AARHUS UNIVERSITET
BUSINESS AND SOCIAL SCIENCES

Introduction to Excel

By Martin Lægård Poulsen

See more at au.dk/it

Analytics Group

Agenda

- Introduction
- Formulas and functions
  - Everyday functions
  - Incorporated analyzes
  - Diagrams
- Processing data
  - Sorting, filtrating and validating
  - Datasources
  - Pivot
  - Graphic presentation (Pivot diagrams)
- Presentation of the spreadsheet
  - Conditioned formatting
  - Page setup (for print etc.)
  - Commenting and protecting the work sheet
- Effective workflow
  - Short on macros
- Assignments and review
- Extra (if there is time left)
  - Goalseek

Introduction

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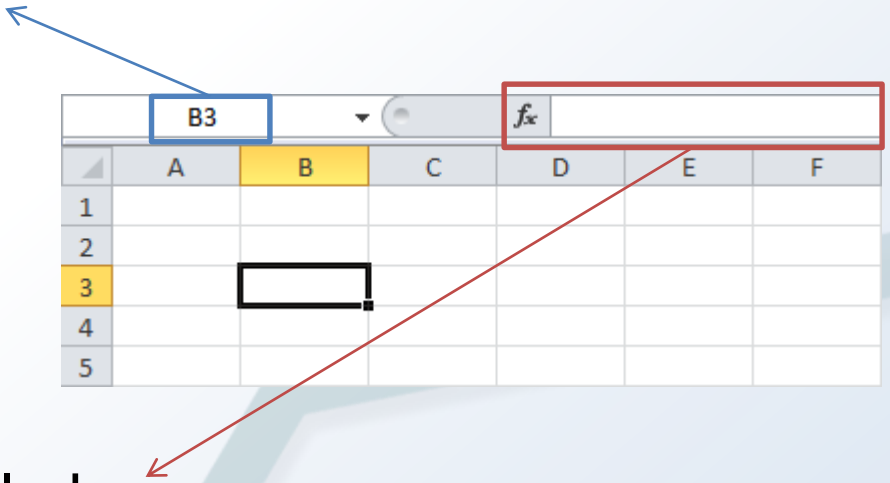
Introduction

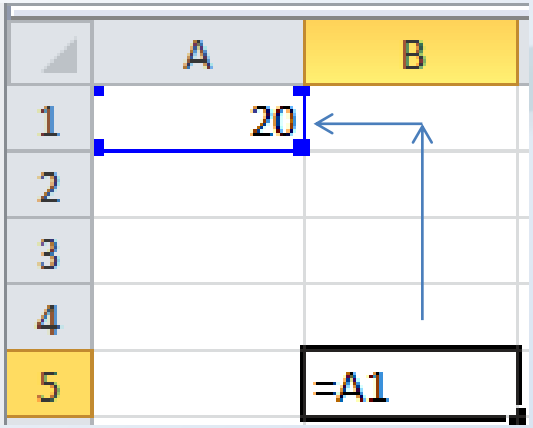
- One large table of columns (A, B, C) and rows (1, 2, 3) that forms cells (A1, B2, C3)
  - Cell B3 is picked



  - Formula bar

References

- Excel uses either relative or absolute references
  - Relative references or used, if you want to use numbers from cells that has a relative position to the result cell
    - =A1 is a relative reference, and will move if you copy the formula



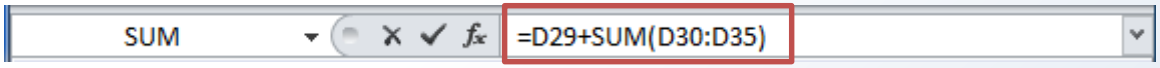
Here: 4 up and 1 left

References

- Absolute references are used, if you would like to use numbers from the same cell, no matter where the result cell if places.
  - =A1 is an absolute reference, and will always refer to A1
  - =A$1 will always refer to row 1, but the column will move along
  - =$A1 will always refer to column A, but the row will move along

Formulas and functions

- Formulas are written either directly into the cells or in the formula bar:



  – Can contain mathematical expressions or integrated functions as SUM
- Functions receive input, do a certain operation, and make output in the same cell
  – fx contains a list of the functions

