

# Introduction to Excel

## CA A-kasse

by Analytics Group, Aarhus University

See more at [au.dk/it](http://au.dk/it)

# Agenda

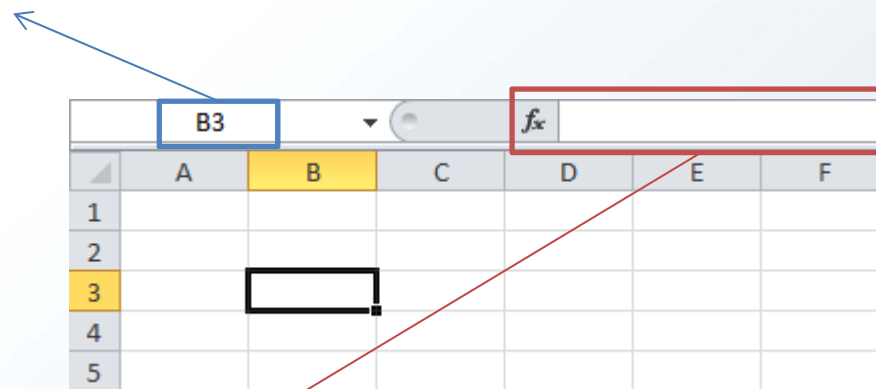
- Who are we?
- Formulas and Functions
  - Everyday functions
  - Charts
  - If functions
- Data Management
  - Sorting, filtering and validation
  - Pivot
  - Graphic display (Pivot Charts)
- Presentation of the Spreadsheet
  - Conditional formatting
  - Page setup (for printing, etc.).
  - Commenting, and protection of the sheet
- Streamline Workflow
  - Adapting the work environment
- If time allows us
  - Goal seek
- Appendix
  - Built-in analysis

*All topics will be covered with examples and exercises*

See more at [au.dk/it](http://au.dk/it)

# Introduction

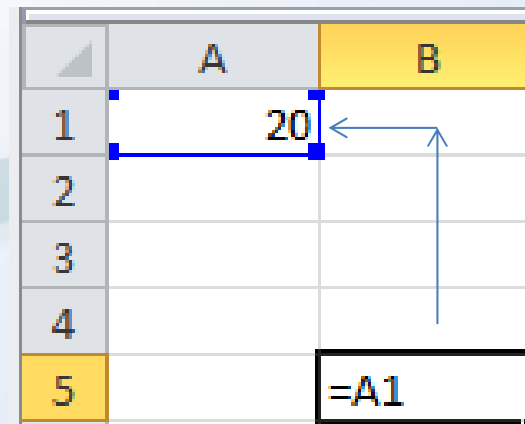
- A large table composed of columns (A, B, C) and rows (1, 2, 3), creating the cells (A1, B2, C3)
  - Cell B3 selected



- Formula bar

# References

- Excel uses either relative or absolute references
  - Relative references are used if you want to use numbers from cells which have a location relative to the result cell



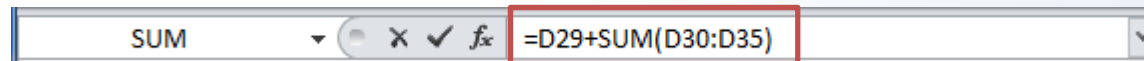
	A	B
1	20	
2		
3		
4		
5		=A1

# References

- Absolute references are used if you want to use numbers from the same cell, regardless of how the result cell is located
  - = \$ A \$ 1 is an absolute reference, and will always refer back to A1
  - = A \$ 1 will always refer to number 1, but the column would vary
  - = \$ A1 will always refer to column A, but the row would vary

# Formulas and Functions

- Formulas are entered directly in the cells or in the formula bar:



- May contain mathematical expressions, or built-in functions. E.g. SUM
- Functions accept input, perform a specific action, and provide output in the same cell.
  - $f_x$  provides an overview of functions.

# Overview of Data

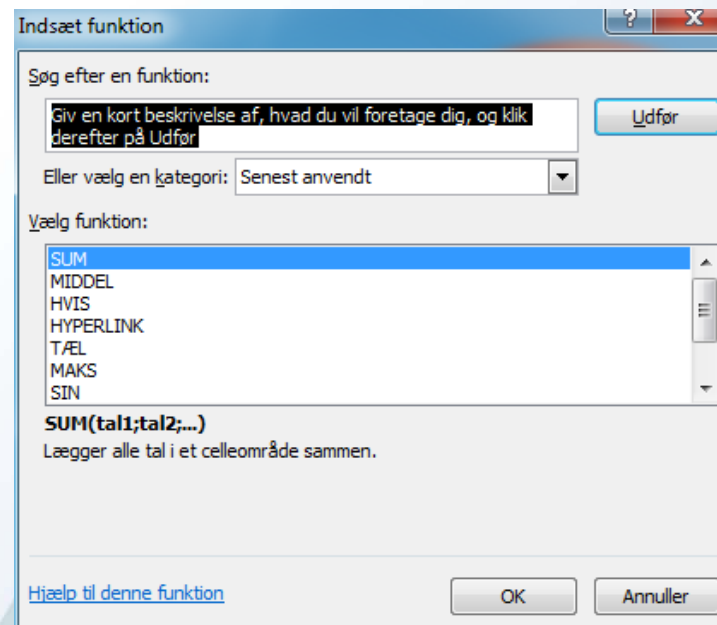
- Average, sum and number are constantly being calculated in the lower right corner:

Middel: 4,5   Antal: 4   Sum: 18

Use it to keep track of your data !!!

