

Data processing in life sciences

Microsoft Excel 2016

Lecture 1



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2018

Lecture bonus with Mentimeter

Bonus system

Two bonus points (1%) can be awarded in each lecture if:

1. Providing a valid **full name** at the Mentimeter test
2. At least **3 correct answers** out of the 4 online test questions

Participation:

- Mobile devices with installed Mentimeter application
- Online device with internet access ***<http://www.menti.com>***



Simplified infrastructure of informatics in life sciences

Theory (systems)

Data collection
and evaluation

Data
presentation

Publication

Practice (software)

Spreadsheet
MS Excel

Presentation
MS Powerpoint, Prezi

Word processor
MS Word

Data processing in biomedical sciences

lecture – 1 Topics

1. Spreadsheet programs – introduction
2. History
3. Properties
4. Entering data into a worksheet
5. Protection, formatting

Spreadsheets in life sciences

Spread: newspaper or magazine (text or graphics) covering two facing pages*

Sheet: rectangular piece of paper

Spreadsheet: interactive computer application for data in tabular form (rows, columns, cells, ranges of cells)

Cells may contain:

- **numeric** values
- **text** data
- results of **formulas**
 - automatically calculate
 - display value based on the contents of other cells

The image shows a digital spreadsheet grid with columns labeled A, B, and C, and rows numbered 1 through 6. A small black square is visible in cell A1. Below the grid is a printed spreadsheet with various numerical values in a grid format.

My Health Record


Name _____		Emergency Contact Name _____						
Birth Date _____		Address _____						
Medical Plan _____		Phone _____						
Medical Plan ID _____		Alternate Phone _____						
Medical Visits								
Date	Description	Attending Physician	Diagnosis	Tests Performed	Test Results	Prescribed Action	Prescribed Medication	Notes

* wikipedia.org

Spreadsheets in life sciences

History and alternatives

- **VisiCalc** (1979)
 - first spreadsheet program for PCs
 - first "killer application,, on IBM PC
- **Lotus 1-2-3** (1983-2014)
 - from Lotus Software (later part of IBM)
- **Quattro (Pro)** (1988 -)
 - developed by Borland and now sold by Corel, part of Corel's WordPerfect Office
- **OpenOffice Calc** (2002 -)
 - spreadsheet component of the OpenOffice.org software package
 - Last stable version 3.3 (2011)
- **Libre office Calc** (2011 -)



ITEM	NO.	UNIT	COST
MUCK RAKE	4	12.95	556.85
TONER CUT	1	161.00	161.00
TONER	25	49.95	1248.75
EYE SNUFF	2	4.95	9.90
SUBTOTAL			13155.50
9.75% TAX			1282.66
TOTAL			14438.16



Spreadsheet programs

Web based and free

- **Google Sheets** (Part of Google apps from 2005)
 - Free, Web-based office suite, data storage
 - Writely, Google Spreadsheets, Presentations and Drawing application
 - Documents are automatically saved (Google drive)
 - 15 GB of storage for free
- **Microsoft Office Online** (2007)
 - A web-based version of Microsoft Office
 - Web-based online versions of Word, Excel, PowerPoint, and OneNote.
 - Access documents from anywhere (One drive)
 - Share files and collaborate with other users online
 - 5 (15) GB free space

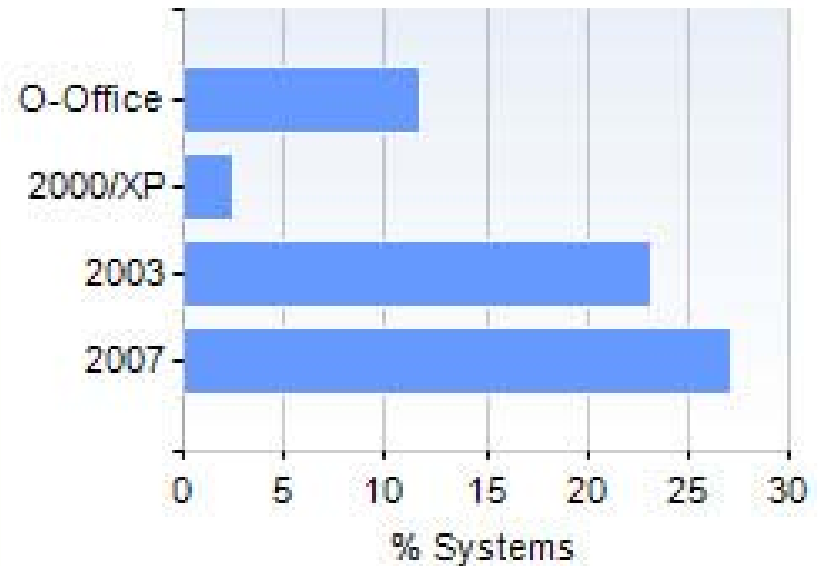
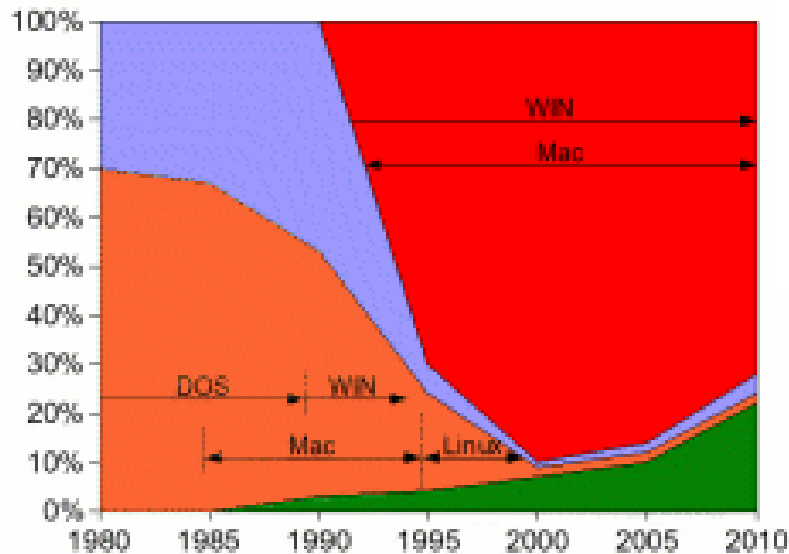


