**A WEB BASED MATHEMATICS TOOL**

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# 1 Introduction

**Introduction**

This project was made as a final work for the course; developer basic skills. The project contains a number system converter, number system outputs from 0-50 digits, combinatorics calculator, a truth table generator, random value generator and a pascal’s triangle generator. The reason why we chose pascal’s triangle generator, was that we wanted to have a different and interesting feature in our project.

**2 THE WORK ENVIRONMENT**

We worked on the project in school, and during the free time after school. Most of the project was made outside school. The project was made using the computer. External tools or functions weren’t used in the making of the project, we used Visual studio code in the creation of html and javascript code.

**3 Definition**

**3.1 Number system converter**

This function converts the number of your choice into a binary, octal, decimal or hexadecimal number.

**3.2 Number system outputs**

This function displays the first 50 digits from binary, octal, decimal and hexadecimal numbers.

**3.3 Combinatorics**

This function displays the result of combinations and permutations, depending on the chosen statement.

**3.3 Truth tables**

This function generates a truth table based on the formula it has been given.

**3.3 Random values**

This function chooses a number of a random value from the given string.

**3.3 Pascal’s triangle generator**

This function prints a pascal’s triangle from the inserted number.

**4 Implementation**

**4.1 Number system converter**

This converter works by inserting a binary, octal, decimal or hexadecimal number into a text-input field. After inputting the number, the number system is changed with dropdown boxes, the result is displayed on key-input. The default number system in this converter is binary. The converter displays an error message after it has been given an incorrect value, for example, a decimal number is inserted into a binary numbering system.

**4.2 Number system outputs**

This function automatically generates digits from 0 to 50 in binary, octal, decimal and hexadecimal. A button is included for hiding and showing the content of the table.

**4.3 Combinatorics**

This function includes both, combination and permutation calculator. The order of selected items and the way of selected items is chosen from dropdown boxes. The amount of different items is inserted into the field A, and how many numbers is used into field B. The result is shown on key-input.

**4.4 Truth tables**

This function creates a truth table from given Boolean logic statement. A statement is inserted into a text-input field, after that a button is pressed which creates a truthtable.

**4.5 Random values**

This function picks a number of a random value from the given range of numbers, the numbers are inserted into a text-field, then a button is pressed and a random value number is received.

**4.6 Pascal’s triangle generator**

This function generates a pascal’s triangle from the inserted number of a value, the number is inserted into a text-input field, after that a button is pressed to generate the triangle.

**5 Testing**

**5.1 Planning the testing**

We planned the testing with different kinds of mathematical equations and numbers.

**5.2 Implementing the testing**

We tested the project’s functions with different kinds of example equations and numbers and compared the results with a calculator’s official answers. The results were correct, and we were satisfied with the results.

**6 POSSIBILITIES OF FURTHER DEVELOPMENT**

This project could be developed further by adding different kinds of functions related to mathematics and computer mathematics, improving the current functions even more, adding animations and nice effects into the functions.

**7 conclusion**

The most significant results are from the number system converter and the combinatorics converter. They display the results just like a calculator should. Most essential issues were displaying the number system outputs in a correct location and generating the truth table without hard-coding.

In this project, we created a numbering system converter, which converts numbering systems. A function which lists the first 50 digits from binary, octal, decimal and hexadecimal, the display of the list is toggled with a button. A combinatorics calculator, which calculates the selected items and the number of items, also calculates permutations. A truth table generator, it generates a truth table based on the given Boolean logic statement. A random value generator, gives a random value number of the given range of numbers and classifies the values. A pascal’s triangle generator, it creates a pascal’s triangle from the given number.