# Formulas and Functions

- The functions are all described with input type and action
  - Divided into categories





# Everyday Functions

- SUM (number1; number2, ...)
- SUMPRODUCT (array1; array2; ...)
- ROUND (number; number of digits)
- COUNT (value1; value2; ...)
- COUNTIF (range; criteria)
  - Counts number of cells in a table (if criteria met)
- RAND ()
- RANDBETWEEN (bottom; top)
  - Generates a random number between 0 and 1 (or self-selected interval)

# Translations

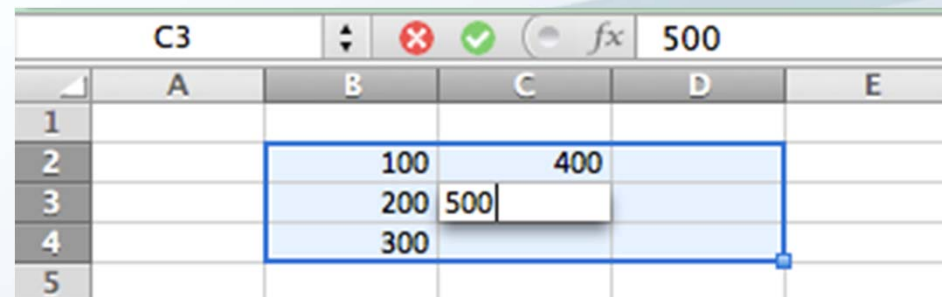
Dansk	Engelsk
HVIS	IF
SLUMP (SLUMPMELLEM)	RAND (RANDBETWEEN)
GENNEMSNIT	AVERAGE
TÆL (TÆLHVIS)	COUNT (COUNTIF)
MAKS/MIN	MAX/MIN
STDAFV	STD.DEV
LOPSLAG	VLOOKUP
VOPSLAG	HVLOOKUP
AFRUND	ROUND
KVROD	SQRT

# Select Entire Rows / Columns

- Ctrl + Arrows: Moves to the next filled cell
- Shift + Arrow: Selects cells
- Ctrl + Space: Selects an entire column
- Shift + Space: Selects an entire row
- Ctrl + A: Selects a region

# Entering Data

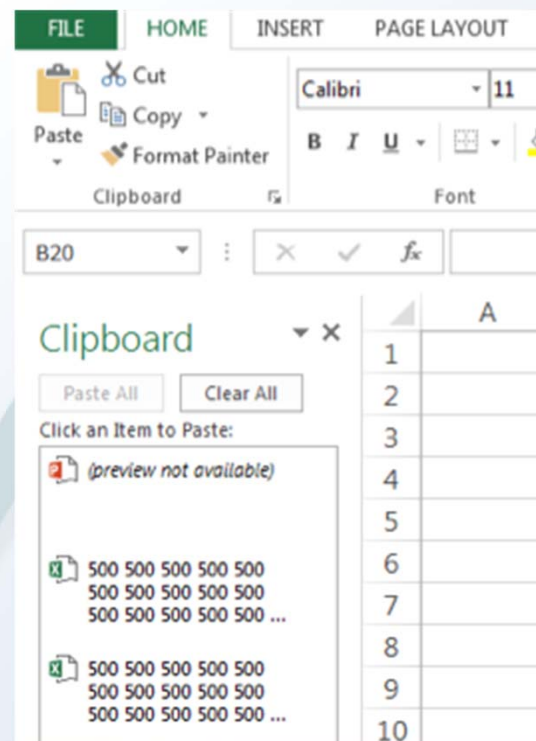
- To enter data in adjacent cells, first select an area
- Then start entering data, click Enter when you want to advance to the next cell
- If you want to have the same value in all cells can you hold the Ctrl key when you press Enter



	A	B	C	D	E
1					
2		100	400		
3		200	500		
4		300			
5					

# Copying Multiple Elements

- Open Clipboard
- Every time you now copy / cut something, then it can save up to 24 items in this menu



