

Microsoft Excel 2016

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Adapted in English by Prakarn Unachak



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1. Excel Basics

- 2. Calculation and Formula
- 3. Charts
- 4. Other Spreadsheet Works on Excel



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4. Other Spreadsheet Works on Excel

- 1) Sorting
- 2) Filtering
- 3) Basic Data Analysis
 - Preparing Tools for Data Analysis

The following files are used in this slide.

Grading Example:

https://goo.gl/iPheGL

Survey Example:

https://goo.gl/gXnkP8

- Analyzing Frequency of the Data
- Using Descriptive Statistics
- 4) Conditional Formatting



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We'll use the following score data as an example

	А	В	С
1	No.	Score	Grade
2	1	90	Α
3	2	67	С
4	3	76	В
5	4	60	С
6	5	53	D
7	6	74	В
8	7	69	С
9	8	77	В
10	9	57	D
11	10	99	А
12	11	59	D
13	12	75	В
14	13	51	D
15	14	59	D
16	15	92	А
17	16	77	В
18	17	47	F
19	18	98	Α
20	19	59	D
21	20	76	В
22	21	61	С
23	22	58	D
24	23	79	В
25	24	66	С
26	25	61	С
27	26	62	С
28	27	61	С
29	28	59	D
30	29	82	Α

We want to sort the data, first by Grade (Smallest (A) to Largest (B)), and if grades are equal, we then sort by Score (Largest

(100) to Smallest (0))



We need to sort by 2 conditions, in this order:

- 1) Sort by Grade, from smallest to largest
- 2) Then by Score, from largest to smallest

	А	В	С
1	No.	Score	Grade
2	10	99	А
3	18	98	Α
4	15	92	А
5	58	91	А
6	1	90	А
7	68	90	Α
8	55	89	Α
9	32	88	Α
10	47	84	Α
11	29	82	Α
12	49	82	Α
13	69	82	Α
14	67	81	Α
15	23	79	В
16	34	78	В
17	35	78	В
18	8	77	В
19	16	77	В
20	64	77	В
21	3	76	В
22	20	76	В
23	12	75	В
24	6	74	В
25	41	74	В
26	38	72	В
27	50	72	В
28	59	72	В
29	63	70	В
30	7	69	С



Steps in Sorting

(1) Select the data range to be sorted

By drag the mouse to cover the range of the

data

OR

just click select column A, B and C

OR

Click cell A1, press

- 1. Ctrl-Shift- \rightarrow
- 2. Then Ctrl-Shift- \downarrow

This should select the entire block of data



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	А	В	С
1	No.	Score	Grade
2	1	90	А
3	2	67	С
4	3	76	В
5	4	60	С
6	5	53	D
7	6	74	В
8	7	69	С
9	8	77	В
10	9	57	D
11	10	99	А
12	11	59	D
13	12	75	В
14	13	51	D
15	14	59	D
16	15	92	А
17	16	77	В
18	17	47	F
19	18	98	А
20	19	59	D
21	20	76	В
22	21	61	С
23	22	58	D
24	23	79	В
25	24	66	С
26	25	61	С
27	26	62	С
28	27	61	С
29	28	59	D
30	29	82	Α

Steps in Sorting (cont.)

₽↓

(2) Under Data tab \rightarrow Sort & Filter group, click Sort



Sort by first column, from smallest to largest

Z↓ Sort by first column, from largest to smallest Z A A Z ? Х Sort Sort Define how you want to sort Add Level X Delete Level Copy Level Options... My data has headers Column Sort On Order Sort by \sim \sim Values \sim A to Z ภาควิชาวิทยาการคอมพิวเตอร์ COMPUTER SCIENCE DEPARTMENT, CMU 204100 IT AND MODEF คณะวิทยาศาสตร์ มหาวิทยาลัยเซียงใหม่

Steps in Sorting (cont.)

Sorting by Your Own Conditions

(3) Select the column to be consider first (Sort by)



(3.1) Sort By: We will set the main column to be Grade

(3.2) Order: We will sort from Smallest grade (A) to Largest grade (F)



Steps in Sorting (cont.)

