
A5: Spreadsheet Computation II

Important:

Familiarizing oneself with the background material is strongly recommended. In addition, assignment 4 is recommended to complete before assignment 5 **especially if spreadsheet computation is new to you**. Doing the tasks in a computer lab on Thursdays/Fridays is strongly recommended especially if getting ahead feels difficult.

Make sure you submit the correct documents.

Remember to save your data regularly.

Objectives of the Assignment

The assignment deepens the already learned matters in the previous assignments. The assignment is done with MS Excel 2016. After completing the assignment, the student will

- know how to import text data into a spreadsheet
- be familiar with data sorting, conditional formatting and filtering
- know how to create a Pivot table

Tasks and Grading of the Assignment

There are 4 tasks in the assignment. The maximum total points for the assignment are 10 points.

Task 1 TIEY4 Course performance processing (8 p)

Task 2 Creating a Pivot table (2 p)

What needs to be submitted?

Two MS Excel documents (1 per a task), that are named as follows:

A5T1.xlsx

A5T2.xlsx

At First

The course grades discussed in task 1 are not genuine.

The files used in the tasks are in a zip file **A5-pohjatiedostot.zip**. The Zip file can be found on the course material website under the assignment as well. Download it on your computer and extract (extracting files was discussed towards the end of Theme 1 background material).

Task 1 (8p): T3 Course performance processing

Open the extracted file *kurssipisteet.txt* in Excel spreadsheet computation program (the data is separated by \$ key) **Tip 1** and save the file right away as A5T1.xlsx. Then do the exercises (a) – (i).

- (a) The file contains 186 students' imaginary course grades from an IT skills course: student's name, branch of science and degree program are in the first four columns (A-D), the grades for each exercise are in the next nine columns (E-O), passed information security course credit in the column N.

Format the first row the same way as the column title in the picture below (bold font, yellow background, under the title a thick underlining, column width formatting, centered E-N columns and N-column titles in 2 rows.)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Etunimi	Sukunimi	Tiedekunta	Tutkinto-ohjelma	H1	H2	H3	H4	H5	H6	H7	H8	H9	Tietoturva-kurssi
2	Anu	Hokkanen	MED	Bioteknologia	6	6	6	10	5	9	10	4	10	OK
3	Suvi-Elina	Ruippo	MED	Bioteknologia	10	8	10	9	9	10	10	10	10	OK
4	Ville	Widen	MED	Bioteknologia	5	0	5	0	7	0	7	0	5	OK
5	Heini	Hakala	COMS	Englannin kieli	10	9	9	5	10	10	10	9	8	OK
6	Heli	Hautala	COMS	Englannin kieli	10	8	9	8	9	7	5	8	6	PUUTTUU
7	Katriina	Heinonen	COMS	Englannin kieli	9	10	10	9	5	10	10	10	9	OK

- (b) **Adding up the grades.** Make 3 new columns between the columns M and N **Tip2** name the columns as in the picture (vertical text) and add up the points for all assignments (instead of A1-A9 the assignments are marked in Finnish H1-

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Etunimi	Sukunimi	Tiedekunta	Tutkinto-ohjelma	H1	H2	H3	H4	H5	H6	H7	H8	H9	Teema 1	Teema 2	Teema 3	Tietoturva-kurssi
2	Anu	Hokkanen	MED	Bioteknologia	6	6	6	10	5	9	10	4	10	18	24	24	OK
3	Suvi-Elina	Ruippo	MED	Bioteknologia	10	8	10	9	9	10	10	10	10	28	28	30	OK
4	Ville	Widen	MED	Bioteknologia	5	0	5	0	7	0	7	0	5	10	7	12	OK
5	Heini	Hakala	COMS	Englannin kieli	10	9	9	5	10	10	10	9	8	28	25	27	OK
6	Heli	Hautala	COMS	Englannin kieli	10	8	9	8	9	7	5	8	6	27	24	19	PUUTTUU
7	Katriina	Heinonen	COMS	Englannin kieli	9	10	10	9	5	10	10	10	9	29	24	29	OK

H9 in the picture) in the new columns. **Tip3**

- (c) **Conditional formatting.** Use conditional formatting on the cells of the new column the way that the background is red if the total points in the cell are less