Office Web Apps



Spreadsheet softwares - popularity

<http://blogs.computerworld.com>



<http://openoffice.or.kr>

Office reigns as Microsoft's most lucrative product and maintains a 90% market share of PCs (***Cnn.com, Heather Kelly, July 16, 2012***)

Welcome to MS Office

Károly Simonyi
(Charles Simonyi)

- Hungarian-American computer software executive
- Head of Microsoft's application software group created Microsoft Office
- 2007: aboard Soyuz TMA-10, the fifth space tourist and the second Hungarian in space

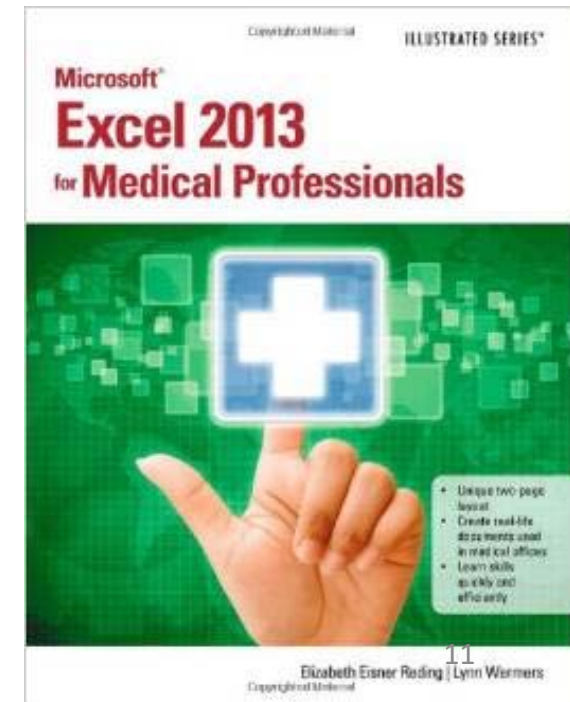


Welcome to Excel-1

- **Excel** is the most popular **spreadsheet** application created by **Microsoft**
- Used in
 - **Business** (*dashboard, calendar, stock management, planning, trend analyses, forms, ranking, employee information*)
 - **Engineering** (*calculations, data analyses, graphing*)
 - **Education** (*medical education*)
 - **Research** (*planning, data analyses, ranking, charts, statistical analyses*)
 - **Life sciences** (*data analyses, ranking and sorting, filtering, statistical analyses, charts*)

