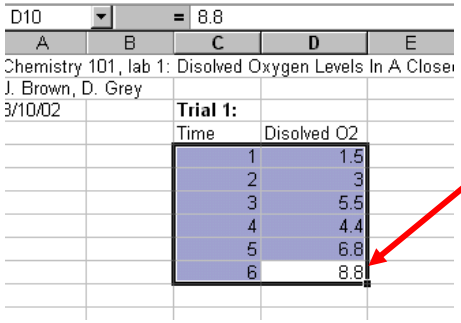
	A	B	C	D	E	F	G	H
1		**Movie Prices**						
2	**Day**	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
3	**Price**	$11.00	$11.00	$11.00	$15.00	$15.00	$15.00	$15.00
4								
5	**Movie Tickets**							
6	**Name**	**Day**	**Cost**					
7	John	Tues	$11.00					
8	Jane	Thurs	$15.00					
9	Tom	Sat	$15.00					

Graphing data

- **Start by sorting the data into dependent and independent variables**

Independent	Dependant
1	1.5
2	4.9
3	2.4
4	2.6
5	3.3

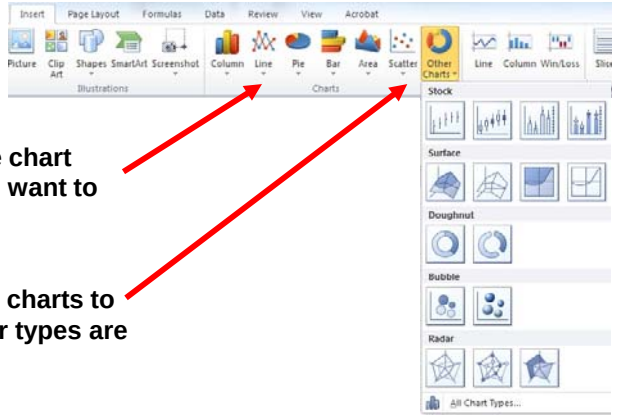
Enter the data



Highlight the data that you wish to graph by holding down the left mouse button & drag over your numbers, then release.

The area highlighted will be graphed. So make sure that you have selected all the data that you want to appear on your graph.

Create a chart

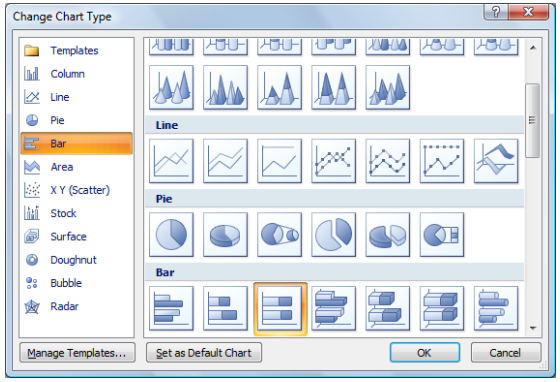


With your data highlighted, left click on the chart type which you want to use

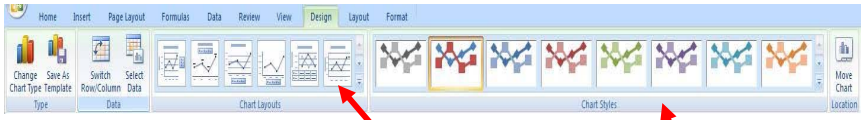
Click on other charts to see what other types are available

Change Chart

- **Click right on your chart an select "Change chart type"**



Change layout/style



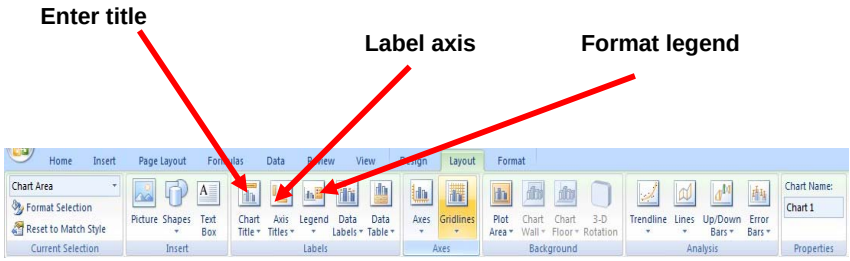
- **Select your chart and select the "Design" ribbon**

Layouts

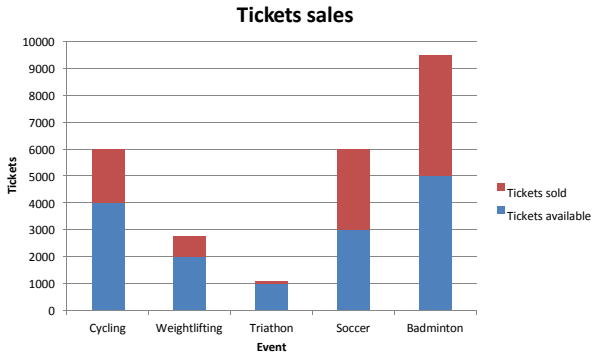
Styles

Enter labels

- Enter a title
- Label the X and Y axes.