Overview of data

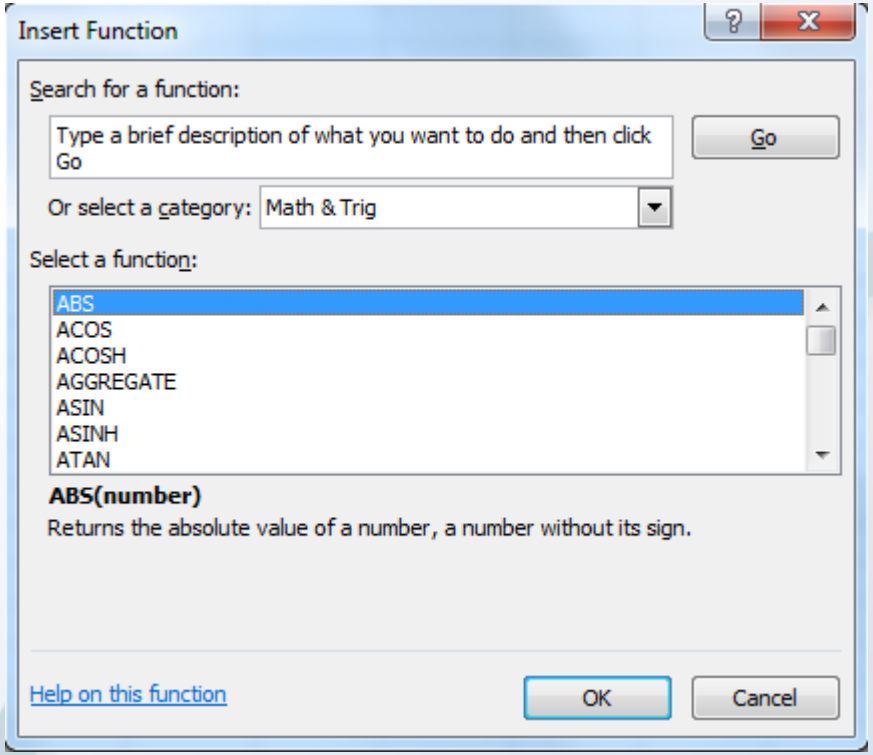
- Excel are constantly making a protocol with common variabels
  - Average, sum and quantity are constantly calculated in the lower right corner:

Average: 4,5 Count: 4 Sum: 18

Use it to keep control of your data

Formulas and functions

- The functions are alle described with input type and operation
  - Divided into categories



Everyday functions

- SUM(**number1;number2;…**)
  - Sumproduct(table1;table2;…)
- ROUND(**number; decimals**)
- COUNT(**table**)/COUNTIF(**table; condition**)
  - Counts the number of cells in af table (if condition is met)
- RAND()/RANDBETWEEN(**smallest; largest**)
  - Generates a random number between 0 and 1 (or the picked interval)
- IF(**condition; ifTrue; ifFalse**)
  - Tests the condition and performs the operation
  - Can also use AND()/OR() in the condition

Incorporated analyzes

- Add-Inns: File -> Options -> Add-Inns –> Excel… -> Analysis ToolPak -> OK
  - Data -> Data analysis
- Contains different pre-installed outputs:
  - Descriptives
  - Z-tests
  - ANOVA (Varians analysis, both one and two sided)
  - Correlation
  - Etc.

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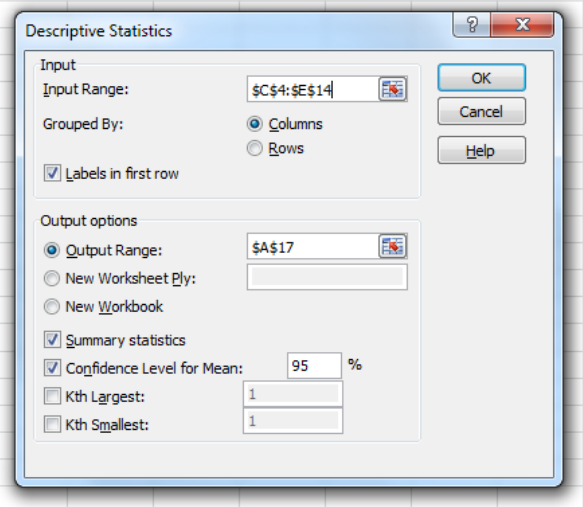
Incorporated analyzes, descriptives

The following data is well suited for the integrated analyses in excel:
Descriptives, correlation, ANOVA

Shop 1	Shop 2	Shop 3
49	40	25
25	28	30
9	18	21
46	12	22
22	24	23
42	5	15
40	40	30
46	5	18
33	30	36
50	25	49

