USING MICROSOFT EXCEL IN CREATING SOFTWARE FOR LIBRARIES

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ABSTRACT

Nowadays, software applications are entwined in every area of life. It is almost inevitable. In addition to helping businesses, software's also facilitates over jobs and services, such as: in libraries. These software's are created through high programming languages, namely Java, C#, Python etc. Nonetheless, we can also create them while using applications from the Microsoft Office Package. One of these applications is Microsoft Excel. It has all the tools we need. This software application is created through Microsoft Excel for the sole reason that it is familiar to the majority of users, one of whom are librarians.

The application comprises five pages: Content, Book Fund, Remaining Book Fund, Readers and Realization. The link between these pages will be done by numerous different functions, such as: if, sumif, sum, vlookup, etc.

Key words: Software, Microsoft Excel, Library, Books, Readers

INTRODUCTION

It is hard to think of any business related, or non-business related activity that is not digitized. This has been made possible by the rapid development of information technology in recent years. This was mostly due to the diligence of the youth, which benefited from programming languages. But, not everyone can code.

However, there are also other ways to do it, thankfully. This is enabled by the Microsoft Office Software package, more precisely- the Microsoft Excel software known to others as spreadsheet calculation[1]. This means that the microsoft excel program is such that, with very little in-depth knowledge of programming, software or applications can be developed, in which we can lodge the

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[1] Torben L. F, "Microsoft Office Excel 2007", BookBoon, London UK, 2010, pg. 24

library book fund, find the remaining book fund by placement location, according to the readers by indicating the date of receipt and return, as well as the financial performance according to the annual membership of the readers.

The book fund

For the execution of this page[2] no formula is needed. Inside the cells, you list only the relevant data: ordinal number, author's name, surname, book title, total book fund, publisher, the placement shelf, the filing date. We can see these in the first table.

	A	B	C	D	E	F	G	H
1				Library				
2	Nr	Author's name	Author's last name	Book title	The book fund in total	Publishing company	Shelf	Archiving date
3	1	Ismajl	Kadare	Buzqeshje mbi botë	12	Rozafa	1	12.10.2005
4	2	Ismajl	Kadare	Gjeneral i ushtrisë së vdekur	25	Rozafa	1	
5	3	Ismajl	Kadare	Motive me diell	50	Dugagjini	2	
6	4	Ismajl	Kadare	Kështjella	42	Teuta	2	
7	5	Ismajl	Kadare	Pallati i ëndrrave	6	Rilindja	3	
8	6	Ismajl	Kadare	Dialog me Alain Boskuet	9	Gjon Buzuku	3	
9	7	Ismajl	Kadare	Legjenda e legjendave	15	Naim Frashëri	3	
10	8	Ismajl	Kadare	Komisioni i festes	14	Sfinga	3	
11	9	Ismajl	Kadare	Pashallëqet e mëdha	23	Faik Konica	4	
12	10	Ismajl	Konica	Vepra të zgjedhura	3	Sejko	4	
13	11	Ismajl	Konica	Nën hijen e hurmave	54	Rilindja	4	
14	12	Ismajl	Dervishi	Pirgu i lartë	24	Faik Konica	5	
15	13	Ismajl	Dervishi	Skedaret	9	Sejko	5	
16	14	Ismajl	Dervishi	Herezia e Dervish Mallutës	8	Teuta	5	
17	15	Ismajl	Duraku	Shtrojera	40	Rozafa	6	
18	16	Ismajl	Duraku	Kopshti i pleqërisë	21	Rozafa	6	
19	17	Ismajl	Duraku	Kobi	22	Dugagjini	7	
20	18	Ismajl	Duraku	I treturi	30	Dugagjini	7	
21	19	Ismajl	Duraku	Murana	12	Naim Frashëri	8	
22	20	Ismajl	Duraku	Dhengrëdhënësit	1	Faik Konica	7	
23	21	Llazi	Tona	Automobili dhe qarku rrugor	1	LMG	5	

Table 1: The book fund sheet

From the first table, we can see that for the purpose of making it simpler to find the books, filtering was applied to the title line[3], from which we find the filtered books either by author's name, or by surname, or by title, publisher, date and shelf placement.

The remaining book fund

There are many formulas used, in order to create the link to the table from the book fund page. We will observe and evaluate these from the remaining book fund page (table 2).