Sorting by Your Own Conditions

(4) Click Add Level to define secondary (tie-breaking) column (Then by)

₽ <u>al</u> dd Level	Sort						?	×
	* <u>A</u> ↓ <u>A</u> do	Level	X Delete Level		Copy Level	<u>O</u> ptions	🗹 My data	a has <u>h</u> eaders
	Column				Sort On		Order	
	Sort by	Grade	~	•	Values	~	A to Z	~
	Then by	Score	~		Values	~	Largest to Smallest	~
							(5) Clic	k OK
							ОК	Cancel

(4.1) Then By: We will set the main column to be Score

(4.2) Order: We will sort the rows with equal grade from Largest to Smallest



The Result

We want to sort the data, first by Grade (Smallest (A) to Largest (B)), and if grades are equal, we then sort by Score (Largest (100) to Smallest (0))

Column Sort On Order Sort by Grade Values A to Z Then by Score Values Largest to Smallest	-
Sort by Grade Values A to Z Then by Score Values Largest to Smallest	~
Then by Score Values Values Largest to Smallest	
	~

	А	В	С
1	No.	Score	Grade
2	10	99	Α
3	18	98	А
4	15	92	А
5	58	91	А
6	1	90	Α
7	68	90	Α
8	55	89	Α
9	32	88	Α
10	47	84	Α
11	29	82	Α
12	49	82	Α
13	69	82	Α
14	67	81	Α
15	23	79	В
16	34	78	В
17	35	78	В
18	8	77	В
19	16	77	В
20	64	77	В
21	3	76	В
22	20	76	В
23	12	75	В
24	6	74	В
25	41	74	В
26	38	72	В
27	50	72	В
28	59	72	В
29	63	70	В
30	7	69	С



	А	В	С
1	No.	Score	Grade
2	1	90	Α
3	2	67	С
4	3	76	В
5	4	60	С
6	5	53	D
7	6	74	В
8	7	69	С
9	8	77	В
10	9	57	D
11	10	99	Α
12	11	59	D
13	12	75	В
14	13	51	D
15	14	59	D
16	15	92	Α
17	16	77	В
18	17	47	F
19	18	98	Α
20	19	59	D
21	20	76	В
22	21	61	С
23	22	58	D
24	23	79	В
25	24	66	С
26	25	61	С
27	26	62	С
28	27	61	С
29	28	59	D
30	29	82	Α

Filtering is limiting rows to be displayed to only those that match a certain condition We filter the data to only show the rows with grade **B**

	А	В	С
1	No. 🔻	Score 👻	Grade 🕶
4	3	76	В
7	6	74	В
9	8	77	В
13	12	75	В
17	16	77	В
21	20	76	В
24	23	79	В
35	34	78	В
36	35	78	В
39	38	72	В
42	41	74	В
51	50	72	В
60	59	72	В
64	63	70	В
65	64	77	В
72			
73			
74			
75			
76			
77			
78			
79			
80			
81			



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1) Using Filtering

Under Data tab, select Filter command

Filter (and sorting) tools will appear



	А	В	ζ-,
1	No. 🔽	Score 👻	Grade
4	3	 76	- - B
7	6	74	В
9	8	77	В
13	12	75	В
17	16	77	В
21	20	76	В
24	23	79	В
35	34	78	В
26	25	70	n

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2) Example: Filter the rows to only those with grade B

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Grade

В

В

В

В

В

В

В

В

В

В

В

В

В

В

В

4) Example of using number filters to show only rows with score from 61 to 69.

4) Example of using number filters (cont.)