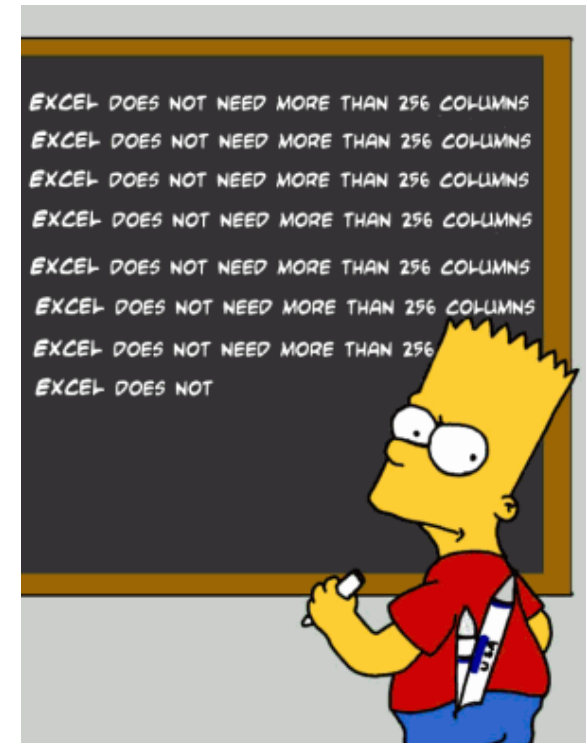


Dick Cheney



Welcome to Excel-2

- **Workbook**: excel spreadsheet documents
- **Worksheet**: each workbook contains individual worksheets
- Many types of **calculations** can be made in the Excel in an automated fashion
- More flexible and robust than a scientific calculator
- Any calculated value is updated automatically if the content of the referred cells have been changed



*Prior to Excel 2007,
Microsoft agreed with Bart.*

Welcome to Excel-3



What is excel used for?

- Calculation, graphing tools, pivot tables and a macro programming (VBA)
- Processing and evaluation of measured raw data (validating, converting, calculating, filtering, sorting, querying, subtotaling, ...)
- Functions to answer mathematical, statistical, engineering or financial needs
- Display data as line graphs, histograms, charts and with a very limited three-dimensional graphical display

“The average person spends:

9.5 years sleeping



4.2 years eating

3.8 years on the toilet

2.8 years traveling

and...

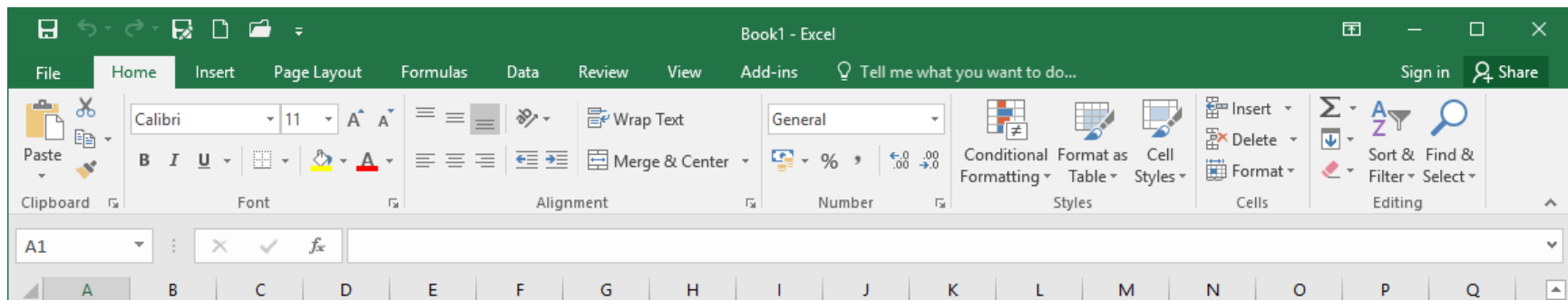
*1.9 years waiting for
Excel to recalculate!”*

spreadsheetpage.com

MS Excel 2016

Properties

- Workbook with **1.024 spreadsheets**
- A worksheet is a **table** with **rows** and **columns**, where the rows are numbered and columns are labeled with letters
- Total number of available columns: **16.384** (2^{14})
 - *Columns from A, B, C ... AB, AB, AC Until XFD*
- Total number of available rows: **1.048.576** (2^{20})
- **Last cell: XFD1048576**
- **Ribbons** (instead of old menus, toolbars)
- **Contextual tabs**