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[2] Shmalz, M. "Integrating Excel and Access", O' Reilly Media. Inc, Pennsylvania Usa, 2005, pg. 82
[3] Frye, C. D. "Microsoft Excel 2010: Step by Step", Microsoft Press, Redmond Washington Usa, 2010, pg 97

	A	B	C	D	E	F	G	H	I
1				Library					
2	Nr	Author's name	Author's last name	Book title	The book fund- in total	blishing compa	Rafti	The remaining book fund	The books still not returned
3	1	Ismajl	Kadare	Buzqeshje mbi botë	12	Rozafa	1	11	1
4	2	Ismajl	Kadare	Gjeneral i ushtrisë së vdekur	25	Rozafa	1	25	
5	3	Ismajl	Kadare	Motive me diell	50	Dugagjini	2	50	
6	4	Ismajl	Kadare	Kështjella	42	Teuta	2	42	
7	5	Ismajl	Kadare	Pallati i ëndrrave	6	Rilindja	3	5	1
8	6	Ismajl	Kadare	Dialog me Alain Boskuet	9	Gjon Buzuku	3	9	
9	7	Ismajl	Kadare	Legjenda e legjendave	15	Naim Frashëri	3	15	
10	8	Ismajl	Kadare	Komisioni i festes	14	Sfinga	3	14	
11	9	Ismajl	Kadare	Pashallëqet e mëdha	23	Faik Konica	4	23	
12	10	Ismajl	Konica	Vepra të zgjedhura	3	Sejko	4	3	
13	11	Ismajl	Konica	Nën hijen e hurmave	54	Rilindja	4	54	
14	12	Ismajl	Dervishi	Pirgu i lartë	24	Faik Konica	5	24	
15	13	Ismajl	Dervishi	Skedaret	9	Sejko	5	9	
16	14	Ismajl	Dervishi	Herezia e Dervish Mallutës	8	Teuta	5	8	
17	15	Ismajl	Duraku	Shtrojera	40	Rozafa	6	39	1
18	16	Ismajl	Duraku	Kopshti i pleqërisë	21	Rozafa	6	21	
19	17	Ismajl	Duraku	Kobi	22	Dugagjini	7	22	
20	18	Ismajl	Duraku	I treturi	30	Dugagjini	7	30	
21	19	Ismajl	Duraku	Murana	12	Naim Frashëri	8	12	
22	20	Ismajl	Duraku	Dhengrëdhënësit	1	Faik Konica	7	1	
23	21	Llazi	Tona	Automobili dhe qarku rrugor	1	LMG	5	1	

Table 2: The remaining book fund sheet

In the A3[4] cell (number) of the second table, which takes the data from A3 cell of the first table, is used the following formula:

$$= IF \ (\text{'The book fund'! A3} = 0, " ", \text{'The book fund'! A3}) ... (1)$$

The above formula is created through the IF function, whereas the explanation of the formula is as follows: if cell A3 on 'The Book Fund page' is empty ('The Book Fund'! A3 = 0), then cell A3 of the remaining book fund page will be empty (""), otherwise the cell contents will be displayed A3 of the book fund page ('The Book Fund'! A3).

In the B3 cell (the author's name), of the second table, which gathers its data from the B3 (the author's name) of the first table, is used the following formula:

$$= IF \ (\text{A3} = " ", " ", \text{'The Book Fund'!B3}) ... (2)$$

The explanation for (2) formula is as follows: if cell A3 on the remaining book fund page is empty (A3 = ""), then cell (B3) of the remaining book fund page will be empty (" "), otherwise the contents of cell B3 of the book fund page ('Book Fund'! B3) will be displayed.

In the C3 cell (Last name of the author) of the second table, which takes all of its data from the C3 (Last name of the author) of the first table, is used the following formula:

$$= IF \ (\text{A3} = " ", " ", \text{'The book fund'!C3}) ... (3)$$

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[4] Akbar, A "Function and Formula Excel 2016", Kanzul Ilmi Press, London UK, 2016, pg. 112

The explanation of formula (3) is the following: if cell A3 on the remaining book fund page is empty (A3 = ""), then this cell (C3) on the remaining book fund site will be empty (" "), otherwise the content of cell C3 of the book fund site ('The Book Fund'! C3) will be displayed.