Custom AutoFilter		? ×
Show rows where:) Specify the cor	ditions
is greater than or equal to	∞ 61	\sim
● <u>A</u> nd ○ <u>O</u> r		
is less than or equal to	∞ 69	\sim
Use ? to represent any single char Use * to represent any series of ch	acter naracters OK	Cancel

(4) Click OK

The Result

	А	В	С
1	No. 🔻	Score 🕶	Grade
3	2	67	С
8	7	69	С
22	21	61	С
25	24	66	С
26	25	61	С
27	26	62	С
28	27	61	С
34	33	68	С
43	42	66	С
49	48	62	С
54	53	66	С
55	54	64	С
57	56	69	С
58	57	69	С
67	66	61	С

4.3 Basic Data Analysis

Preparing Analysis ToolPak for Data Analysis in Excel

(1

Under File tab select Options to activate the add-ins.

General				
General	View and manage Microsoft Office	e Add-ins.		
Formulas				
Proofing	Add-ins			
Save	Name 🔺	Location	Туре	^
Language	Active Application Add-ins			
Advanced	No Active Application Add-ins			
State	Inactive Application Add-ins	2) Select Analysis 1	FoolPak	
Customize Ribbon	Analysis ToolPak	C:\ffice16\Library\Analysis\ANALYS32.XLL	Excel Add-in	
Quick Access Toolbar	Analysis ToolPak - VBA	C:\e16\Library\Analysis\ATPVBAEN.XLAM	Excel Add-in	
A 414 144	Euro Currency Tools	C:\16\Office16\Library\EUROTOOL.XLAM	Excel Add-in	
Add-Ins	Inquire	C:\oft Office\Office16\DCF\NativeShim.dll	COM Add-in	
Trust Center	Microsoft Actions Pane 3		XML Expansion Pack	
	Microsoft Power Map for Excel	C:\ Excel Add-in\EXCELPLUGINSHELL.DLL	COM Add-in	
Add-Ine	Microsoft Power View for Excel	C:\Add-in\PowerPivotexcelClientAddin.dl	COM Add-in	
	Solver Add-in	C:\ffice16\Library\SOLVER\SOLVER.XLAM	Excel Add-in	
	Document Related Add-ins			
	No Document Related Add-ins			
	Disabled Application Add-ins			
	Add-in: Analysis ToolPak			
	Publisher: Microsoft Corporation			
	Compatibility: No compatibility informa	ation available		
	Location: C:\Program Files\Microso	oft Office 2016\Office16\Library\Analysis\ANALYS	32,XLL	
	Description: Provides data analysis too	ols for statistical and engineering analysis		
				_
	Manage: Excel Add-ins	📖 (3) Click Go		

4.3 Basic Data Analysis

Preparing Analysis ToolPak for Data Analysis in Excel (cont.)

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1) Example of frequency analysis from survey response data

(1) Preparing data in Excel

- Gender data is in the range of 1 2
- Age data is in the range of 1 3
- Proficiency data is in the range of 1 5

	А	В	С	D	E	F
1	Gender	1	2			
2	Age	1	2	3		
3	Proficiency	1	2	3	4	5
4						
5	No.	Gender	Age	Proficiency		
6	1	1	1	5		
7	2	1	2	5	Respo	nse
8	3	2	3	4		
9	4	2	2	2	data fr	om 5
10	5	2	2	5		
	-				respon	dents

1) Example of frequency analysis from survey response data (cont.)

(2) Under Data tab, click Data Analysis

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1) Example of frequency analysis from survey response data (cont.)

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1) Example of frequency analysis from survey response data (cont.) – the Result

From the range of Age data (1-3), the frequency we get 5 responses are:

Age	Number of Responses
1 (1-20 yr.)	1
2 (21-30 yr.)	3
3 (31-60 yr.)	1

2) Example of Frequency Analysis on score data in cells B2 to B71

	А	В	С	D	E	F
1	No.	Score	Grade			
2	1	90	А		Bin	Score
3	2	67	С		c	49
4	3	76	В		50	65
5	4	60	С		66	79
6	5	53	D		80	100
7	6	74	В			
8	7	69	С			
9	8	77	В			
10	9	57	D			
11	10	99	А			
12	11	59	D			
13	12	75	В			
14	13	51	D			
15	14	59	D			
16	15	92	Α			
17	16	77	В			
18	17	47	F			
19	18	98	А			
20	19	59	D			
21	20	76	В			
22	21	61	С			
23	22	58	D			
24	23	79	В			
25	24	66	С			
26	25	61	С			
27	26	62	С			
28	27	61	С			
29	28	59	D			