MS Excel

History

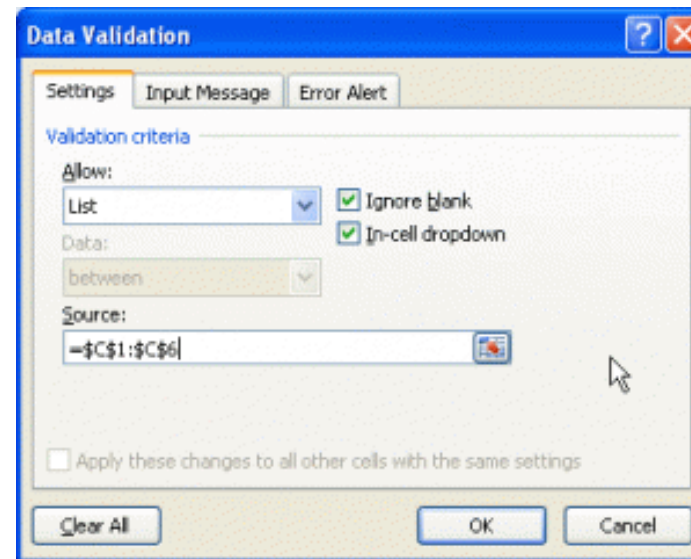
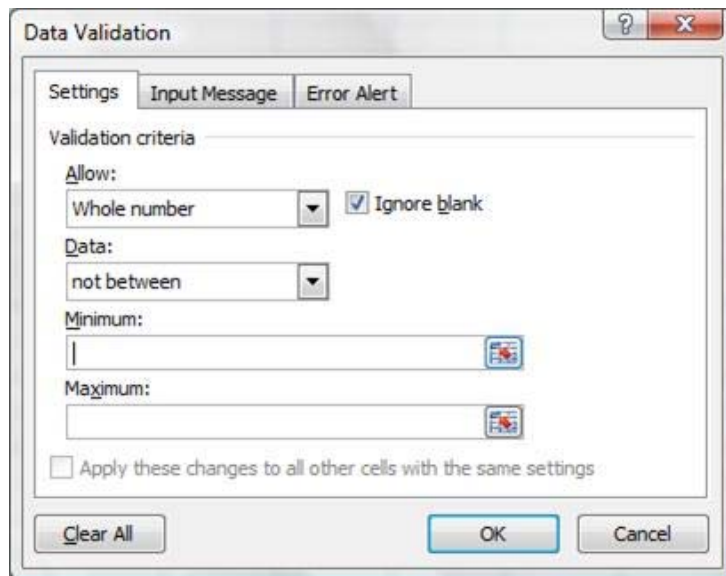
- MS originally marketed a spreadsheet program called **Multiplan** in 1982 (Multiplan became very popular on **CP/M** systems, but on MS-DOS systems it lost popularity to **Lotus 1-2-3**)
- MS released the first version of Excel for the Mac in **1985** (Excel 1.0)
- 1987 Excel 2.0 for Windows
- 2001 Excel 2002 (version 10) included in Office XP
- 2003 Office Excel 2003 (version 11) included in Office 2003

- 2007 Office Excel 2007 (version 12)
- *The major version number 13 has been skipped presumably due to aversion to the number 13*
- 2010 Excel 2010 (version 14) included in Office 2010
- 2013 Excel 2013 (version 15) included in Office 2013
- **2015 25th of January: Microsoft Office Mobile (Android/IOS)**
- **2016 Microsoft Office Professional Plus 2016**
- ? 2018 Excel 2019 in Office 2019 ?



Entering data into a worksheet - Typing

- Select the cell where you want to enter the data
- Enter the data into the active cell – **Cell properties and type!**
- Enter, tab or arrow key to finish data entering
- Data validation: to be able to prevent invalid data from being entered into a cell.

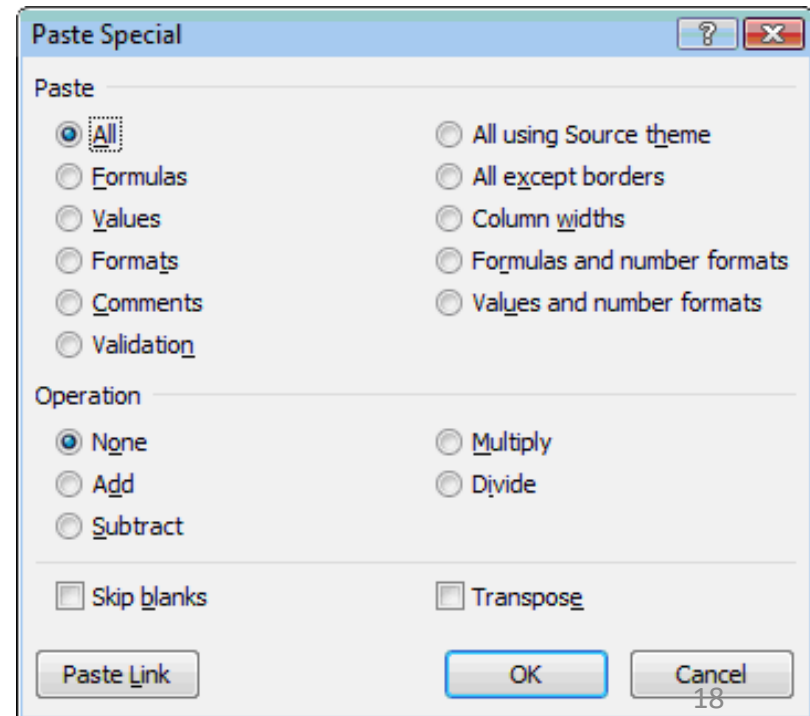
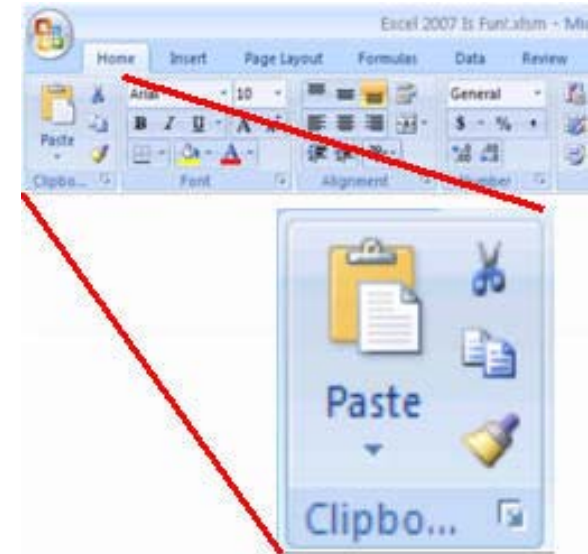