In cell D3 (book title) of table 2, which receives the data from cell D3 (book title) of table 1, the formula is as follows:

$$= IF (A3 =" ", " ", 'The\ book\ fund'!D3) ... (4)$$

The explanation of formula (4) is the one that follows: if cell A3 on the remaining book fund page is empty (A3 = ""), then cell (D3) of the remaining book fund site will be empty (" "), otherwise the content of cell D3 of the book fund site ('The Book Fund'! D3) will be displayed.

In cell E3 (total book fund) of table 2, which receives data from cell E3 (total book fund) of table 1, the formula is as follows:

$$=IF (A3 = " ", " ", 'The\ book\ fund'!E3) ... (5)$$

The explanation of formula (5) is: if cell A3 on the remaining book fund page is empty (A3 = ""), then cell (E3) of the remaining book fund site will be empty (" "), otherwise the E3 cell content of the book fund page ('Book Fund'! E3) will be displayed.

For cells F3 and G3 of table 2, same as for formulas (1), (2), (3), (4), (5) are used the following :

$$= IF (A3 = " ", " ", 'The\ book\ fund'!F3) ... (6)$$

$$= IF (A3 = " ", " ", 'The\ book\ fund'!G3) ... (7)$$

As it happens, even the explanation of the 6 and 7 formulas, is the same as the explanations given above for the cases of formulas 1, 2, 3, 4 and 5.

The H3 cell of the second table is much more complex (nevertheless still through the IF function) in the calculation, because both - absolute references (\$ column\$ row)[5] and sumif[6] function must be used. This cell enables us to find the remaining book fund.

$$= IF('The\ book\ fund'!A3 = 0, " ", E3\text{-}SUMIF(Readers!\$A\$2:\$A\$5000, A3, Readers!\$I\$2:\$I\$5000) + SUMIF(Readers!\$A\$2:\$A\$5000, A3,Readers!\$L\$2:\$L\$5000)) ...(8)$$

The explanation of formula 8 is as follows: if cell A3 of the book fund page is empty ('Book Fund'! A3 = 0), then cell H3 will be empty (""), otherwise in cell H3 will be placed the difference between cell E3 (total book fund) and the conditional amount for books obtained on the Readers page

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[5] Harvey, G "Microsoft Excel 2019 All In One", Wiley & Sons, Inc New Jersey, 2019, pg. 212

[6] Zapawa, T "Excel Advanced Report Development", Wiley Publishing, Inc Indianapolis, 2005, pg. 219

(SUMIF (Readers! $ A $ 2: $ A $ 5000, A3, Readers! $ I $ 2: $ I $ 5000)) and the conditional amount for books returned to the Readers page (SUMIF (Readers! $ A $ 2: $ A $ 5000, A3, Readers! $ L $ 2: $ L $ 5000)).

Cell I3 of the second table enables us to find the books that have not been returned (their number). We find this by formula (9):

$$=IF (E3 = H3, " ", E3 - H3) ... (9)$$

According to formula (9), if cells E3 (total book fund) and H3 (remaining book fund) are equal, then cell I3 will be empty (meaning that all received books are returned) otherwise in cell I3 there will be the difference from the deduction of the book fund (E3) and the residual book fund (H3).

The readers

This sheet, just like the others, has an important role to play. Its connection to the other sheets is fulfilled in the quality of the reader's side. The title of the third table has the following column's titles: in cell A1 is the ordinal number of the book (or even the code), in cells B1 and C1 the author's name -namely the author's last name, in D1 the title of the book, in cells F1 and G1 the name of the reader, then by date order of book receipt, amount received, auxiliary syntax, date of book return, return and finally cell N1 payment per member. We see all this in Table 3.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Code (Nr)	Author's name	Author's last name	Book title		Reader's name	Reader's last name	Withdrawal date	Withdrawal	Auxiliary syntax	Return date	Return		Member's fee
2	1	Ismajl	Kadare	Buzqeshje mbi botë		Teuta	Pylla	04/12/2005	1	1	04/07/2005			€3.00
3	5	Ismajl	Kadare	Pallati i ëndrrave		Ylli	Hana	25/2/0205	1		04/10/2005	1		€3.00
4	5	Ismajl	Kadare	Pallati i ëndrrave		Zana	Vula	03/03/2005	1	5	23/4/2005			€2.00
5	16	Ismajl	Duraku	Kopshti i pleqërisë		Hana	Bicurri	02/04/2005	1			1		€3.00
6	20	Ismajl	Duraku	Dhengrëdhënësit						20				€3.00
7	21	Llazi	Tona	Automobili dhe qarku rrugor		Thellenza	Kuqi	26/9/2005	1			1		€10.00
8										0				

Table 3: Reader sheet

In the above table, we see that the columns E and M are incomplete. They are the separation between the part of the books (columns A to D), the part of receiving and returning them (columns F to L) and the part of the book's payments (column N).

