

Excel Tables composition with JavaScript and HTML

Luka Čabarkapa

Department of Applied Computer Science
University of Montenegro
81000 Podgorica, Montenegro
lukacabarkapa@hotmail.com

Abstract—This paper provides an overview and examples of exporting HTML tables to Excel using JavaScript. The paper will show examples of exporting as well as brief introduction about the tools themselves. In addition, the given code will be commented.

Keywords-JavaScript; HTML; Excel; CSS

I. INTRODUCTION

Excel as a program it has long been known to the information society as well as to people who deal with entering and sorting data in tables, all with the help of Excel programs. With the help of tables, it is best to display numerical data on web pages, which is one of the methods. If we want the user to download one of the HTML tables, we have to convert it to a file. Exporting data to Excel is very useful in the data list for almost every web application. The export feature helps to download the list of data as a file format for offline use. The Excel format as a product is ideal for exporting data to a file. The server-side method for exporting data is mainly used to execute using PHP. But if you want the client solution of table data to be exported to excel, this can be easily done by using JavaScript. Using JavaScript, HTML table data can be easily exported without refreshing the page. The JavaScript export function can be used in a member list, product list, or other lists to download a list of data in an excel file format. JavaScript is a full-fledged dynamic programming language. When applied to an HTML document, it can provide dynamic interactivity to websites. JavaScript is the most widely used language in the world. Web browsers receive HTML documents from a web server or local storage and generate them into multimedia web pages. HTML semantically describes the structure of a web page and originally includes indications for the appearance of the document.

II. EXCEL

Microsoft Excel is a useful and powerful program for data analysis and documentation. It is a spreadsheet program that contains multiple columns and rows [1]. What is a cell? The cell consists of each intersection of a row and a column. Each cell can contain a group of data or a part of the data. By organizing the information in this way, you can easily find data and automatically download it from the data change [1]. For easier

analysis and management of a group of data, it is necessary to group them into an Excel spreadsheet (formerly known as an Excel list). There are three ways provided by Excel where you can sort the data in a spreadsheet, so that you can use it as a database with worksheet formulas:

- Simple tables or “Gray Cell” - they were used since Excel 2.0
- Excel tables were introduced in Excel 2007.
- PivotTables with a Tabular Report Layout, introduced in Excel 2010.

Pivot tables are one of Excel's most powerful features. A pivot table allows you to extract the significance from a significantly large part of detailed data [2]. Pivot Tables can quickly provide an answer to many important business questions. The pivot table is a summary report made from using data from the database. When creating a Pivot table, we cannot have empty cells and each column needs to have a name. Once the table is created, it is easy to change or modify the table by adding or removing dimensions.

	C8		<i>fx</i>	10253
	A	B	C	D
1	Country	Order Date	Order ID	Profit
2	Montenegr	10.7.2015	10247	3,545
3	USA	5.3.2018	10248	7,473
4	Serbia	15.10.2019	10249	2,300
5	Croatia	7.7.2005	10250	3,750
6	Slovenia	22.9.2013	10251	6,400
7	Italy	18.4.2015	10252	4,375
8	Denmark	2.3.2020	10253	5,350
9	Germany	17.8.2019	10254	10,275
10	China	23.12.2019	10255	12,353
11	Total			55,821

Figure 1. Pivot Table

A Pivot Table is used to summarize, sort, reorganize, group, count, total or average data stored in a table. It allows us to

transform columns into rows and rows into columns. It allows grouping by any field (column), and using advanced calculations on them.

III. HTML

Hypertext Markup Language (HTML) is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript. HTML is awesome. It helps you to build the main structure of a website. It's the main part of a website. Basically, everything we see in a website from the front-end is built with HTML. Web browsers read HTML giving the user a visual representation of a given page, but do not show them the HTML code and scripts used if any. With the advancement of web browsers and technology it is possible for the user to see the HTML code and scripts that are executed. This can be done by clicking on the right side of a given page and then on the "View page Source" option. We can even create amazing pieces of stuff like form, table, lists, and much more using just HTML. HTML can embed programs written in a scripting language such as JavaScript, which affects the behavior and content of web pages. It is possible to export Excel Worksheet as HTML. We can do it like in the example shown down below:

1. In Excel, navigate to File > Save As.
2. In the Save as type list, select *.htm, *.html.

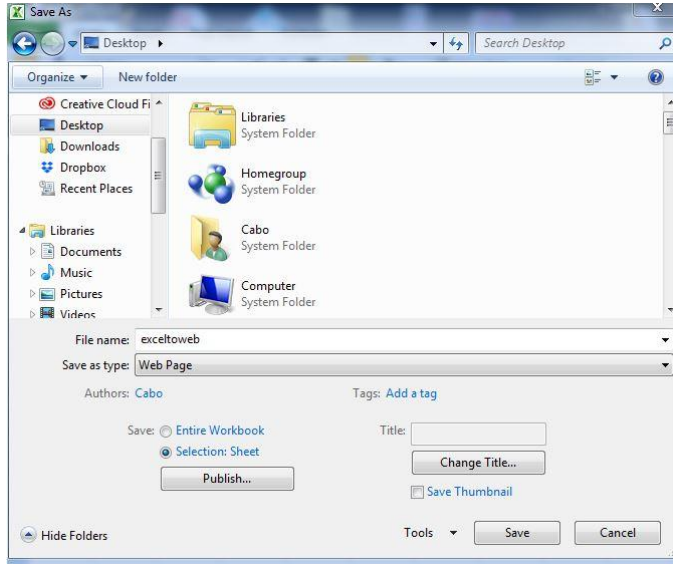


Figure 2. Save as procedure

3. Under Save, choose Selection: Sheet and click Publish. The Publish as Web Page window will open.

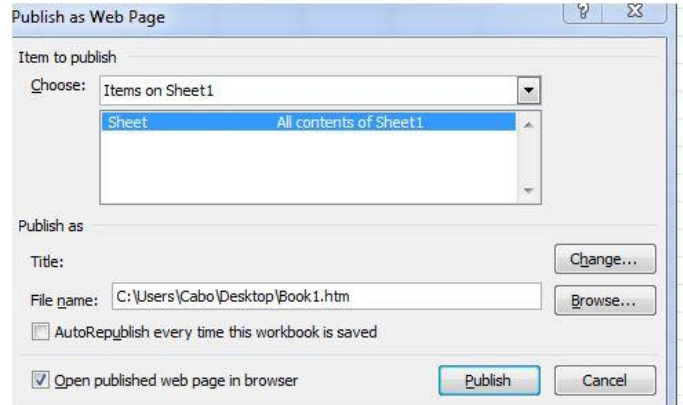


Figure 3. One step before publishing.

4. Select the sheet(s) you wish to publish.
5. Use the Browse button to find and select your server (in the example screenshot, the HTML file is being placed into a public dropbox folder).
6. Check the AutoRepublish web page box.
7. Click Publish.

One way is the example above shown in Fig. 1-3, but there is another way where you can create a table directly in HTML with HTML code. The following example will be presented on how to do so.

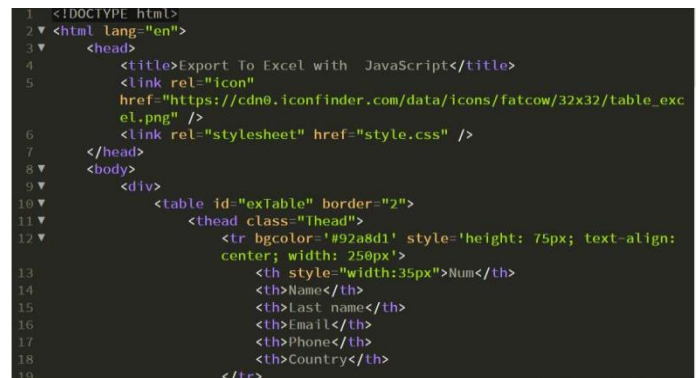


Figure 4. HTML and CSS code for table (part 1)