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Etunimi	Sukunimi	Tiedekunt	Tutkinto-ohjelma	H1	H2	H3	H4	H5	H6	H7	H8	H9	Teema 1	Teema 2	Teema 3	Tietoturva-kurssi
2	Anu	Hokkanen	MED	Bioteknologia	6	6	6	10	5	9	10	4	10	18	24	24	OK
3	Suvi-Elina	Ruippo	MED	Bioteknologia	10	8	10	9	9	10	10	10	10	28	28	30	OK
4	Ville	Widen	MED	Bioteknologia	5	0	5	0	7	0	7	0	5	10	7	12	OK
5	Heini	Hakala	COMS	Englannin kieli	10	9	9	5	10	10	10	9	8	28	25	27	OK

than 15 points. **Tip4**

- (d) **Creating a Pass/Fail column.** Give the columns R, S, T titles *Pass 1*, *Pass 2* and *Pass 3* (in the picture “Läpi 1...” Use the formula to assign the cells of themes 2 and 3 OK or Fail depending on whether the student passed the theme

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Etunimi	Sukunimi	Tiedekunt	Tutkinto-ohjelma	H1	H2	H3	H4	H5	H6	H7	H8	H9	Teema 1	Teema 2	Teema 3	Tietoturva-kurssi	Läpi 1	Läpi 2	Läpi 3
2	Anu	Hokkanen	MED	Bioteknologia	6	6	6	10	5	9	10	4	10	18	24	24	OK	ok	ok	ok
3	Suvi-Elina	Ruippo	MED	Bioteknologia	10	8	10	9	9	10	10	10	10	28	28	30	OK	ok	ok	ok
4	Ville	Widen	MED	Bioteknologia	5	0	5	0	7	0	7	0	5	10	7	12	OK	hyl	hyl	hyl
5	Heini	Hakala	COMS	Englannin kieli	10	9	9	5	10	10	10	9	8	28	25	27	OK	ok	ok	ok
6	Heli	Hautala	COMS	Englannin kieli	10	8	9	8	9	7	5	8	6	27	24	19	PUUTTUU	ok	ok	ok
7	Katriina	Heinonen	COMS	Englannin kieli	9	10	10	9	5	10	10	10	9	29	24	29	OK	ok	ok	ok
8	Riikka	Mustonen	COMS	Englannin kieli	10	10	10	10	9	9	9	10	3	30	28	22	OK	ok	ok	ok
9	Krista	Härkönen	COMS	Englannin kieli	8	10	10	10	9	10	9	9	10	28	29	28	OK	ok	ok	ok
10	Maarit	Härmä	COMS	Englannin kieli	10	10	10	10	10	10	10	10	9	30	30	29	OK	ok	ok	ok
11	Anni	Kari	COMS	Englannin kieli	10	9	5	10	10	10	10	9	7	24	30	26	OK	ok	ok	ok
12	Henrik	Kartesalo	COMS	Englannin kieli	9	10	9	9	5	5	10	10	10	28	19	30	PUUTTUU	ok	ok	ok
13	Henrik	Kinnunen	COMS	Englannin kieli	9	5	9	10	0	3	3	5	8	23	13	16	OK	ok	hyl	ok
14	Ilari	Kulmala	COMS	Englannin kieli	6	8	9	8	9	9	6	8	0	23	26	14	OK	ok	ok	hyl

(15 points or more) **Tip5**

- (e) **Information security course and the conditional formatting (coloring) of pass/fail data.** Fix the values in column R to include the information security course pass/fail data as well. In other words, theme 1 gets the value “fail” (in the picture “hyl”) if the information security course is missing. **Tip6** Visually distinguish the fail and pass cells according to the example below (red and green).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Etunimi	Sukunimi	Tiedekunt	Tutkinto-ohjelma	H1	H2	H3	H4	H5	H6	H7	H8	H9	Teema 1	Teema 2	Teema 3	Tietoturva-kurssi	Läpi 1	Läpi 2	Läpi 3
2	Anu	Hokkanen	MED	Bioteknologia	6	6	6	10	5	9	10	4	10	18	24	24	OK	ok	ok	ok
3	Suvi-Elina	Ruippo	MED	Bioteknologia	10	8	10	9	9	10	10	10	10	28	28	30	OK	ok	ok	ok
4	Ville	Widen	MED	Bioteknologia	5	0	5	0	7	0	7	0	5	10	7	12	OK	hyl	hyl	hyl
5	Heini	Hakala	COMS	Englannin kieli	10	9	9	5	10	10	10	9	8	28	25	27	OK	ok	ok	ok
6	Heli	Hautala	COMS	Englannin kieli	10	8	9	8	9	7	5	8	6	27	24	19	PUUTTUU	hyl	ok	ok
7	Katriina	Heinonen	COMS	Englannin kieli	9	10	10	9	5	10	10	10	9	29	24	29	OK	ok	ok	ok