Entering data into a worksheet

- Data types can be
 - Numeric (numbers and the decimal symbol only)
 - Date (strict format)
 - Alphabetic (a single letter or string)
 - Alphanumeric (letter and numbers together)
- The cell content may be
 - A constant (value never changes – protection)
 - A formula (arithmetic operation)
 - An Excel function (simple or complex data manipulations)

Rows and columns ...

- Resizing rows and columns
 - Drag the borders
 - Double click on the border for automatic resizing
- Copy or move data in cells
 - Keyboard (ctrl-c to copy, ctrl-x to cut, ctrl-v to paste)
 - Mouse (Home tab, Clipboard group)
 - „Dragging”
 - Paste special
 - Copy or moving cells with formula of functions may alter the cell references!

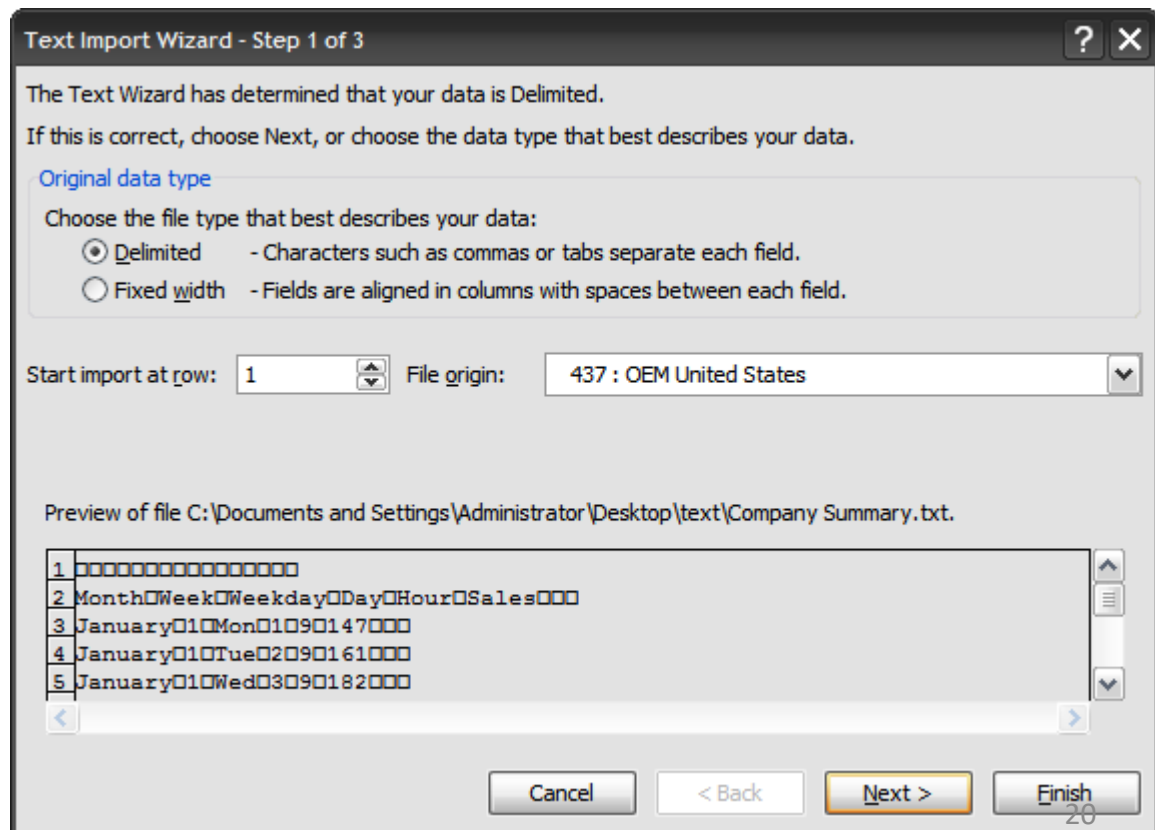
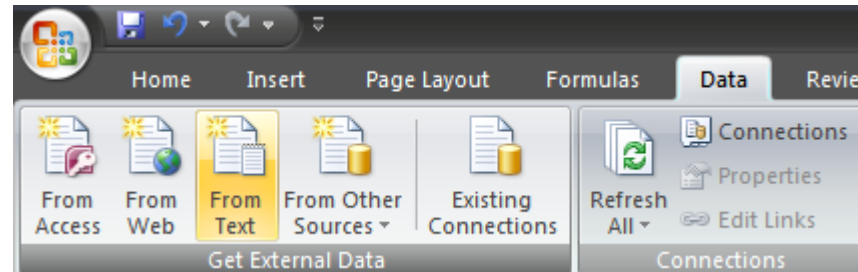