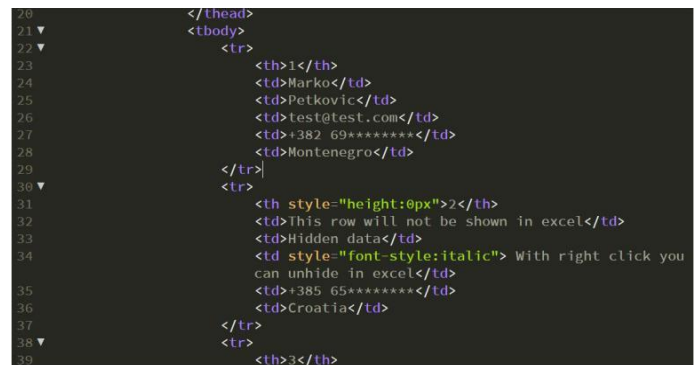


Figure 5. HTML and CSS code for table (part 2).

```

40 <td>test 123</td>
41 <td>Last name test</td>
42 <td style="text-decoration: underline;">Underline
   text</td>
43 <td style="background-color:blue;color:white"
   colspan="2"> Nebesko plava boja u spojenim
   celijama</td>
44 </tr>
45 <tr>
46 <th>4</th>
47 <td style="height:140px; padding:15px">
   
48 </td>
49 <td>Avatar</td>
50 <td style="font-weight:bold">test@gmail.com</td>
51 <td rowspan="2">+1 41*****</td>
52 <td>USA</td>
53 </tr>
54 <tr>
55 <th>5</th>
56 <td>sp char as - !"#%&'()* WILL NOT BE
   TOLERATED</td>

```

Figure 6. HTML and CSS code for table(part3)

```

58 <td>Only letters</td>
59 <td style="text-decoration: line-through;">line
   through text</td>
60 <td>+91 29*****</td>
61 <td>Swiss</td>
62 </tr>
63 <tr>
64 <th>6</th>
65 <td>
66 Ovo je pokusaj da se napravi Cv u tabeli i na kraju
   da se exportuje putem dugmeta u excel tabelu<br />
67 Kroz primjer su korisnici razni fontovi i tagovi
   kako bi se dobili,<br />
68 razliciti rezultati.Navedene info su uzete random
   za potrebe ovoga projekta.
69 </td>
70 <td>Prezime pokusaj</td>
71 <td>pokusaj@gmail.com</td>
72 <td rowspan="2">Merge row 2 and 3</td>
73 <td>Pakistan</td>
74 </tr>

```

Figure 7. HTML and CSS code for table (part 4)

```

75 <tr>
76 <th>7</th>
77 <td>James</td>
78 <td>Khurt</td>
79 <td>test1@gmail.com</td>
80 <td style="color:red">Canada</td>
81 </tr>
82 <tr>
83 <th>8</th>
84 <td style="font-weight:bold; height:0px;">0bac</td>
85 <td>The Great</td>
86 <td>obac123@outlook.com</td>
87 <td style="font-weight: bold;" colspan="2">This is
   admin row and it will be hidden</td>
88 </tr>
89 </tbody>
90 </table>
91 <input type="button" value="export"
   onclick="exportToExcel('exTable')" />
92 </div>
93 <script src="exportToExcel.js" defer</script>
94 </body>

```

Figure 8. HTML and CSS code for table (part 5)

In Fig. 4-8 we can find the HTML and CSS code that we used to create the table on the web. We used some standard HTML tags that help us to create a table with rows and columns. In this example we created table with 9 rows and 6

columns. The <tbody> tag is used to group the body content in an HTML table [2]. The <tbody> element is used in conjunction with the <thead> and <tfoot> elements to specify each part of a table (body, header, footer). The <td> tag defines a standard data cell in an HTML table [2,6]. Text in <td> elements are regular and left-aligned by default. Text in <th> elements are bold and centered by default. The <tr> tag defines a row in an HTML table. You can notice that we used the tag <style> in the code. Tag <style> is used to define style information (CSS) for document. In practice, a CSS file is created separately for document styling, which is not the case in this example. Styling tags are used directly in HTML code. The only separate CSS file is made for the EXPORT button. We can see the code below.

```

1 <input [type="button"] {
2   margin: 30px 0px 20px 210px;
3   width: 250px;
4   height: 60px;
5   text-transform: uppercase;
6   font-weight: bold;
7   font-size: 25px;
8   text-align: center;
9   cursor: pointer;
10  background-color: darkcyan;
11  color: #f4ce01;
12  border: 2px solid #f4ce01;
13 }
14 <input [type="button"]:active {
15  color: #13b236;
16  border-color: #13b236;
17  background: gold;
18 }
19 <input [type="button"]:hover {
20  border: 3px solid;
21 }
22 <table tr td {
23   padding: 5px;
24 }

```

Figure 9. CSS code for "EXPORT" button.