- (f) **Sorting.** Sort students by sorting thematically into passed and failed (first passed then failed) and finally within these categories sorted in an ascending alphabetical order by last name and first name. **Tip7** This results in the first being the ones who passed in all themes in an alphabetical order and the last being the

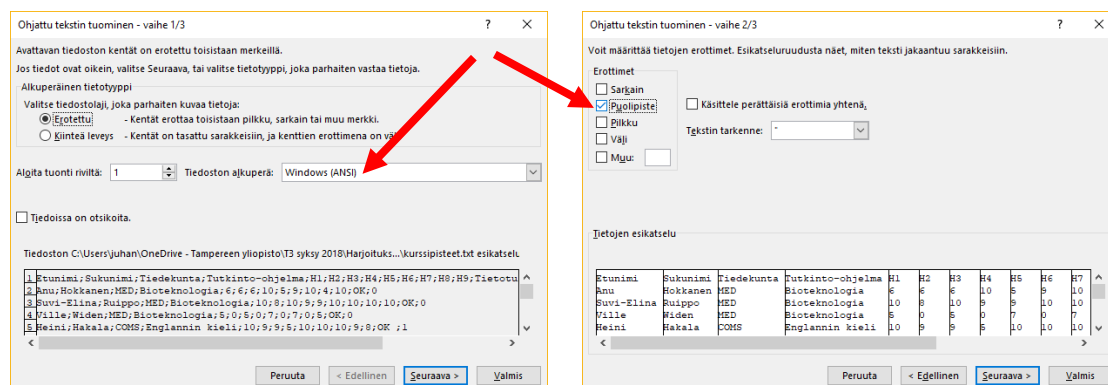
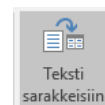
ones who failed in all themes in an alphabetical order. In between are the ones who failed in some of the themes.

- (g) **Copying of a table to another worksheet.** Name the first worksheet (in other words, the first “tab”) according to your whereabouts at the time of performing the task (*for example, Windows 10 – computer lab 1084*). Create another worksheet in the workbook and name it *Filter test*. Copy the entire table from the first worksheet to the second worksheet. **Tip 8** (leave the first worksheet’s table the way it was after applying the first part of the task.)
- (h) **Auto-filtering experiment.** Activate auto-filtering for the new worksheet. Experiment with the filtering how many economic science students got exactly 10 points of the exercise A5 and who they were. **Tip 9**
- (i) Create a third worksheet in the workbook and name it *Filtered Save*. Copy the previously filtered information (economic science students who scored 10 points of Ex5) to the third worksheet. Return to the *Filter test*-worksheet and change the filtering so that you can see all the students in the Department of Communications (COMS) (and only them).

Task 1 solution: Document A5T1.xlsx, containing 3 worksheets (tabs).

Tip 1. The text file *kurssipisteet.txt* can be opened in Excel in the following way: First, open the spreadsheet computation program. Then open the students’ course grade file “*kurssipisteet.txt*” from the menu **File/ Open** in your spreadsheet program. To ensure that the *.txt-file will show in the open file box the file type needs to be set as **All files (*.*)**. See the pictures on the next page.

Alternatively, you can copy (copy, ctrl + c) and paste (paste, ctrl + v) the text in an opened worksheet and use the data -tab **Text to columns** -tool. The next phases are described below.



In order to interpret the Scandinavian characters properly, the best choice is to select the universal character (UTF-8): have a look at the characters in the preview box– do they look alright? Data fields are separated with characters (*Delimited*) and the separating character is a *semicolon*. Here, too, preview provides a hint.

Tip 2. Activate column N and select **Home/Cells/Insert/Column**. Repeat 3 times.

Tip 3. Calculate the value for the cell N2 as the value is the sum of E2:G2. Use the sum function and relative cell references according to the pattern in the previous task and copy the N2 formula to the other cells in the column N3-N187. The same way, add up the values for themes 2 and 3 (columns O and P).

Tip 4. Conditional formatting can be done in the menu **Home/Styles/Conditional Formatting/New Rule**. “Format only cells that contain” rule is suitable for this task. Select suitable values in the fields and select the background color using **Format**- button. Copy the style of N2 to the other cells in the

column N3-N187 and O2-P187 (if you selected all cells before defining the formatting the style is defined for the entire column.)