The formulas used in the table above will be presented and explained below. The B2 cell of the page enables the reader to transfer the data to the following formula:

$$= IF (A2 = 0, " ", VLOOKUP (A2, Stamp, 2, FALSE)) ... (10)$$

Here we see that the very important excel function, vlookup, is used to transfer data from one table to another[7]. The explanation of formula (10) is as follows: if the A2 cell of the reader page is empty or zero (A2 = 0), then the B2 cell of the reader page will also be empty (""), if not empty but if there is a number listed there (code), then the data which is in column 2 of cell A2 of the stamp table will be transferred (VLOOKUP (A2, stamp, 2, FALSE)).

The C2 cell of the page enables the reader to transfer the data to the following formula (formula 11):

$$= IF (A2 = 0, " ", VLOOKUP (A2, Stamp, 3, FALSE)) ... (11)$$

Explanation of formula (11): if the A2 cell of the reader site is empty or zero (A2 = 0), then the C2 cell of the reader site will also be empty (""), if not empty but if there is a number listed there (code), then the data which is in column 3 according to cell A2 of the stamp table (VLOOKUP (A2, stamp, 3, FALSE)) will be transferred.

The D2 cell of the page reader (or book title) enables us to transfer data there according to the following formula (formula 12):

$$= IF (A2 = 0, " ", VLOOKUP (A2, Stamp, 4, FALSE)) ... (12)$$

The explanation of formula (12) is this: if the A2 cell of the reader site is empty or zero (A2 = 0), then the D2 cell of the reader site will also be empty (""), if not empty, but if there is a number listed there (code), then the data which is in column 4 according to cell A2 of the stamp table (VLOOKUP (A2, stamp, 4, FALSE)) will be transferred.

In column F of the page the reader puts the names of the readers, and so on in column G, the surnames of the readers, in column H, the dates of receipt of the books, in column K, the dates of return of the books, in the column L, whether the books are returned, or not (1 if returned or empty if not returned), and column I indicates the number 1 indicating that the book was read. The same can be said for column N where membership fees are listed. All of these columns are formula-free.

In column J, where its title in cell J1 is the auxiliary syntax, we can find which of the books has not been returned. This is based on the ordinal number of the book (or code). This is provided by formula (13):

$$= IF (L2 = 1, " ", A2) ... (13)$$

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[7] Alexander, M & Walkenbach, J "Microsoft Excel Dashboards & Reports", Wiley, New Jersey, 2013, pg. 284

According to formula (13) we see that if cell L2 (in the book return column, L) is number 1, then the auxiliary syntax cell is empty ("") indicating that the book is returned, otherwise the book is not returned and in column J of the auxiliary syntax the column number A (in this case A2) is set.

Realization

This sheet is about the personal income of the library staff, and according to table 4 their number may change as needed, as it does not affect the formulas created at all. The headings of this table contain the ordinal number of the employee (column A), the name (column B) and the surname (column C) of the employee, the position of the employee (column D), the number of points by position (column E), the fund of the employee. Pensions (column F), value added tax (column G), total tax deductions (column H) and net income (column I).