In the CSS file from Fig. 9 we can notice some elements that we used to beautify and customize the buttons to export the HTML table to excel format. With the help of CSS elements, we adjusted the margins, width, height, as well as whether the cursor will change if we move the cursor over it. We did this with the "cursor: pointer" option, we can see this option in line code number 9. We also played around a bit with the colors of the buttons as well as the colors that will be used to print the text in the button itself. We can see these options in the code line 10 and 11. We also added a few elements for the option if the user clicks the button. What will happen when you click the button and what effects will be applied, we defined by using CSS commands between lines 14 and 18. When you click the button, the color of the text, the color of the button border and the background color will change to gold. If the user just moves the mouse over the export button, the borders will be bolded and will be larger. We achieved this with the help of the "border: 3px solid" option. With the <style> tag we can adjust various things like height, length, background color, text color, whether the cursor will change when you click the button and much more. When we save the file from above its executed. We will find the table with some data like: name, last name, email, phone and country.

IV. JAVASCRIPT

What is JavaScript? JavaScript (often abbreviated in JS) is a high-level object-oriented scripting language [3]. It is mainly used when creating web pages with the help of HTML and CSS. JS is not only related to web design and browsers, its low consumption of memory and speed compared to other languages which contribute to the fact that we can apply it for many other purposes. JS's primary role was to "revive the website". JS was created in 1995, inspired by the Java programming language. At the time, internet connections were much more modest than they are now. Sending any query to the server page for any client entry was not practical at all. JS is performed on the client side of the server or the web, which we can use to design, program and behave web pages. With the advent of JS, new possibilities of data processing on the client's side were introduced, which significantly improved the performance of the former websites. JS allows us to implement complex features on web pages - every time a web page does more than just sit and displaying static data. JS represents the third layer of standard web technologies. We covered the other two HTML and CSS articles above. These layers pile up nicely on top of each other. We can say that by combining these three layers we get Dynamic HTML (DHTML).. Let's make an example code for the HTML code above so we could export our HTML table to Excel. In the following we can see the JavaScript code:

```

1 function exportToExcel(tableId){
2   let dataTable = document.getElementById(tableId).outerHTML;
3
4   dataTable = dataTable.replace(/<A[>]*></A>/g, "");
5   dataTable = dataTable.replace(/<input[>]*></input>/g, "");
6
7   dataTable = dataTable + '<br /><br />Code written by Luka.'
8
9
10  let a = document.createElement('a')
11  let dataType = 'data:application/vnd.ms-excel';
12  a.href = 'data:application/vnd.ms-excel, ${encodeURIComponent(dataTable)}'
13  a.download = 'Obac_3' + rand() + '.xls'
14  a.click()
15 }
16 function rand() {
17   let rand = Math.floor((Math.random().toFixed(2)*100))
18   let dateObj = new Date()
19   let dateTime = `${dateObj.getHours()}${dateObj.getMinutes()}${dateObj.getSeconds()}`
20
21   return `${dateTime}${rand}`
22 }
23

```

Figure 10. JavaScript code for exporting table.

After implementing the JavaScript code from Fig.10 together with HTML code and CSS from Figure 4-9, we are ready to export our table to Excel. In Fig. 8 we can see the example of JavaScript code. In the given code, we created a couple of variables and created a function that helps us to easily enter data into an excel spreadsheet. Between lines 16 and 22 I made a function "rand" and in it I used the mathematical function $\text{Math.floor}((\text{Math.random}().\text{toFixed}(2) * 100))$. Using this function we take numbers between 0 and 1 and round them to two decimal places, then multiply the obtained number by 100

to move the decimal point by two places to the left and, Math.floor rounds the obtained number into a whole. In `dateObj` we enter a new date `a`, in `dateTime` time in the order of hours and minutes. Js code allows us to Export an HTML table to Excel using the code from Fig. 8. I also added my personal signature at the end as a small sign of drawing attention to the author. Clicking on the Export table button will save the document in .xls format called "Obac_3". I have added some more options to get rid of special characters as well as input parameters.