Alternatively, you can exploit ready-rules in the menu **Home/Styles/Conditional Formatting/...**

Tip 5. The value of the cells is **PASS/ FAIL** according to the course rules (at least 15 total points per theme). This can be solved by IF function. With the formula you say:

- **If** (total points >= 15, then "OK", otherwise "FAIL")

This needs to be typed in the correct form of IF -sentence.

Tip 6. Here you have to use either nested IF statements or another IF statement and a logical operator AND. In the first case, you would replace the "then" part of the IF statement with an IF statement when you check whether the student has completed the information security course as well.

Tip 7. Data / Sort&Filter / Sort). Select to sort first by the value *Pass 1* (in column R) in a descending order (because we want the OK value before the fail/hyl value). Then, add a second and third level with the **Add level**-button. Set it to sort by the values in the *Pass 2* and *Pass 3* columns (columns S and T). Finally, add sorting levels according to the last name (column B) and first name (column A) in an ascending order.

Tip 8. Activate the entire area of the table A1-Q187 in the first worksheet. Copy it to the clipboard (**ctrl+c / ⌘+c**) and paste it (**ctrl+v / ⌘+v**) on the first cell A1 in the other worksheet.

Tip 9. Select **Data/Sort &Filter/Filter** to get auto-filter. You can then directly select from the column title cells' dropdown lists the data you wish to filter in your table. Try it! Filtering can be canceled by selecting the option in the list **Select All**.

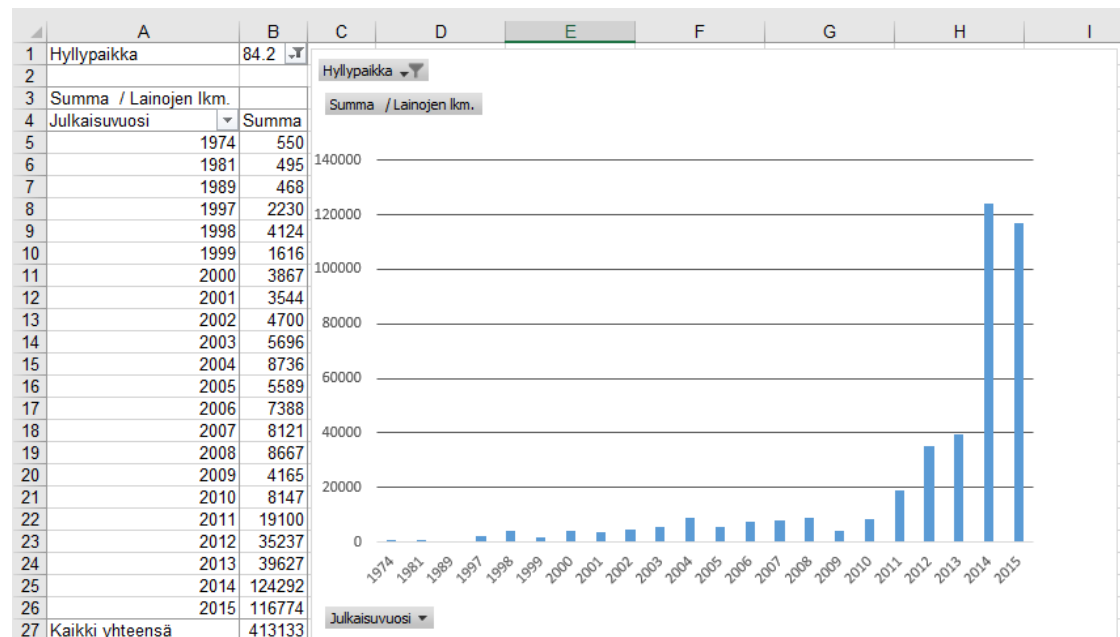
Task 2 (2p): Creating a Pivot table

Open the file *PIKI_lainatuimmat_2015.xls* you extracted in Excel spreadsheet program and save it right away as *A5T2.xlsx*.