Shop 1		*Shop 2*		*Shop 3*	
Mean	36,2	Mean	22,7	Mean	26,9
Standard Error	4,309679029	Standard Error	4,014003266	Standard Error	3,142716447
Median	41	Median	24,5	Median	24
Mode	46	Mode	40	Mode	30
Standard Deviation	13,62840172	Standard Deviation	12,69339286	Standard Deviation	9,938142013
Sample Variance	185,7333333	Sample Variance	161,1222222	Sample Variance	98,76666667
Kurtosis	0,005693546	Kurtosis	-1,037729583	Kurtosis	1,789966422
Skewness	-0,963898522	Skewness	-0,102655616	Skewness	1,249103687
Range	41	Range	35	Range	34
Minimum	9	Minimum	5	Minimum	15
Maximum	50	Maximum	40	Maximum	49
Sum	362	Sum	227	Sum	269
Count	10	Count	10	Count	10
Confidence Level(95,0%)	9,749171285	Confidence Level(95,0%)	9,08030624	Confidence Level(95,0%)	7,109318521



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Incorporated analyzes, ANOVA

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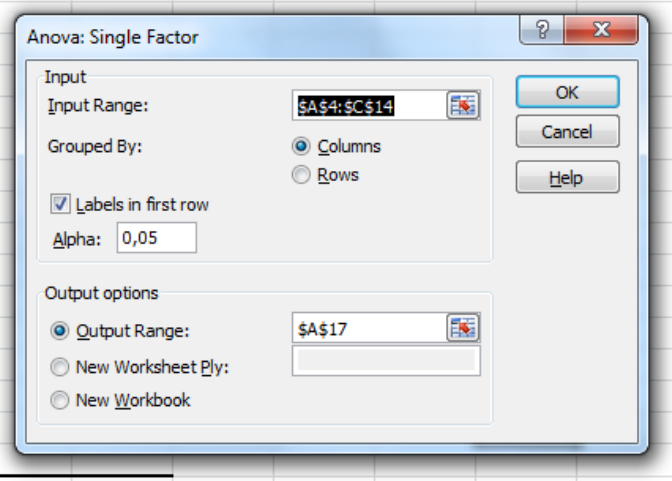


Anova: Single Factor

SUMMARY

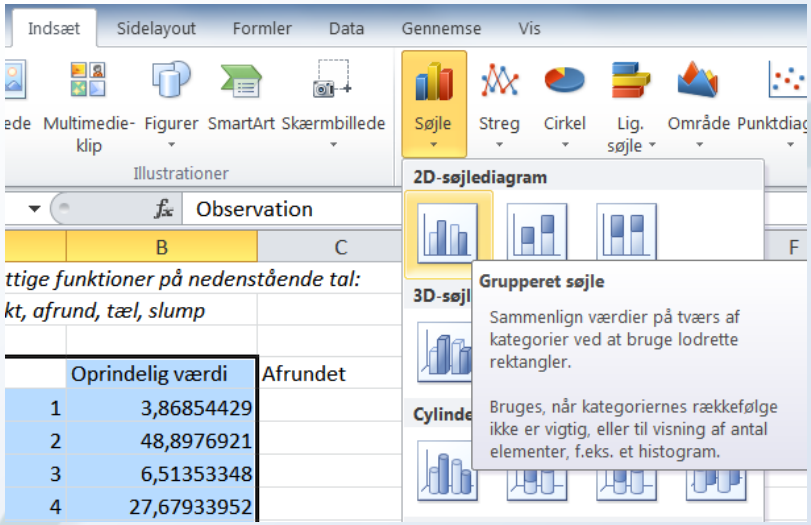
Groups	*Count*	*Sum*	*Average*	*Variance*
Shop 1	10	362	36,2	185,7333
Shop 2	10	227	22,7	161,1222
Shop 3	10	269	26,9	98,76667

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	954,6	2	477,3	3,21326	0,055999	3,354131
Within Groups	4010,6	27	148,5407			
Total	4965,2	29				