# Skipping Blank Cells

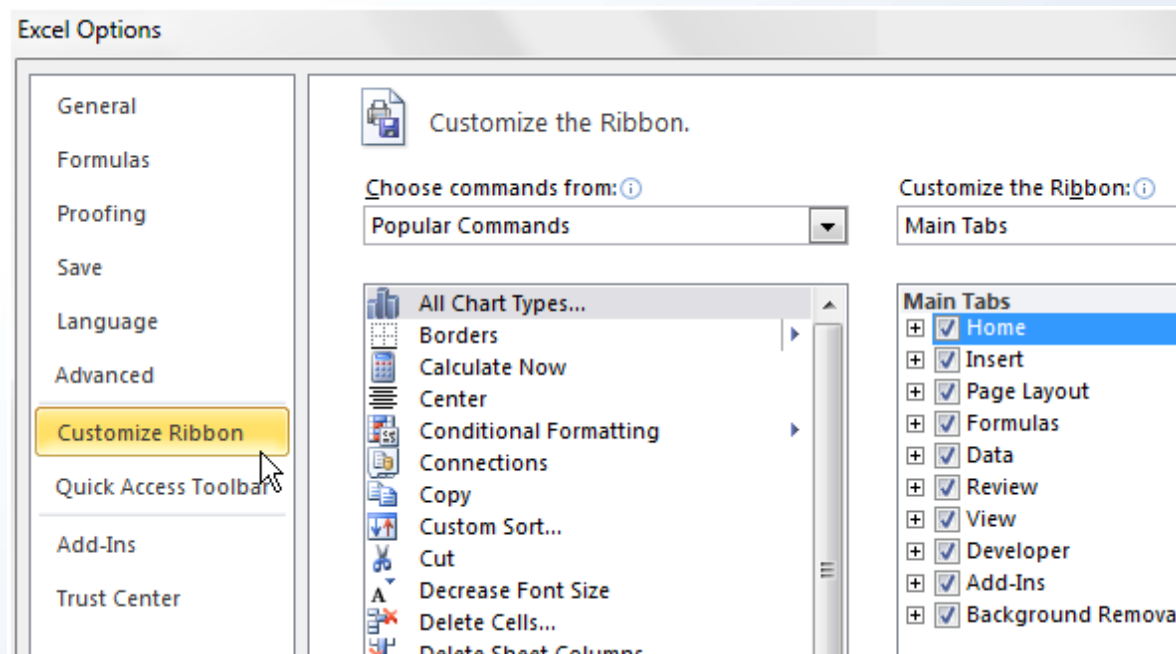
- 'Paste special' box contains the option 'Skip Blanks'
- If the copied field contains blank cells, then it does not replace the cells in the insertion area that already contain text

# Moving Cells

- Move the cell by dragging
- Clip and paste cells by holding down Shift (between rows / columns)
- Paste copied cells, hold down Shift + Ctrl whilst "moving" cells

# Customize Ribbon

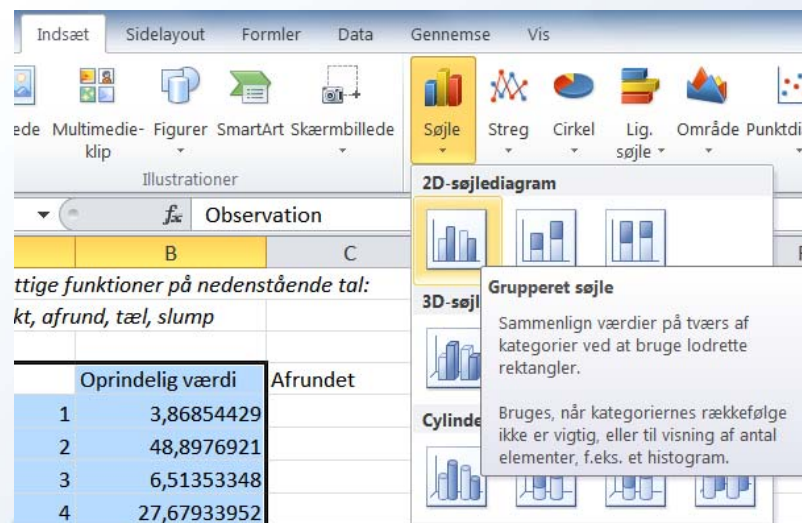
- File → Options → Customize Ribbon
- Commands can be created for shortcuts (Alt + a number)





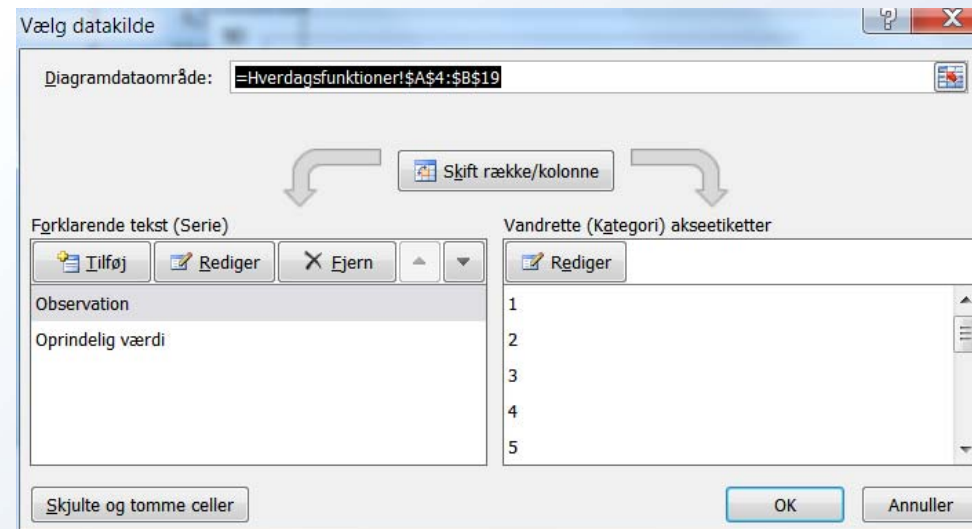
# Charts

- Charts can be inserted using the Insert tab → Charts:
  - Then select the chart type that best represents the data (can be changed later if necessary)
  - It may be an advantage to select the data range first