Entering data into a worksheet - Typing

- Navigation around the worksheet
 - The **arrow keys** and **PgUp/PgDn**.
 - **Alt-PgUp/Alt-PgDn** are horizontal versions of PgUp/PgDn.
 - **Ctrl-Home** returns to the upper left of the worksheet, and **Ctrl-End** to the lower right.
 - Over 9 hours to reach the bottom of Excel:
<https://www.youtube.com/watch?v=thvcTyJvRvM>
 - <https://www.youtube.com/watch?v=sF8k3zl70os>
 - **Ctrl-arrow** moves "to the edge of the current region." (until blank cells)
- **Ctrl+Shift together**: moving+selecting cell ranges

Entering data into a worksheet – Data import

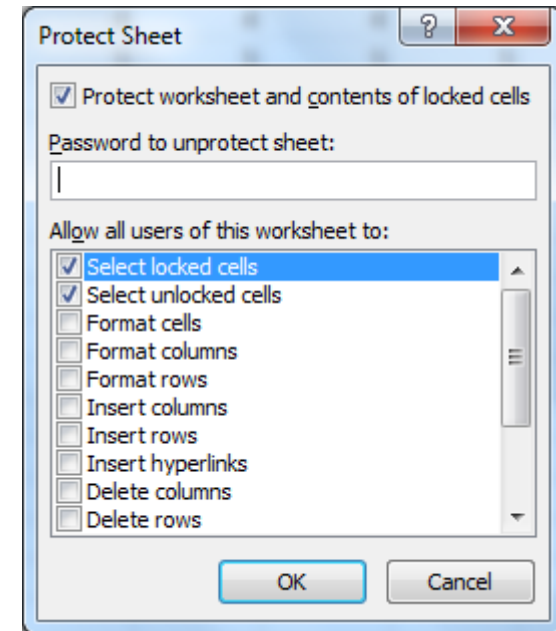
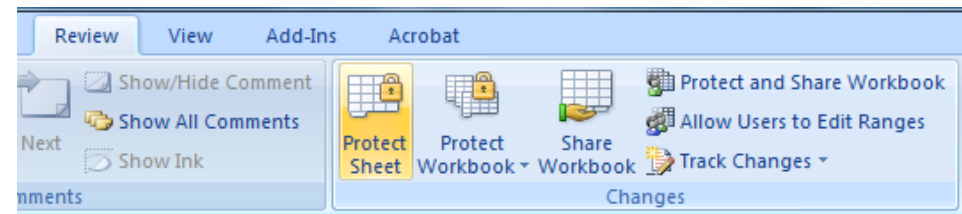
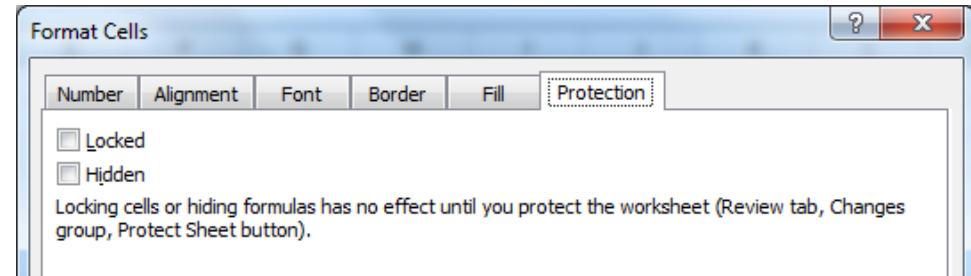
- **Import from**
 - From Access
 - From Web
 - From text
 - Other sources
- **Data import wizard ...**



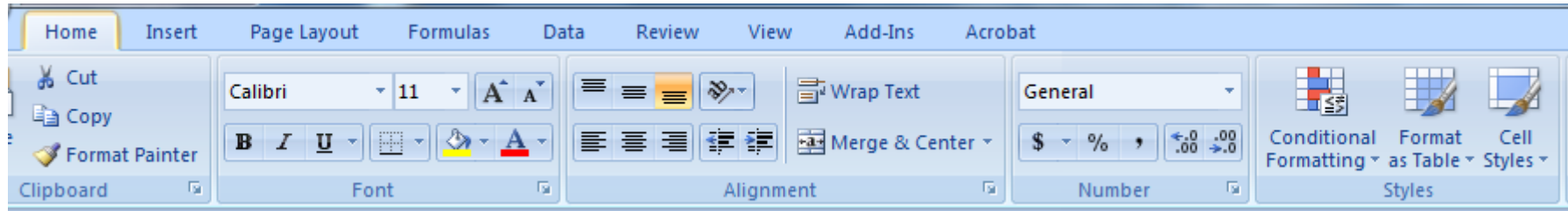
Protection

Protecting data from change in Excel is a two step process:

1. **Locking/unlocking** specific cells in your spreadsheet.
2. Apply the **Protect Sheet** option. Until step 2 is completed, all data is vulnerable to change.