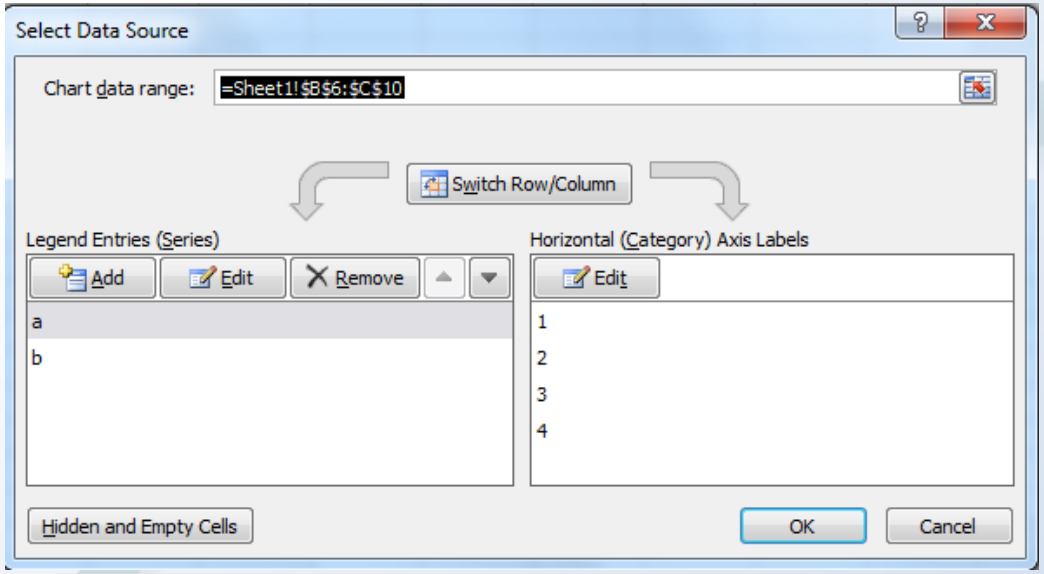
Diagrams

- Diagrams can be inserted by the tab Insert -> Diagrams:
  - Now pick the diagramtype that is best representing the data (can be changed later if it is necessary)
  - It might be best to mark the data area first



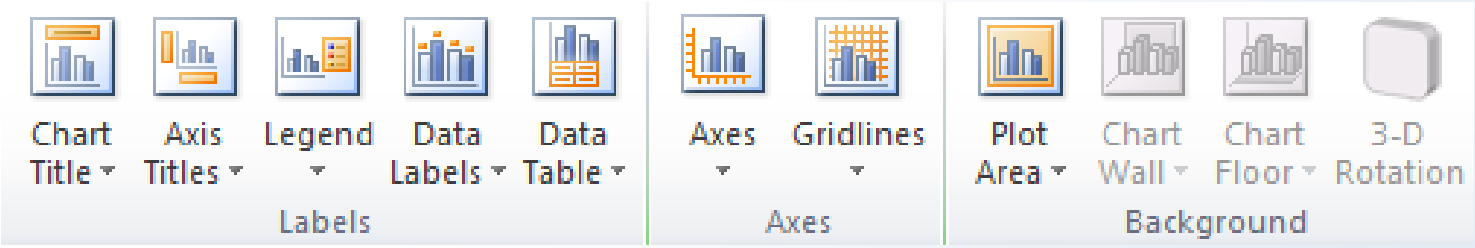
Diagrams

- When the diagrams are created, you can use the tabs design, layout and format to change almost all aspects
  - Design is used to change the data in the diagram:



Diagrams

- Layout is used to change the look of the diagram
  - E.g. axis titles, labels, grid lines and more



- Format is used to standard editing of objects (just as in Word)

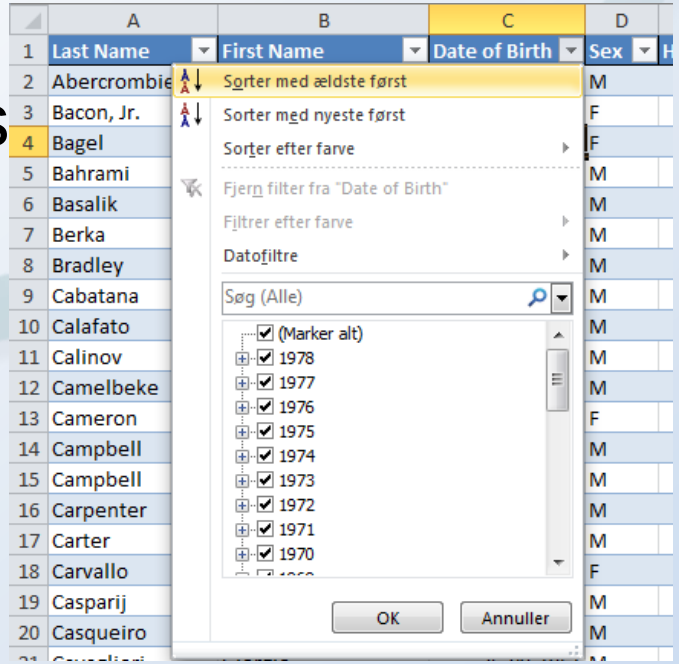
The diagram's forces are in the many layout possibilities. Explore them yourself ☺

Assignments

- Checklist
  - Assignment1 – Count and slump: 45 – 50 participants
  - Assignment 2 - IF-conditions: 7795,8 kr.
    - Part 2: 6876,24 kr.
  - Assignment 4 – ANOVA: Significant difference, p-value ≈ 0,00