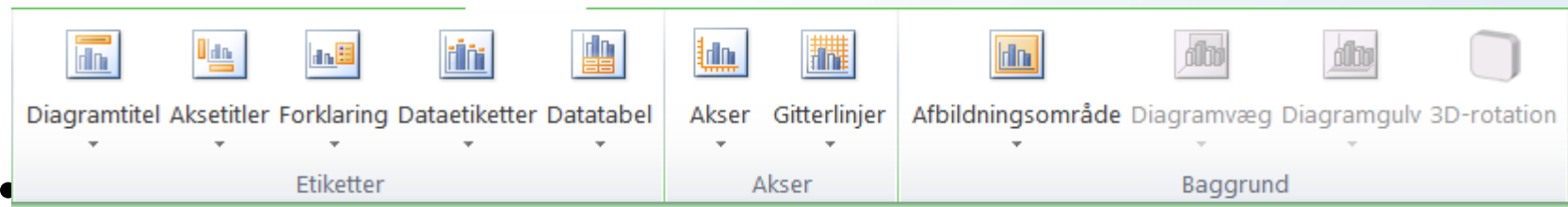
# Charts

- When the chart is created, using the tabs Design, and Format you can change virtually every aspect
  - Design is used to change the data used in the graph. Amongst others:



# Charts

- Layout is used to change the appearance of the chart
  - Among other things, axis titles, series explanation, grid lines and so on.



know it from Word)

The diagram's strength lies in the many layout options.  
Explore!


# If functions

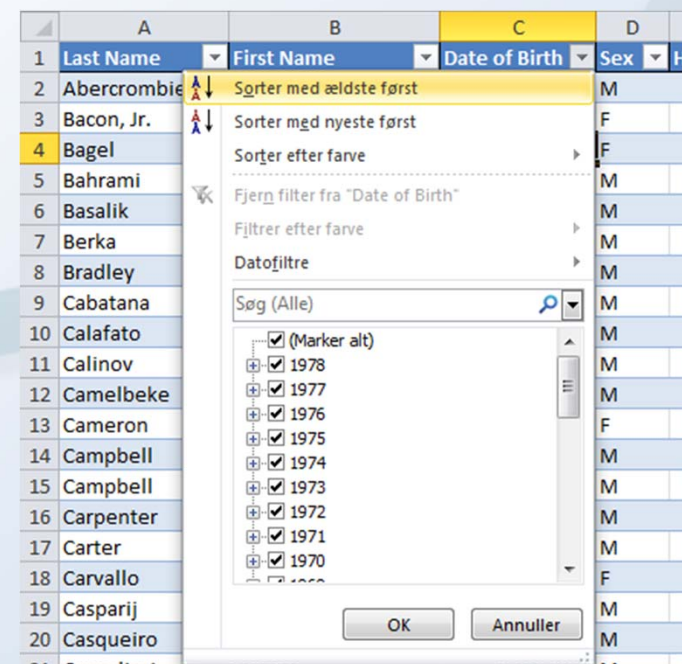
- IF(logical test; value if *true*; value if *false*)
  - Creates true / false check, performs corresponding action
  - If two or more conditions must be fulfilled, then use: IF (AND (test1, test2); if true; if false)
  - If one of the two or more conditions must be fulfilled used: IF (OR (test1, test2); if true; if false)

# Exercises

- Checklist
  - Ex. 1 – COUNT and RAND: 'Yes' + 10-15 'drop-in'
  - Ex. 3 – IF functions: 7795.8 kr.
    - Subsection 2: 6876.24 kr.


# Data Management and Sorting

- Data management is often easiest if you make data tables:
  - Insert → Table → Select Table
- Formulas applied to all rows
- Sorting is indicated by: 
- Sorting can be done by:
  - A-Z, 1-10, oldest-newest etc.
  - Sort Lists (days or similar)



	A	B	C	D
	Last Name	First Name	Date of Birth	Sex
1	Abercrombie			M
2	Bacon, Jr.			F
3	Bagel			F
4	Bahrami			M
5	Basalik			M
6	Berka			M
7	Bradley			M
8	Cabatana			M
9	Calafato			M
10	Calinov			M
11	Camelbeke			M
12	Cameron			F
13	Campbell			M
14	Campbell			M
15	Carpenter			M
16	Carter			M
17	Carvallo			F
18	Casparij			M
19	Casqueiro			M