Formatting cells



Font type

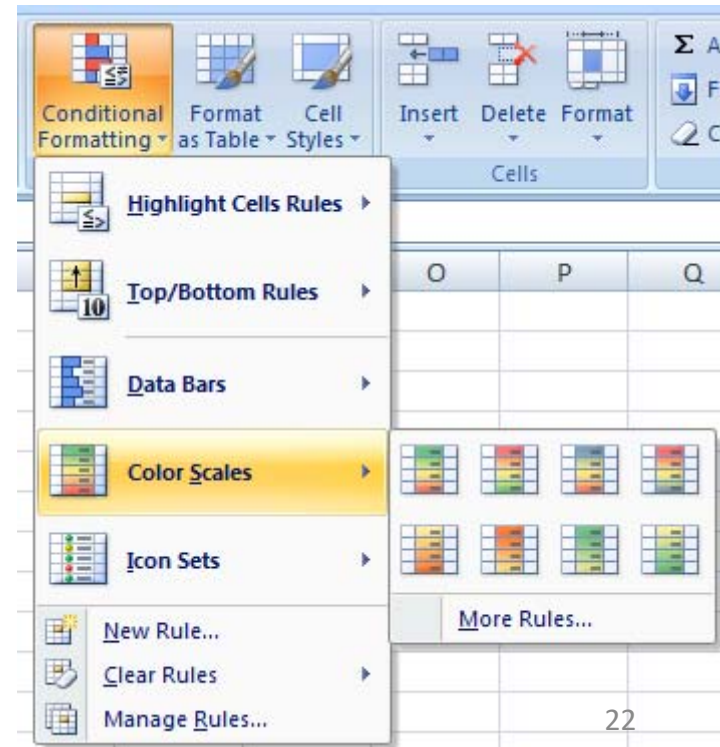
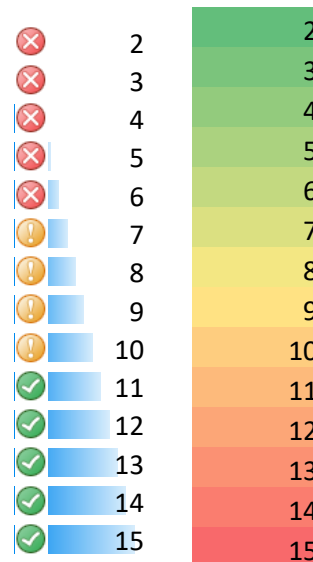
Alignement