Data processing and sorting

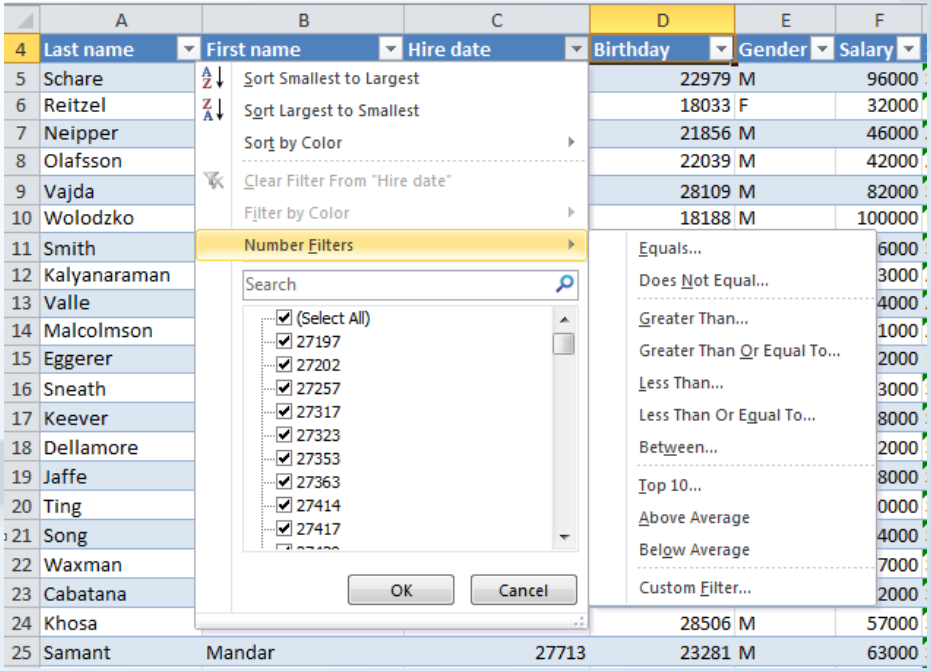
- Data processing are often easiest with data tables:
  - Insert -> Table -> Pick table
- Formulas are used on all rows
- Sorting is indicated by
- The sorting can be by:
  - A-Z, 1-10, oldest-newst etc.
  - Sorting lists (days or similar)



Data processing, filtering

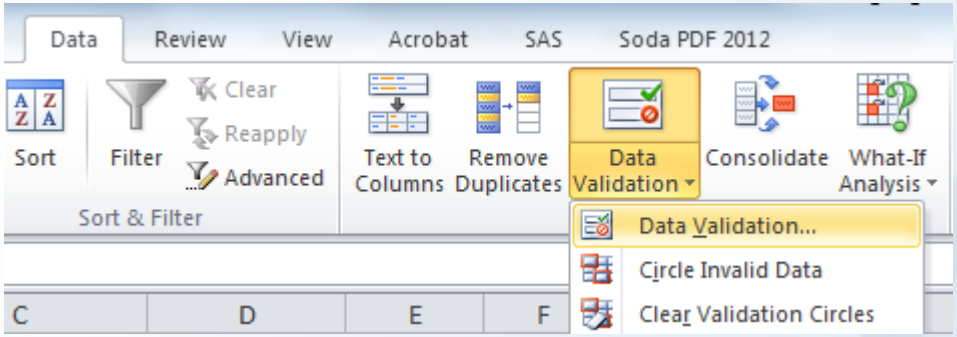
- Filter is indicated by
- Filtering can be by:
  - Conditions
  - Manual selection