# Data Management, Filtering

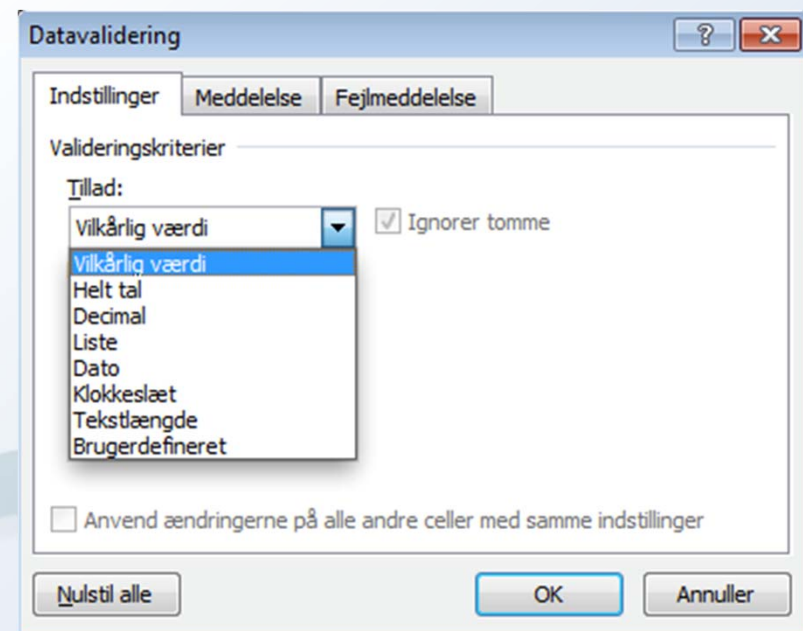
- Filter is indicated by 
- Filtering can be done by:
  - Conditions
  - Manual selection
- Filtering can be done on more than one variable

Last Name	First Name	Date of Birth	Sex	Hourly wage	Hours
Valdes			F		25
Zighetti			F		25
Abercrombie			M		100
Bacon, Jr.			F		100
Ilyina			F		100
Ito			F		100
MacBeth					
Ting					
Wolodzko					
Saenz					
Salah					
Salas-Szlejter					
Salavaria					
Salimzianova					
Shirley					
Smith					
Sabantsev					
Sacksteder					
Saddow					
Rolecki	Marek	22-11-1954			
RothKugel	Michael	29-07-1972			
Sabaditsch	Ina	02-04-1961			
Rodman	John	04-12-1963			
Roessler	Don	16-10-1962			
Rogers	Iris	05-01-1975			
Roland	Alex	03-01-1956			
Riis	Bjarne	26-04-1952			
Ringqvist	Joakim	16-09-1954			
Ringstrom	Titti	27-08-1951			
Rißling	Stefan	09-11-1961			
Rivas	Juan-Carlos	08-10-1967			
Rizaldy	Arif	02-03-1964			



# Data Management, Validation

- Apply a validation to selected cells
  - Drop-down list can be created by having a list of possible values as the source
- Error messages can be used to tell that you have entered an illegal value





# Data Management, Grouping

- Data → Group
- Rows and columns can be grouped so that they can easily be hidden or displayed
- Difference between filtering (data still included in the calculations)

