Technical Design Document

Project

Adjustable Multiplication Table

Developer

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Github

https://github.com/KayevonAzuca/Adjustable-Multiplication-Table

Introduction

The project provides a way to create and display a multiplication table. The table can be sized differently depending on the settings the end-user has set.

The width of a table is determined using the inputs with the label “Start Column” & “End Column” and similarly the height is determined by the “Start Row” & “End Row” inputs. There is a range limit for column and row size but the table does not have to start at the number 1 or end with the limit of the column/row. “Start Column” and/or “Start Row” can contain positive, negative, or decimal numbers to create a unique table.

For example, the column range limit could be 25 but a table can be created starting at number 50 and ending at 75. As long as the range is not exceeded the end-user can start at any number they would like. The table can also be be in ascending or descending order if the end-user has a larger number in “Start Column” and/or “Start Row”.

This adjust-ability allows the table to reach higher or lower numbers while multiplying by unique numbers even if there is a range limit.

Lastly the end-user has the choice to choose to create the multiplication table using their current viewing device or the web server. This server option can be beneficial for mobile devices on limited battery life or CPU processing power since the application will fetch the results from the web server letting it do all the work. The server receives the request of values that the table should be sized at, calculates, and sends back the table result for JavaScript to display to the end-user.

Architecture

The main feature of this application is the ability to calculate & display a multiplication table. The end result is a HTML table element with each cell representing the correct mathematical multiplication result of two number.

The front-end design involves JavaScript “main.js” script to initialize the necessary module called “CalculateTable.mod.js” which will handle table creation requests. It attaches an event listener to the form’s submit button (the table creation’s “Settings” interface) which will do the following:

1) Delay the next form submission to prevent abuse
2) Check if a hidden input contains a value to prevent automated scripts from using the interface
3) Validate the inputs while determining the device to use to calculate the multiplication table
4) Check the size of the table against the range limit
5) Send the input values to the correct device to create the multiplication table

The numbers provided by the website interface are validated as a valid JavaScript “number” type before calculating in either JavaScript or PHP. The range limit is also checked in order to not exceed the processing power of the devices CPU.

Validation is involved to prevent values that are not integers or floating point numbers from being passed into the table creating function. The radio input’s value that determines the calculation device is crossed referenced and validated in case of malicious text. Lastly, the range limit is also checked in order to not exceed the processing power of the devices CPU whether its the client’s device or the server.

The table is created row by row from top to bottom using a JavaScript or PHP nested loop. A “<table>” element will house the overall results as a new “<tr>” element is appended to it at the end of each outer loop iteration. Inner loop (or the nested loop) iteration is where two numbers are multiplied and the end result is placed in a new table data cell element “<td>” which is then appended to the current “<tr>” element.