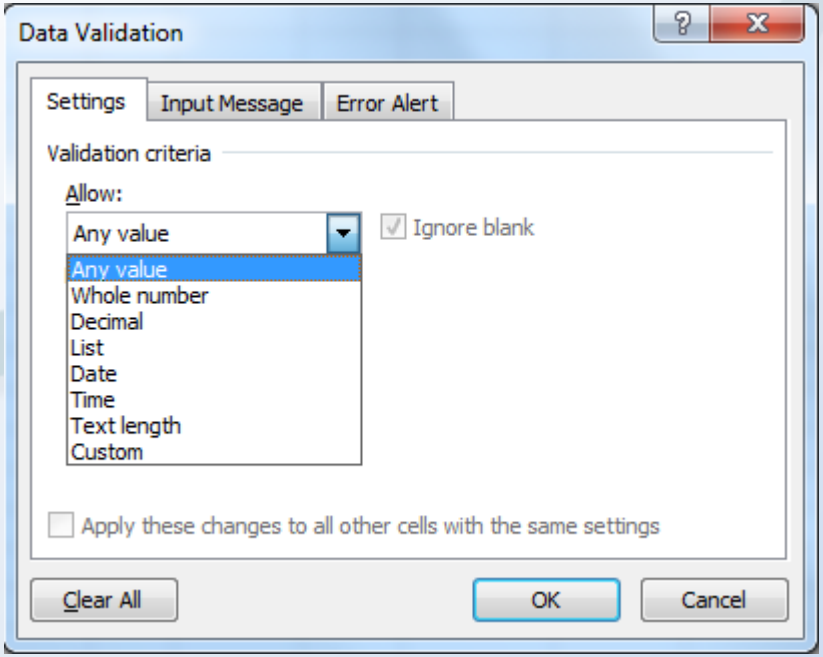
- It is possible to filter by more than one variable



Data processing, validating

- The validating will be on the chosen cells
  - A drop down-list is made by having a table with possible values as source
- An error message will tell if you have typed a wrong value





Data processing, grouping

- Rows and columns can be grouped so they can easily be hidden or shown

- Different from data filtering (here the data will still be in the calculations)

	A	B	E	F	G
1	Efternavn	Fornavn	Køn	Løn	Stilling
2	Phillips	Jeff	M	36.000	Bogholder
3	Ringqvist	Joakim	K	30.000	Bogholder
4	Ebdrup	Mads	M	98.000	Bogholder
5	Davidovski	Velimir	M	83.000	Bogholder
6	Larsson	Katarina	M	55.000	Bogholder
7	Basalik	Evan	M	93.000	Bogholder
8	Rolecki	Marek	K	28.000	Bogholder
9	Malgorzaciak	Janusz	M	50.000	Bogholder

Data processing, pivottable

- Pivot tables are used to summarize data
  - Gives overview of categories
  - It is possible to go down in details
  - You can make automatic graphs of the tables

- Insert -> PivotTable -> Mark data and output location

Data processing, pivottable

Antal af Efternavn	Kolonnenavne					
Rækkenavne	Bogholder	Forsker	Leder	Sekretær	Sælger	Hovedtotal
Bogholderi						
K	22					22
M	69	3	1	6		79
Direktion						
K				2		2
M			1	17		18
Marketing						
K					37	37
M		3	4	3	134	144
Udvikling						
K		8	3	11	12	34
M		16	2	4		22
Hovedtotal	**91**	**30**	**11**	**43**	**183**	**358**

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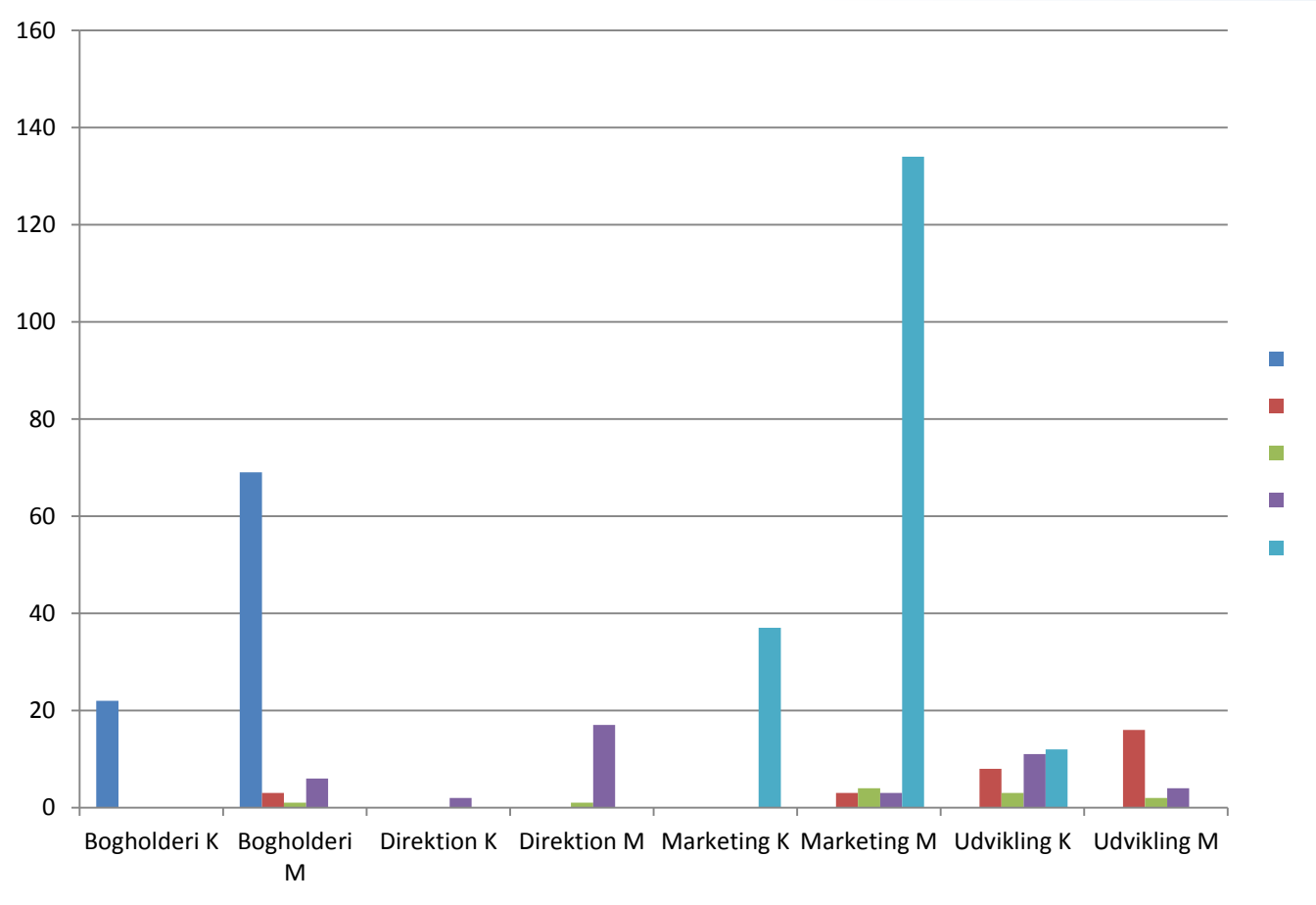
Data processing, pivotchart