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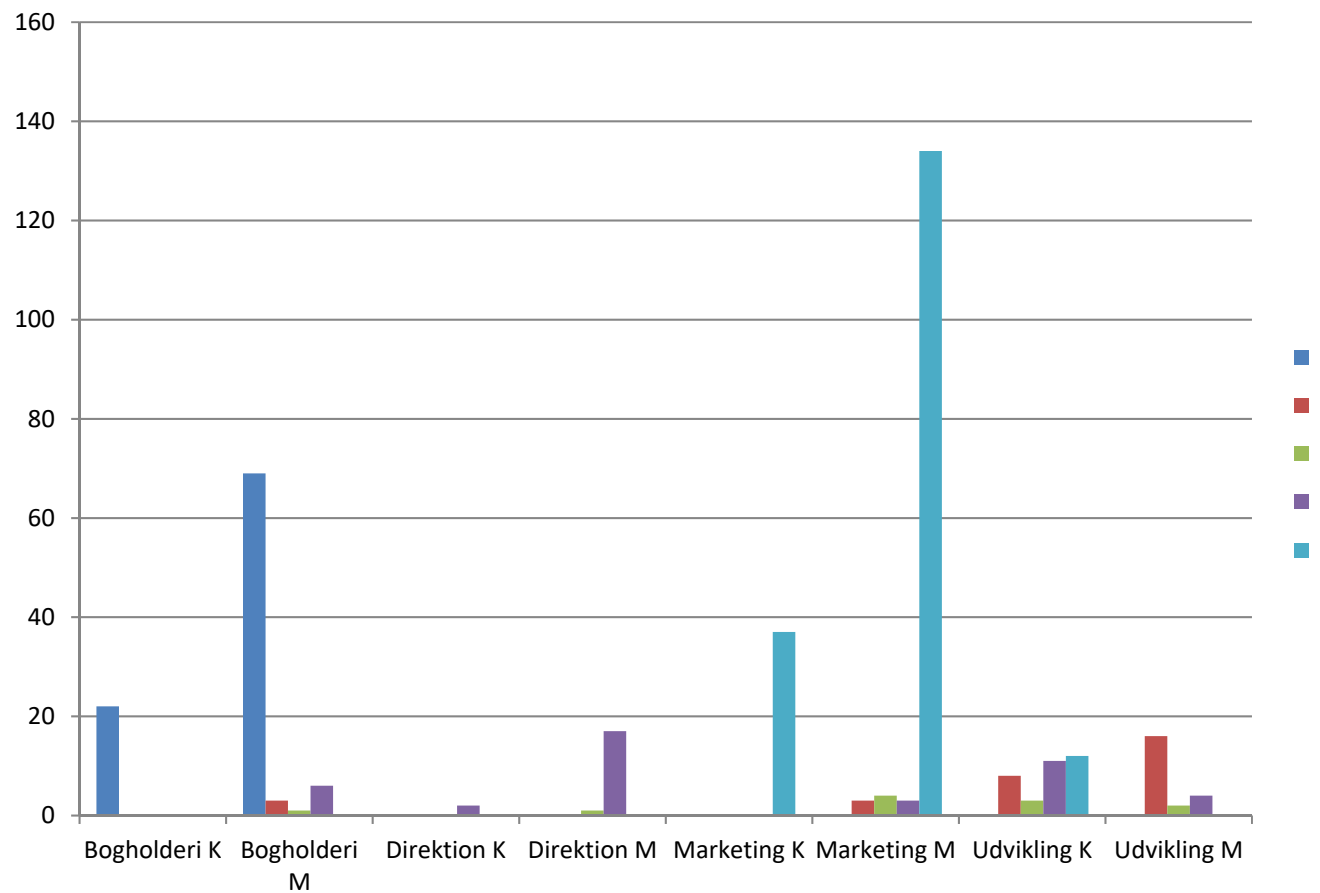
# Data Management, PivotTable

- Pivot tables are used to summarize data
  - Provides an overview of categories
  - That can be examined in detail
  - You can make automatic graphs of tables
- Insert → PivotTable → Select data and output-location

# Data Management, PivotTable

Antal af Efternavn	Kolonnenavn					
Rækkenavn	Bogholder	Forsker	Leder	Sekretær	Sælger	Hovedtotal
<b>Bogholderi</b>						
K	22					22
M	69	3	1		6	79
<b>Direktion</b>						
K					2	2
M			1		17	18
<b>Marketing</b>						
K					37	37
M		3	4		3	134
<b>Udvikling</b>						
K		8	3		11	12
M		16	2		4	
<b>Hovedtotal</b>	<b>91</b>	<b>30</b>	<b>11</b>	<b>43</b>	<b>183</b>	<b>358</b>

# Data Management, Pivot Chart



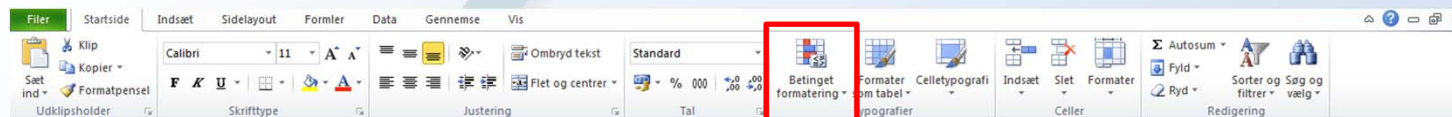
# Exercises

- Checklist
  - Ex. 6: Bottom row (Total)

<b>Total</b>	<b>723.39</b>	<b>1048.97</b>	<b>55191.39</b>	<b>206.25</b>	<b>57170</b>
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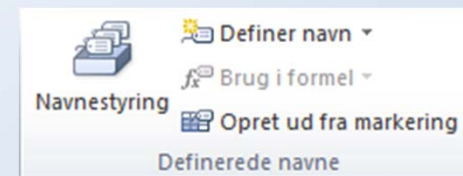
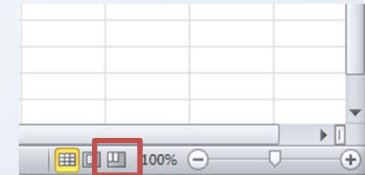
# Presentation, Conditional Formatting

- Format (colors, underlines etc.) Cells based on content:
  - Highlight individual cells, for example. larger than average, equal to 4 or the like.
  - Highlight top / bottom in series such. Top 10 largest values, at least 10% similar.
  - Low color scales such. From red over yellow to green
- There can be applied more than one rule to each cell



# Presentation, Page Setup

- Going from the Page Layout tab
  - (File → Print → Page Setup)
- Overview page break → Page Break
- Better understanding of formulas when naming cells / areas
  - Formulas tab → Name Manager