Histogram		? ×
Input Input Bange:	\$B\$1-\$B\$71	ОК
Bin Range:	\$F\$2\$F\$6	Cancel
✓ Labels		Help
Output options		
Output Range:	\$H\$2	
• New Worksheet <u>P</u> ly:	Score_Historgram	
O New <u>W</u> orkbook	The result will be o	n
Pareto (sorted histogram)	Score_Histogram w	orksheet
<u> </u>		

2) Example of Frequency Analysis on score data in cells B2 to B71 (cont.)

- Descriptive Statistics is a set of statistics values used to describe or summary data of interest
- **Examples of statistics calculated by descriptive statistics**
 - Percentage
 - Arithmetic mean (average)
 - Standard deviation
 - Variance

Example: Preparing Descriptive Statistic for Score Data

Exponential Smoothing

Fourier Analysis

Histogram

F-Test Two-Sample for Variances

(1) Select Data

	A D		C
1	No.	Score	Grade
2	1	90	Α
3	2	67	С
4	3	76	В
5	4	60	С
6	5	53	D
7	6	74	В
8	7	69	С
9	8	77	В
10	9	57	D
11	10	99	Α
12	11	59	D
13	12	75	В
14	13	51	D
15	14	59	D
16	15	92	А
17	16	77	В
18	17	47	F
19	18	98	А
20	19	59	D
21	20	76	В
22	21	61	С
23	22	58	D
24	23	79	В
25	24	66	С
26	25	61	С
27	26	62	С

P C

(2) Under Data tab, click Data Analysis

File	Home	Insert	Page Layout	Formulas	Data	Re	view	View S	2 Tell me	Sign in	R si
Get External Data *	New Query *		Refresh All +	Ž↓ <mark>Z A</mark> Z↓ Sort	Filter	14 10 K	Data Tools *	Forecast	Outline •	🗖 Data An	alysis
	Get & Tra	nsform	Connections	Sort &	Filter					Analys	s
Data A Anov Anov Anov Corre Cova	analysis sis Tools va: Single Fa va: Two-Fac va: Two-Fac elation riance riptive Stat	actor tor Witl tor Witl	n Replication hout Replication	n	?	OK Cance <u>H</u> elp		<mark>(4)</mark> CI	ick Oł	٢	

¥

(3) Select Descriptive Statistics

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Example: Preparing Descriptive Statistic for Score Data (cont.)

	А	В	С
1	No.	Score	Grade
2	1	90	А
3	2	67	С
4	3	76	В
5	4	60	С
6	5	53	D
7	6	74	В
8	7	69	С
9	8	77	В
10	9	57	D
11	10	99	А
12	11	59	D
13	12	75	В
14	13	51	D
15	14	59	D
16	15	92	А
17	16	77	В
18	17	47	F
19	18	98	Α
20	19	59	D
21	20	76	В
22	21	61	С
23	22	58	D
24	23	79	В
25	24	66	С
26	25	61	С
27	26	62	С

	(5) Dofino Input F	Dango	
Input	(5) Denne input r	lange	OK (10) Click O
Input Range:	\$B\$1:\$B\$71	E	
Grouped By:	• <u>C</u> olumns		Cancel
	O <u>R</u> ows		Help
✓ Labels in first row (6) S	pecify data in Co	lumn	
(7) Specify that the first	row is the label		
Output options			
0	\$5\$2	-	(8) Display result
Output Range:	φιφε	E MAR	(b) Display result
 <u>O</u>utput Range: New Worksheet <u>P</u>ly: 	Result		starting at cell E2
 Output Range: New Worksheet Ply: New Workbook 	Result		starting at cell E2
 Output Range: New Worksheet Ply: New Workbook Summary statistics (9) C 	Result	umma	starting at cell E2 ry statistics
 Output Range: New Worksheet Ply: New Workbook Summary statistics (9) C Confidence Level for Mean: 	Result heck to display st	umma	starting at cell E2 ry statistics
 Output Range: New Worksheet Ply: New Workbook Summary statistics (9) C Confidence Level for Mean: Kth Largest: 	Result 95 %	umma	starting at cell E2 ry statistics

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Example: Preparing Descriptive Statistic for Score Data (cont.)