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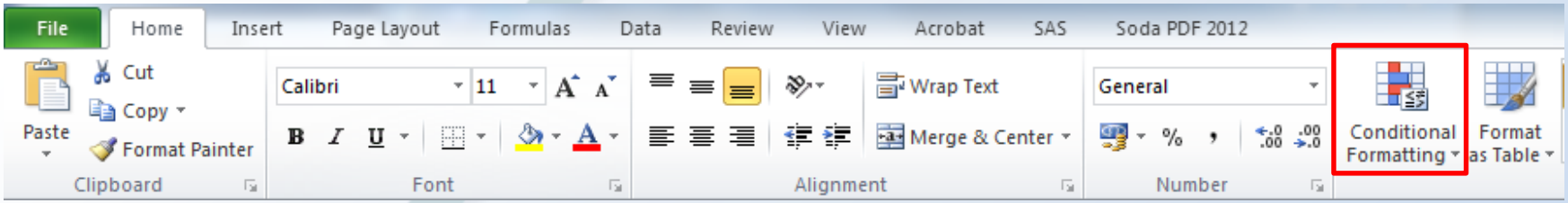
Assignments

- Check list
  - Assignment 7: Lowest row (Grandtotal)

Grandtotal	723,39	1048,97	55191,39	206,25	57170

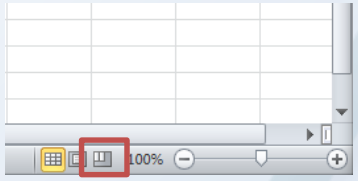
Presentation, conditional formatting

- Format (color, underline etc.) cells depending on the content:
  - Highlight cells that are larger than the average, equal to 4 or the like
  - Highlight top/bottom in series e.g. top 10 of the largest or smallest values
  - Make color scales eg. from red to yellow to green
- You can make more than one rule for the cells

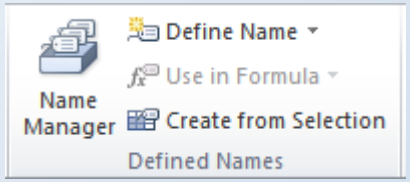


Presentation, page setup

- Find it in the tab ”Page layout”
- Overview of page break -> Page break preview



- Better understanding of formulas by giving names to cells or areas
  - The tab Formulas -> Name manager