A completed graph

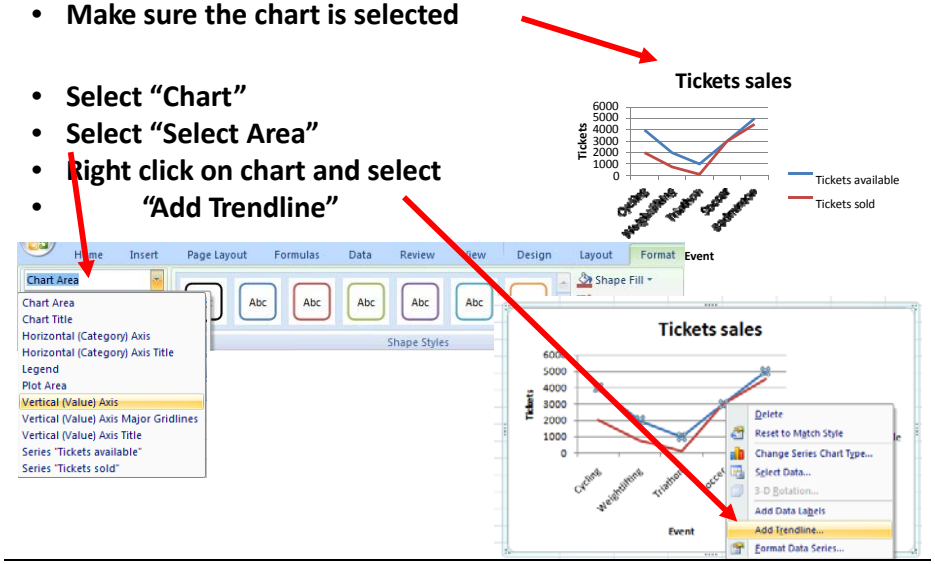


Simple data analysis

- Congratulations you have made a graph, but you still have to draw a line or curve to relate the data.
- Rarely in science do we "connect the dots" in a graph. Rather, we would like to show the trend of our data in the form of a *best fit* line.
- How do we do this in Excel?

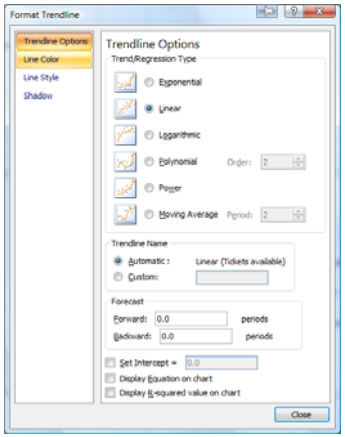
Adding a Trendline

- Make sure the chart is selected
- Select "Chart"
- Select "Select Area"
- Right click on chart and select
- "Add Trendline"



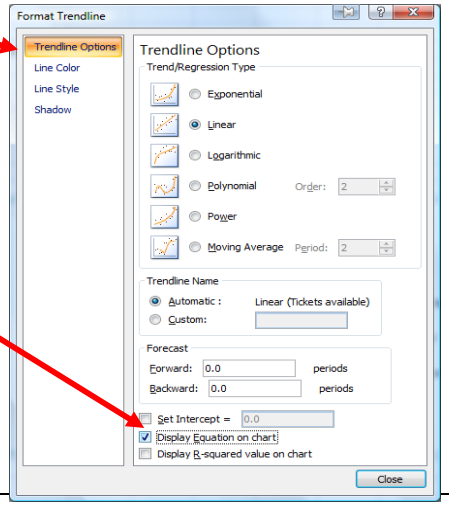
Graphing – Adding a Trendline

- Choose the trend that you wish to show with your data.



Adding equation

- To add the equation of the line, choose the tab entitled "Trendline Options"
- Select "Display
- equation on chart".



The completed graph