TABLE I. DEMO OF OUR TABLE FROM GIVEN CODE (PART 1).

Num	Name	Last name	Email	Phone	Country
1	Marko	Petkovic	test@test.com	+382 69*****	Montenegro
2	This row will not be shown in excel	Hidden data	<i>With right click you can unhide in excel</i>	+385 65*****	Croatia
3	Test 123	Last name test	<u>Underline text</u>	Nebesko plava boja u spojenim celijama	

TABLE II. DEMO OF OUR TABLE FROM GIVEN CODE (PART 2)


4		Avatar	test@gmail.com	+1 41*****	USA
5	sp char as - !"#%&'()* WILL NOT BE TOLERATED	Only letters	<u>line through text</u>	+91 29*****	Swiss
6	Ovo je pokusaj da se napravi Cv u tabeli i na kraju da se exportuje putem dugmeta u excel tabelu Kroz primjer su korisnici razni fontovi i tagovi kako bi se dobili razliciti rezultati.Navedene info su uzete random za potrebe ovoga projekta.	Prezime pokusaj	pokusaj@gmail.com	Merge row 2 and 3	Pakistan

TABLE III. DEMO OF OUR TABLE FROM GIVEN CODE (PART 3)

7	James	Khurt	test1@gmail.com	Canada
8	Obac	The Great	obac123@outlook.com	This is admin row and it will be hidden

EXPORT

After clicking on the button "EXPORT" we will get the table in Excel, In Fig. 6 we can see the converted HTML table into an Excel table. In TABLE I-III we can see all data that have been put in columns and rows.

TABLE IV. EXPORTED HTML TABLE IN EXCEL (PART 1)

Num	Name	Last name	Email
1	Marko	Petkovic	test@test.com
3	Test 123	Last name test	Underline text
4		Avatar	test@gmail.com

TABLE V. EXPORTED HTML TABLE IN EXCEL (PART 2).

Email	Phone	Country
test@test.com	+382 69*****	Montenegro
Underline text	Nebesko plava boja u spojenim celijama	
test@gmail.com	+1 41*****	USA

TABLE VI. EXPORTED HTML TABLE IN EXCEL (PART 3)

5	sp char as - !"#\$\$%&'()* WILL NOT BE TOLERATED	Only letters
6	Ovo je pokusaj da se napravi Cv u tabeli i na kraju da se exportuje putem dugmeta u excel tabelu Kroz primjer su korisceni razni fontovi i tagovi kako bi se dobili, razliciti rezultati.Navedene info su uzete random za potrebe ovoga projekta.	Prezime pokusaj

TABLE VII. EXPORTED HTML TABLE IN EXCEL (PART 4).

line through text	+91 29*****	Swiss
pokusaj@gmail.com	Merge row 2 and 3	Pakistan
7 James	Khurt	test1@gmail.com

Code witten by Luka.

In Table V-VII we can see the exported Table in excel with all data that have been put with HTML code.

CONCLUSION

In this paper, various programs have been used, tools as well as scripting languages such as JavaScript. Throughout the paper work we can notice images of codes written in JavaScript, HTML and CSS. The given codes show the solution and the required result. In the paper itself, we can see two examples of how a table is created and exported as a required result. In the first example we can see how the table is passed to the web from Excel and in the second example we can see how with the help of tools such as HTML and CSS as well as the JavaScript scripting language, I have created a table on the website and converted it to XLS extension so it could run in Excel. Also, the functionality of the code example can be expanded according to your needs. The idea of this project was to create a CV or biography in the table with some basic information.

REFERENCES

- [1] <https://itconnect.uw.edu/learn/workshops/online-tutorials/microsoft-office-2010/microsoft-excel-2010/>
- [2] Čabarkapa, L. (2021). Information systems for the management and realization of conference events, [Master's Thesis, University of Montenegro]
- [3] Guha, Arjun, Claudiu Saftoiu, and Shriram Krishnamurthi. "The essence of JavaScript." ECOOP 2010–Object-Oriented Programming: 24th European Conference, Maribor, Slovenia, June 21-25, 2010. Proceedings 24. Springer Berlin Heidelberg, 2010.