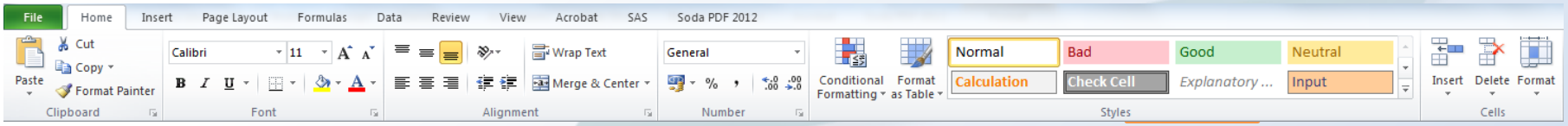


Commenting

- Are often used to explain formulas or results
  - Could also contain information e.g. on input data
  - Very useful if several people should use the worksheet or if you know you will forget what something is
- You can add it by a right-click
  - Alternatively use the tab Review -> new comment
  - Right-click again to hide/show the comment

Protection of sheets

- The sheet can be protected so it is only possible to pick or edit specific cells :
  - Is nice if there is a risk of someone changing the formulas
- In home you can pick Format -> Lock cell



Then the tab Review -> Protect sheet

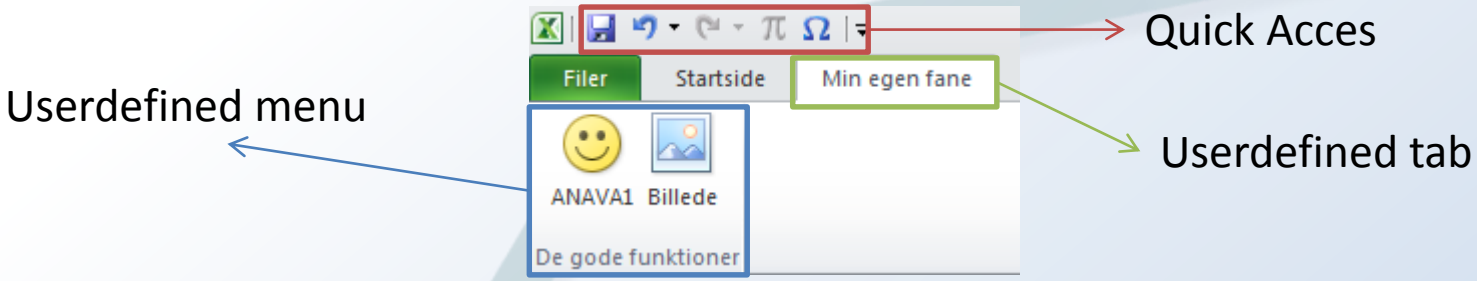
Make a password if you would like

Effective workflow, macros

- Make shortcut buttons for repeated processes e.g. same format, formulas or the like
  - Requires the tab Developer (File -> Options -> Customize Ribbon -> Developer)
- Record macro
  - Records alle clicks, inputs ect.
  - Remember to stop the record again

Effective workflow, adjustment of buttons

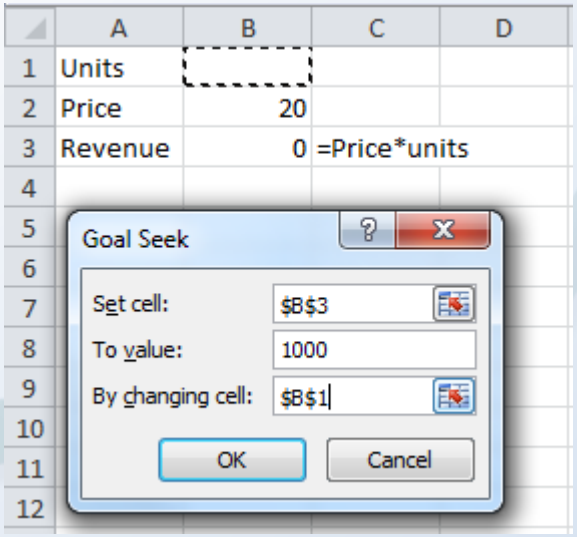
- Userdefined menues can be edited at File -> Options -> Customize Ribbon :
  - Submenues or whole tabs
  - All commandoes + macros can be used
- You can use the toolbar ”Quick Acces ” for very common commandoes:



Goalseek

- Is used to see cause-effect on one variable
  - Go to the tab Data -> What if -> Goal seek

Finds the number of units that gives a revenue of 1000



- Can be expanded with the problem solver (not a part of this course) to several variables and side conditions

Assignments

- Checklist
  - Extra assignment: conditional formatting: AVG. = 0,466
  - Extra assignment: Goal seek: Rate = 6%

Questions

- If your question has not been answered here you are welcome to contact us at:
  - analytics@asb.dk
  - au.dk/it (where you can also find this presentation)

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Our field of competence is varied and covers questionnaire surveys, analyzes 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.

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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.

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