	A	B	C	D	E	F	G	H	I
1						Personal income			
2	Nr	Name	Last name	Job description	Points	Pension fund	Tvsh	Tax	Neto income
3	1	N	N	Director	500	€22.50	€33.75		€56.25	€168.75
4	2	N	N	Librarian	350	€15.75	€23.63		€39.38	€118.13
5	3	N	N	Librarian	350	€15.75	€23.63		€39.38	€118.13
6	4	N	N	Household	200	€9.00	€13.50		€22.50	€67.50
7	5	N	N	Cleaner	150	€6.75	€10.13		€16.88	€50.63
8		in total			1550	€69.75	€104.63		€174.38	€523.13
9									
10		Winnings in total from readers			€24.00		Bilance	Filled in by the tax administration	€499.13
11									
12		within a month, 100 books are anticipated to be read			100				
13		so far, have been read			8				
14		Percentage of realisation			8.00%				
15									
16				Value of a point	€0.45				
17				Pension fund	10%				
18				T.v.sh.	15%				

Table 4: Realization sheet

Before we start with the different calculations according to the created formulas , it should be noted that some data where references are made, such as, prediction of number of readers per month (cell F12), value of point (E16), value of pension fund (E17) as well as value added tax (E18), are values that can be changed as needed. Only in cell F14 is the percentage realization calculated as the ratio of books read (F13) to books expected to be read (F12) (= F13 / F12 * 100%).

Columns A to E do not have formulas as they only contain data (number, name, surname, job and number of points), while in cell F3, we calculate the pension fund using the following formula (14):

$$= E3 * \$E\$16 * \$E\$17 ... (14)$$

Formula (14) shows how to obtain the value in cell F3: The value of cell E3 (number of points) is multiplied by the value of the points (absolute reference in cell E16, thus $ E $ 16) and the percentage of the pension fund (absolute reference in cell E17, i.e. $ E $ 17).

In cell G3, where we will calculate value added tax or VAT, we use formula (15) which can be seen below:

$$= E3 * \$E\$16 * \$E\$18 \quad ... (15)$$

Formula (15) shows how to obtain the value in cell G3: The value of cell E3 (number of points) is multiplied by the value of the points (absolute reference to cell E16, thus $ E $ 16) and the percentage of value added tax (reference absolute in cell E18, i.e. $ E $ 18).

Whereas in cell H3, the sum of the contents of cells F3 and G3 (= F3 + G3) is set. Net income for an employee placed in column I is calculated according to formula (16), which is listed below:
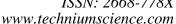$$= E3 * \$E\$16 - H3 \quad ... (16)$$

According to formula (16), we note that, the net income is calculated such that the output of the number of points (column E) with the value of the point ($ E $ 16), is subtracted from the sum of the stops by column H.

Next, in cells E8 (= SUM (E3: E7)), F8 (= SUM (F3: F7)), G8 (= SUM (G3: G7)), H8 (= SUM (H3: H7)) and I8 (= SUM (I3: I7)) there are formulas given, which are based on which we calculate the sum of data from the corresponding columns.

In table 4, in cell E10 we see the monetary value of € 24 which is the sum of the revenues generated by the readers. This amount is carried to cell E10 by the N column of the Readers page (= Readers! N20001), where payment calculations from the N column go to cell number 20001.

In cell I10 is given the value (sum), which must be filled by the institution within which the library operates, if reader revenue does not cover it. We can see this through the formula (17):

$$= IF (E10>I8, " ", I8 - E10) \quad ... (17)$$

The above formula shows that we see that if the revenue from reader fees (E10) is greater than the sum of the net income of all library staff (E10> I8), then cell I10 should remain empty, otherwise that income must be supplemented by the concerned institution.

CONCLUSION

From what is shown here, we can freely say that Microsoft Excel is not just a spreadsheet program but much more. As we saw from formulas 1 through 17, this program has the tools and functions needed to create databases that can be used by any business or service activity for their purposes. Many of the functions used here to create a database for a library (such as if, sum, sumif, vlookup, etc.) are also used in other programming languages such as Java, C #, C, C ++, etc. We saw that as with software developed through other programming languages, the data here are transferred between different cells through the functions used above, different tables, and different sheets, which enables a library to maintain all data about readers and its entries through this software.

Its importance lies in the fact that Excel is a program well known to most of those who use the computer a little and have a job. Anyone can download this software from this computer.

OUTCOME

Today it is impossible to think that there is any commercial, manufacturing or service activity that does not intend to digitize its business. One of the highest forms of digitalization is the creation of different software's in order to make the operation more efficient. Given that high-level preparation is required to create software, there are other ways to implement these software's. Therefore, with a little creativity, anyone can use Microsoft Excel software and create their own database or software for their operations through their tools. Even if software development is difficult, they can implement what they may find readily available in various literatures or what can be found online as open source software.

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