Number format

Styles

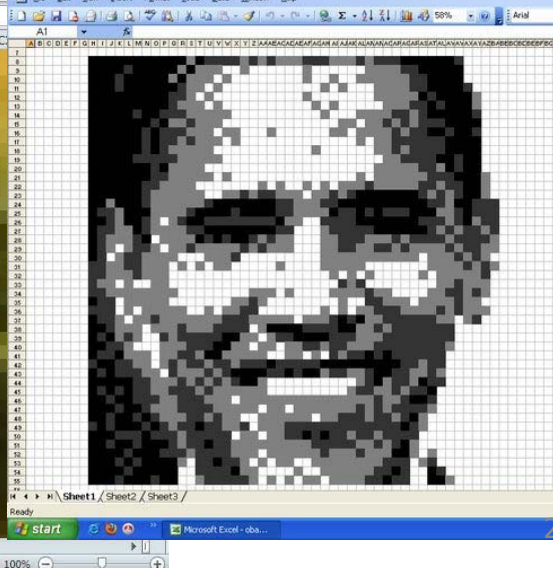
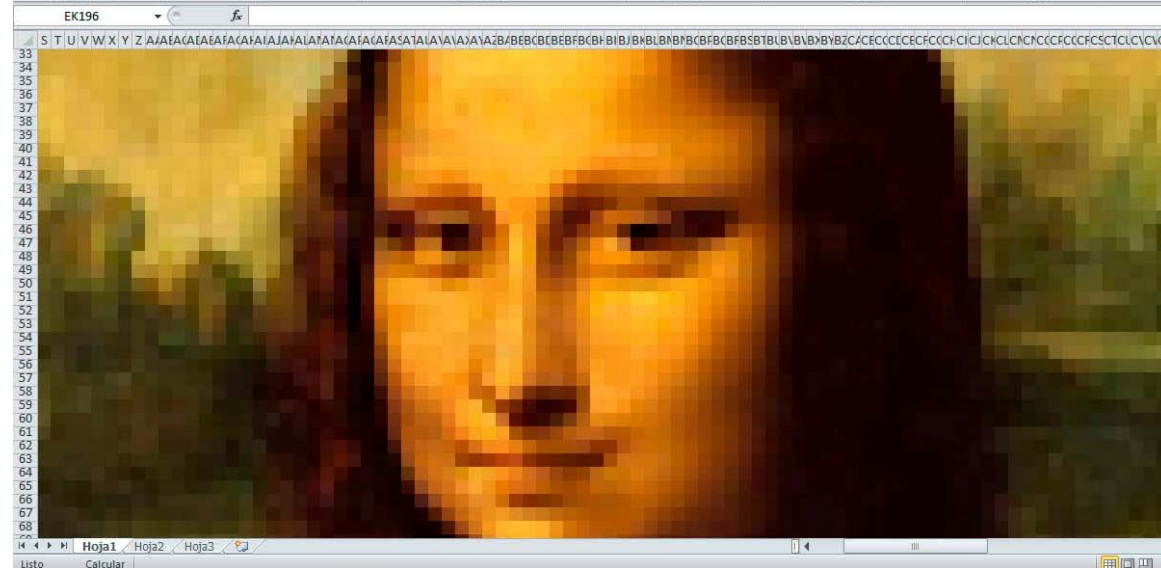
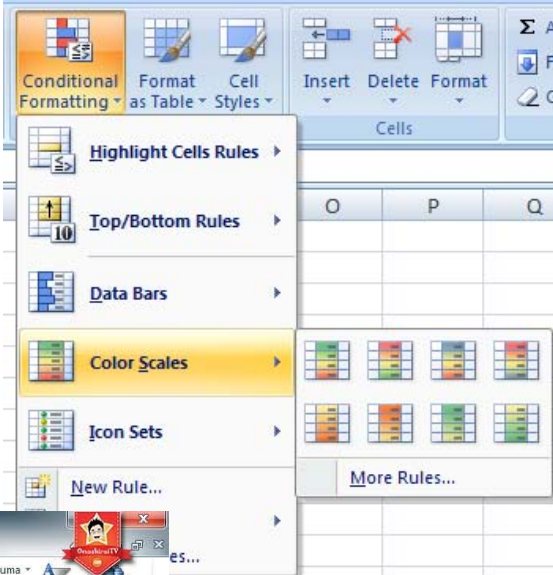
Conditional formatting

Controls how a cell is formatted depending on the data the cell content



Conditional formatting

B	C	D	E	F	G	H	I
Sym	6-8	6-1	5-25	5-18	5-11	5-4	4-27
QID	36.26	37.12	35.28	36.77	33.16	32.63	30.28
RIMM	9.99	10.26	11.00	10.99	11.80	12.01	14.03
RVBD	16.27	15.82	16.52	15.42	16.99	18.98	20.65
SCCO	29.06	28.51	28.79	28.16	30.70	32.23	32.46
SCOR	18.03	17.88	18.01	18.23	18.76	19.10	19.93
SHAW	24.42	25.03	25.74	27.46	29.41	28.59	29.98
SKF	50.91	51.82	48.19	50.34	43.93	42.79	40.60
SMN	18.78	19.15	17.99	19.42	16.56	15.93	14.76
SPG	146.16	143.51	148.12	144.34	156.08	154.19	155.33
SPR	22.12	22.23	23.41	22.14	23.91	25.23	25.44
SRS	30.65	31.49	29.85	31.50	27.66	27.97	27.71
SSO	48.70	48.07	51.13	49.32	53.96	55.11	57.95
STEC	7.00	6.95	7.02	7.02	7.46	8.21	8.35



Microsoft Excel - obama excel art

File Edit View Insert Format Tools Data Window Help

3

Lecture bonus with Mentimeter

Bonus system

Two bonus points (1%) can be awarded in each lecture if:

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Participation:

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Feedback and related questions

Mentimeter access code: 10 75 58

- Mentimeter application on Android or iOS
 - www.menti.com
1. What are the main applications areas of Excel?
 2. How is an Excel workbook organized?
 3. What were the main historical steps in the development of Excel?
 4. What other spreadsheet applications are currently available?
 5. How can you enter data into the Excel worksheet?
 6. What is data validation in Excel refers to?
 7. What are the main navigation keys in Excel?
 8. How can the Excel protect the data entered into its sheet?
 9. What is the difference in formatting and conditional formatting in Excel?

Entering formulas – arithmetic operations

- The formula is a mathematical expression that calculates a value
- Formulas always begin with „=„ sign
- The order of precedence is a set of predefined rules – in accordance with elementary mathematics
- Operator symbols:
 - Arithmetic: + - * / ^ ()
 - Comparison: = > >= < <= <>
 - Text concatenate: &



"Those who can, do. Those who cannot, teach. Those who cannot teach, develop spreadsheets."



The Excel 2016 screen