	A	B	C	D	E	F
	Hyllypaikka	Tekijä	Nimeke	ISBN/ISSN	Julkaisu vuosi	Lainojen lkm.
1	84.2 D	Jokinen, Seppo, kirjoittaja.	Kuolevaksi julistettu	978-952-289-239-3	2015	3845
2	84.2	Nopola, Sinikka.	Risto Rappaa ja viimeinen tottö	978-951-31-3899-8	2007	2773
3	85.22	Havukainen, Aino.	Tatun ja Patun kummat keksinnöt kautta aikojen	978-951-1-27544-2	2013	2762
4	84.2 H	Nopola, Sinikka, kirjoittaja.	Risto Rappaa ja kuuluisa Kamilla	978-951-31-4998-7	2009	2690
5	84.2	Jokinen, Seppo.	Mustat sydämet	978-952-289-136-5	2014	2534
6	84.2	Nopola, Sinikka.	Risto Rappaa ja villi kone	978-951-31-3732-8	2006	2516
7	85.22	Havukainen, Aino.	Tatun ja Patun avaruusseikkailu	978-951-1-25460-7	2011	2478
8	84.2 H	Nopola, Sinikka.	Risto Rappaa ja Sevillan saitturi	978-951-31-7997-7	2014	2470
9	84.2 H	Nopola, Sinikka, kirjoittaja.	Risto Rappaa ja kaksisoisento	978-951-31-7348-7	2013	2439
10	84.2	Nopola, Sinikka, kirjoittaja.	Risto Rappaa ja komea Kullervo	978-951-31-2550-9	2002	2438
11	85.12 LA	Nopola, Sinikka, kirjoittaja.	Risto Rappaa saa isän	978-951-31-5147-8	2011	2430
12	85.22	Havukainen, Aino.	Tatu ja Patu supersankareina	978-951-1-24541-4	2010	2416
13	84.2	Nopola, Sinikka, kirjoittaja.	Risto Rappaa ja sitkea finni	951-31-2772-9	2003	2405
14	84.2	Havukainen, Aino.	Tatu ja Patu päiväkodissa	978-951-1-19658-7	2004	2396
15	85.22 KU	Havukainen, Aino.	Tatu ja Patu työn touhussa	978-951-1-21314-7	2006	2382
16	84.2	Nopola, Sinikka, kirjoittaja.	Risto Rappaa ja Nuudelipää	978-951-31-1478-7	2000	2372
17	84.2	Nopola, Sinikka, kirjoittaja.	Risto Rappaa ja kauhea makkara	951-31-1145-8	1998	2346
18	84.2	Nopola, Sinikka, kirjoittaja.	Risto Rappaa ja Hilpun Tili	951-31-3116-5	2004	2285
19	84.2	Nopola, Sinikka, kirjoittaja.	Risto Rappaa ja nukkavieru Nelli	978-951-31-6874-2	2012	2250
20	84.2	Härkönen, Anna-Leena.	Kaikki oikein	978-951-1-27316-5	2014	2237
21	84.2	Nopola, Sinikka, kirjoittaja.	Hetki lyö, Risto Rappaa	978-951-31-0995-0	1997	2230
22	85.22	Havukainen, Aino.	Tatun ja Patun Suomi	978-951-1-21915-6	2007	2218
23	84.2	Jungstedt, Mari, kirjoittaja.	Viimeinen näytös	978-951-1-26964-9	2015	2217

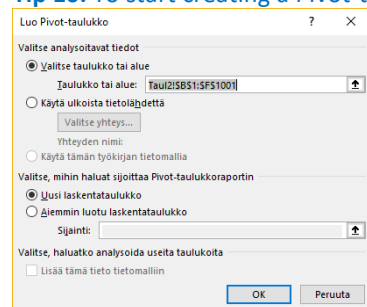
Create a Pivot table and a diagram similar to the picture. Give them their own tab using the material in the thousand rows containing workbook. The Pivot table and diagram should present the cumulative volume of borrowed Finnish fiction (class 84.2) by

publication year. Name the tab *Pivot table*. **Tip 10**

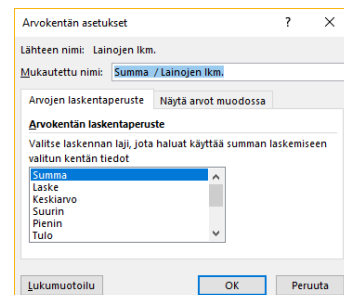


Task 2 solution: Document A5T2.xlsx, containing the Pivot-table you created in its own tab.

Tip 10. To start creating a Pivot-table select **Insert/Pivot-table**. Select the entire table of borrowing data (picture on the left) for analysis. Next select (drag):



- in a row: publication year (julkaisu vuosi)
 - Filter: Shelf location (hyllypaikka)
 - Value: number of borrowings (lainojen lkm)
- Then filter the shelf location as 84.2 and make sure the basis for



calculation is the sum (the picture on the right; click the small triangle next to the field name to get the value field settings). The sum-option is often the default value. When you're satisfied with the table, create a simple diagram by selecting **Insert/Recommended Charts** and a proper suggestion. The color choices or visually don't matter here as much. The main thing is creating a diagram.