	А	В	С	D	E	F	
1	No.	Score	Grade				
2	1	90	А		Score		The Result
3	2	67	С				
4	3	76	В		Mean	66.26	
5	4	60	С		Standard Error	1.823	
6	5	53	D		Median	66	
7	6	74	В		Mode	59	
8	7	69	С		Standard Deviation	15.25	
9	8	77	В		Sample Variance	232.5	
10	9	57	D		Kurtosis	-0	
11	10	99	Α		Skewness	-0.08	
12	11	59	D		Range	76	
13	12	75	В		Minimum	23	
14	13	51	D		Maximum	99	
15	14	59	D		Sum	4638	
16	15	92	Α		Count	70	
17	16	77	В				
18	17	47	F				
19	18	98	Α				
20	19	59	D				
21	20	76	В				
22	21	61	С				
23	22	58	D				

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You can use conditional formatting so that the cell will be formatted only when certain conditions are met.

- "Set cell text to red if the cell value is less than 50"
- "Set cell fill color to blue and text to white if the cell value is "A""
- (Advance) "Set cell fill color to grey if cell is on odd row"

Steps in Conditional Formatting

- 1. Select cells you want to apply conditional formatting to.
- Go to *Home* tab → *Styles* group → *Conditional Formatting.*
- 3. Select type of formatting you want.
- 4. Fill in threshold values, if needed.

Types of Conditional Formatting

- Highlight certain cells
 - Highlight cells rules Highlight if condition is met.
 - Top/bottom rules (top 10% percentile, for example)
- Highlight cells in group/range
 - Data bar
 - Color scale
 - Icon sets

Highlight Cells Rules

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🛠 Data Bar

Select cells, then select the type of data bar you want

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Example: Highlight score cell with score less than 50.

	А	В	С			Α	В	С
1	No.	Score	Grade		1	No.	Score	Grade
2	1	90	Α	Conditional Format as Cell Insert Delete Format	2	1	90	Α
3	2	67	С	Formatting Table Styles T	3	2	67	С
4	3	76	В		4	3	76	В
5	4	60	С	$\underbrace{Highlight Cells Rules}_{\geq} Greater Than$	5	4	60	С
6	5	53	D		6	5	53	D
7	6	74	В	I I I I I I I I I I I I I I I I I I I	7	6	74	В
8	7	69	С		8	7	69	С
9	8	77	В	Data Bars > Between	9	8	77	В
10	9	57	D		10	9	57	D
11	10	99	А	Color <u>S</u> cales	11	10	99	Α
12	11	59	D		12	11	59	D
13	12	75	В	Icon Sets	13	12	75	В
14	13	51	D		14	13	51	D
15	14	59	D	A Date Occurring	15	14	59	D
16	15	92	Α	_ Elear Rules	16	15	92	Α
17	16	77	В	Manage <u>R</u> ules <u>D</u> uplicate Values	17	16	77	В
18	17	47	F		18	17	47	F
19	18	98	А	More Rules	19	18	98	Α
20	19	59	D		20	19	59	D
21	20	76	В		21	20	76	В
22	21	61	С		22	21	61	С
23	22	58	D		23	22	58	D
24	23	79	В	Less Ihan ? X	24	23	79	В
25	24	66	С	Format cells that are LESS THAN:	25	24	66	С
26	25	61	С	50 With Light Red Fill with Dark Red Text	26	25	61	С
27	26	62	С		27	26	62	С
28	27	61	С	OK Cancel	28	27	61	С
29	28	59	D		29	28	59	D
30	29	82	А		30	29	82	Α

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คณะวิทยาศาสตร์ มหาวิทยาลัยเซียวใหม่