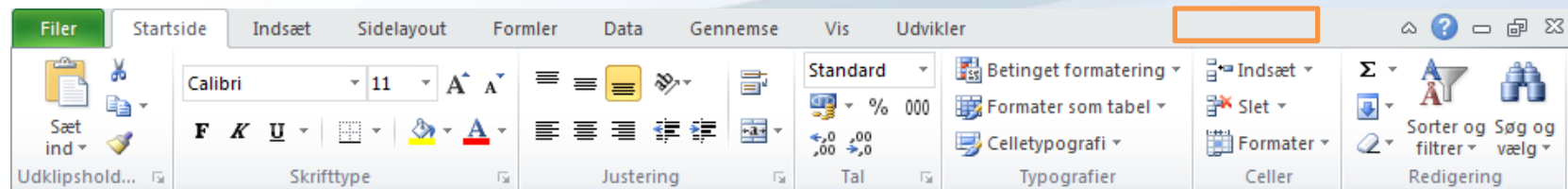
# Commenting

- Often used for clarifications on formulas or results.
  - Can contain information about the input data etc.
  - Advantageously, allowing more people to use the workbook, or if you have to use it repeatedly (and are forgetful, etc.)
- Can be added by right click
  - Alternatively use Review tab → New Comment
  - Right-click again to show / hide comment



# Protection of the Sheet

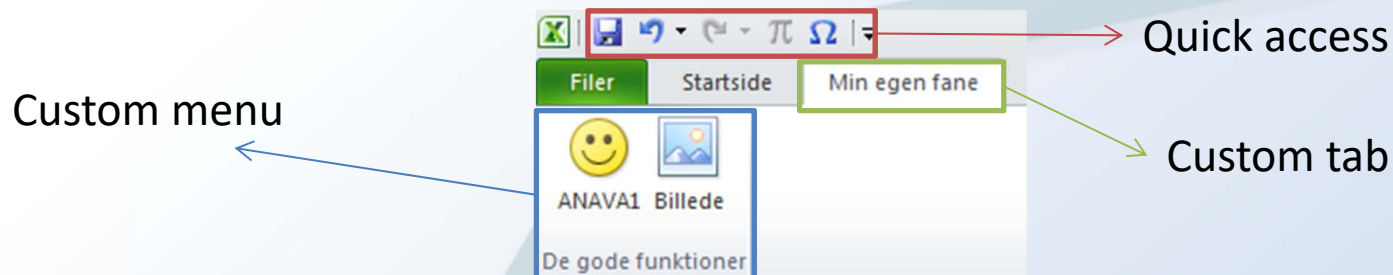
- The sheet can be protected so it is only possible to edit, select, etc. specific cells:
  - Eg. if there is a risk that the formula be changed
- This is done by selecting Format from the Home tab → Lock cell
- Then the Review tab → Protect Sheet



- Possible to enter a password

# Efficiency, Adaptation of Buttons

- Custom menus can be added by the File tab → Options → Customize Ribbon:
  - Submenus or all tabs
  - All commands + macros can be used
- Use for example Quick Access Toolbar for much used commands:



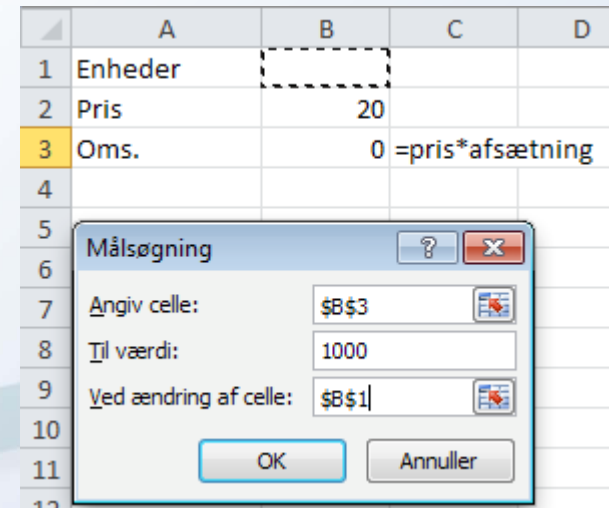
# Questions

- If you have any further questions, please feel free to contact us at:
  - [bss.it@au.dk](mailto:bss.it@au.dk)
  - [www.au.dk/it](http://www.au.dk/it) (which this presentation is also located)

# Goal Seek

- Used to see the cause / effect of one variable
  - Available at Data tab → What-If Analysis → Goal Seek...

Finds the number of units that generates a turnover of 1000



- Expandable to Solver (not part of the course) if you have more than one criteria

# Exercises

- Checklist
  - Extra Ex.: Conditional formatting: avg. = 0.466
  - Extra Ex.: Goal Seek: Interest rate = 6%

# Appendix

## Built-in Analysis and Descriptives

B1 fx Butik 2

	A	B	C	D	E	F	G	H	I	J	K	L
1		Butik 1	Butik 2	Butik 3								
2		49		40	25							
3		25		28	30							
4		9		18	21							
5		46		12	22							
6		22		24	23							
7		42		5	15							
8		40		40	30							
9		46		5	18							
10		33		30	36							
11		50		25	49							
12												
13	Butik 1		Butik 2		Butik 3							
14												
15	Middelværdi	36,2	Middelværdi	22,7	Middelværdi	26,9						
16	Standardfejl	4,309679029	Standardfejl	4,014003266	Standardfejl	3,142716447						
17	Median	41	Median	24,5	Median	24						
18	Tilstand	46	Tilstand	40	Tilstand	30						
19	Standardafvigelse	13,62840172	Standardafvigelse	12,69339286	Standardafvigelse	9,938142013						
20	Stikprøvevarians	185,7333333	Stikprøvevarians	161,1222222	Stikprøvevarians	98,76666667						
21	Kurtosis	0,005693546	Kurtosis	-1,037729583	Kurtosis	1,789966422						
22	Skævhed	-0,963898522	Skævhed	-0,102655616	Skævhed	1,249103687						
23	Område	41	Område	35	Område	34						
24	Minimum	9	Minimum	5	Minimum	15						
25	Maksimum	50	Maksimum	40	Maksimum	49						
26	Sum	362	Sum	227	Sum	269						
27	Antal	10	Antal	10	Antal	10						
28	Konfidensniveau(95,0%)	9,749171285	Konfidensniveau(95,0%)	9,08030624	Konfidensniveau(95,0%)	7,109318521						
29												

Beskrivende statistik

Input

Inputområde:

\$B\$1:\$D\$11

Grupperet efter:

☒ Kolonner

☐ Rækker

☒ Etiketter i første række

Outputindstillinger

☒ Outputområde:

\$A\$13

☐ Ny regnearksfage:

☐ Ny projektmappe

☒ Resymestatistik

☒ Konfidensniveau for middelværdi: 95 %

☐ K'te-største:

1

☐ K'te-mindeste:

1

Beskrivende statistik

Input  
Inputområde:

Grupperet efter: ☒ Kolonner ☐ Rækker

☒ Etiketter i første række

Outputindstillinger  
☒ Outputområde:

☐ Ny regnearksfane:

☐ Ny projektmappe

☒ Resumestatistik

☒ Konfidensniveau for middelværdi:  %

☐ K'te-største:

☐ K'te-mindste:

OK  
Annuller  
Hjælp

# Built-in Analysis

- Add-in: File → Options → Add-Ins → Excel ... → Analysis ToolPak → OK
  - Available under the Data tab → Data Analysis
- Contains various preinstalled outputs:
  - Descriptives
  - Z-tests
  - ANOVA (Analysis of variance, both one-sided / two-sided)
  - Correlation
  - Etc.



# Built-in Analysis, ANOVA

Excel spreadsheet showing data for three stores (Butik 1, Butik 2, Butik 3) and the ANOVA results.

	Butik 1	Butik 2	Butik 3
1			
2	49	40	25
3	25	28	30
4	9	18	21
5	46	12	22
6	22	24	23
7	42	5	15
8	40	40	30
9	46	5	18
10	33	30	36
11	50	25	49

Anova: Enkelt faktor

Input  
Inputområde:

Grupperet efter:  
☒ Kolonner  
☐ Rækker

☒ Etiketter i første række  
 Alpha:

Outputindstillinger  
☒ Outputområde:   
☐ Ny regnearksfane:  
☐ Ny projektmappe

Grupper	Antal	Sum	Gennemsnit	Varians
Butik 1	10	362	36,2	185,7333333
Butik 2	10	227	22,7	161,1222222
Butik 3	10	269	26,9	98,7666667

ANAVA

Variationskilde	SK	fg	MK	F	P-værdi	F krit
Mellem grupper	954,6	2	477,3	3,213259861	0,055998983	3,354130829
Inden for grupper	4010,6	27	148,5407407			
I alt	4965,2	29				



# This presentation is made by Analytics Group

## ANALYTICS GROUP



Analytics Group, a division comprised of student instructors under AU IT, primarily offers support to researchers and employees.

Our field of competence is varied and covers questionnaire surveys, analyses and processing of collected data etc. AG also offers teaching assistance in a number of analytical resources such as SAS, SPSS and Excel by hosting courses organised by our student assistants. These courses are often an integrated part of the students' learning process regarding their specific academic area which ensures the coherence between these courses and the students' actual educational requirements.

In this respect, AG represents the main support division in matters of analytical software.

## ADVANCED MULTIMEDIA GROUP



Advanced Multimedia Group is a division under AU IT supported by student instructors. Our primary objective is to convey knowledge to relevant user groups through manuals, courses and workshops.

Our course activities are mainly focused on MS Office, Adobe CS and CMS. Furthermore we engage in e-learning activities and auditive and visual communication of lectures and classes. AMG handles video assignments based on the recording, editing and distribution of lectures and we carry out a varied range of ad hoc assignments requested by employees.

In addition, AMG offers solutions regarding web development and we support students' and employees' daily use of typo3.