**PROJECT WORK REPORT 2018**

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contents

[Introduction 3](#_Toc532760870)

[THE WORK ENVIRONMENT 4](#_Toc532760871)

[Definition 4](#_Toc532760872)

[Number Converter 4](#_Toc532760873)

[Number Systems Table 5](#_Toc532760874)

[Combinatorics 5](#_Toc532760875)

[Truth Tables 5](#_Toc532760876)

[Random Value Generator 5](#_Toc532760877)

[Insulin Calculator 5](#_Toc532760878)

[Implementation 6](#_Toc532760879)

[Testing 7](#_Toc532760880)

[POSSIBILITIES OF FURTHER DEVELOPMENT 7](#_Toc532760881)

[conclusion 8](#_Toc532760882)

[Attachments 9](#_Toc532760883)

# Introduction

This report is about the project work that I worked on December 2018 in Oulu University of Applied Sciences, while studying my engineering degree on Information Technology.

The project started on 3rd of December in 2018 when our class was divided in teams of two or three people. We were supposed to code a HTML- website, with different mathematical tools in it. During our 1st and 2nd periods we learned the basics of JavaScript (programming language), HTML, CSS, user interface designing and how to take in user experience into account. This project was to test the skills that we had learned in the school so far. Time limit for this project was two weeks.

I was paired up with one of my classmates, but I was left to do the project alone unfortunately, as my pair didn’t communicate and didn’t contribute anything for the project in 4 days. But fortunately in my class we shared a lot of ideas and how we had personally implemented the required functionalities on the website, so I was not doing it completely alone after all.

During the two weeks we build a website that had 6 different tools within it:  
base number converter, table that printed number systems on the website, combinatorics tool, truth tables, random value generator and an optional tool that everyone could choose by themselves.

We were limited to use JavaScript and CSS for the designing of the website. The whole idea of the design was to give a good experience for the user and teach them what the tools on the website do. Keeping things simple was priority number one.

# THE WORK ENVIRONMENT

My working environment was our classroom in my school as well as my home. I started my project with my partner by setting up rules when we would come to school and work the project together and how we would start implementing everything. We agreed that we would come to school every morning at least at 9a.m, then after school we would work on the project at home if we felt like it. We agreed that even if we couldn’t make it to school due to a sickness, other important meeting or a doctor’s appointment, that we would both contribute something every day to the project. We created a repository in GitHub where we could upload our work on our separate branches.

When the team project turned into a solo project I still kept the same schedule by going to school every morning at least at 9a.m. and almost every day I did something at home as well. During the project I was able to get good hints from classmates in school and at home I found it easy to focus on the project at peace.

# Definition

The website can be described as a mathematical tool. There are multiple tabs with different information about the tool and the actual tool itself. The site should teach the very basics of computing mathematics by showing information about the topic as well as having a tool to test it out.

## Number Converter

In this page the user can convert binary, octal, hexadecimal and decimal values between those values. User will input a value to any of those input fields and it will convert the number automatically to the other number bases. Input fields are selected with a button and only one input field is shown at a time.

## Number Systems Table

This page has a number systems table which shows a table that has decimal numbers from 0 to 50 and then the conversions into binary, hexadecimal and octal. The table will be shown when the user presses the ‘Generate Table’- button and the table is cleared when the user presses the ‘Clear Table’- Button.

## Combinatorics

This page has functions to calculate permutations with or without replacement and combinations. User will select which they want between the two by selecting either permutations or combinations from the buttons on the page. Depending on the choice user is prompted with a site that has either one of the two choices. On the permutations page user also has a checkbox that can either disable or enable replacement.

## Truth Tables

This page has a very basic truth table that gives an idea to the user that how truth tables look like.

## Random Value Generator

This page has a button with which the user can generate a table that has numbers between 1-10 and by pressing the button the JavaScript will loop those numbers 50 times and then display how many times each number was generated.

## Insulin Calculator

On this page I created a simple function that calculates how much fast-acting insulin should a person inject after eating set amount of carbohydrates. User can input how much insulin they take per 10g of carbohydrates, how many carbohydrates they just ate and what is their blood sugar level currently. The page will then show how much they should inject and what is the roughly estimated blood sugar in 2 hours.

# Implementation

I started the project with my partner by diving tasks to each other what they should start working on. We made a rough sketch how we want things to laid out and how everything should work. On the first day I went on and started working on the base site so that we had at least something where we could start implementing the tools.

After having the base that we could work on I started styling the website with CSS and started working on a JavaScript function that changes container data within a one page, so that the user experience is fluent and that you don’t have to reload a page every time you want to go to another tab. Each button calls a JavaScript-function that changes the container to the user selection.

The number converter has four input fields that are hidden when you load the page. When the user selects the base number type that they want to convert a single input field will be shown on the site. Same JavaScript-function is used here that was used to change the site tabs, so that the user once again has a fluent experience with the site. Site also has 4 output fields that display the conversions straight away. I used on ‘onchange’ HTML feature so that the fields are updated immediately.

The number systems are hidden when loading the page. User has option to generate the table and clear it as well. I used ‘onclick’ HTML feature for this one. Table is created by using a single for loop.

Truth table page is generated by using a hardcoded function. There is a ‘onclick’- function button on the page that calls the table to be generated.

Random values page has a ‘onclick’ button that calls a function that will loop numbers from one to ten, 50 times. Those 50 results are pushed into an array that will called on the webpage. Every time the user clicks the button the numbers are generated into an empty array.

# Testing

I started testing the website on the fly when I was building the base of the site. If I would stumble on a problem I would immediately fix it before working on other parts of the site. I had a clear idea how I want the page to look like and I followed that path. A lot of my time on the first week was spent on making the site look better and making sure that everything opens like it should.

After I started working on the tab pages I started to get small bugs e.g. text going outside of the container. Fixing CSS wasn’t troubling as you can always see what happens when you try something out.

When I started to write the JavaScript-functions for all the tools I ran into plenty of bugs that took even days to fix. When searching through the internet for a fix I created another issue and it felt frustrating. Usually the bugs were because of a typing error that I had made

# POSSIBILITIES OF FURTHER DEVELOPMENT

The website could be made better by using more time on styling and creating visually pleasing animations and using pictures that would help the user learn more. It is quite clear that the sky is the only limit when implementing mathematical tools on the site. The time available made it so that I could only spend time on the most important issues and missing pieces on the site. I didn’t get the page responsive enough like I originally wanted, so in further development this issue could be fixed. Truth tables should also be coded better as it is hard coded at the release.

Adding videos explaining the mathematical disciplines or just by adding more text information would be a great addition to the site. Maybe even a forum board or a chat where you could talk about all math related things with people around the world. These changes would most likely generate a larger userbase and it could maybe grow to be a big site.

# conclusion

During this short two weeks’ time I’ve learned a lot by encountering on JavaScript-coding problems and solving them. Prior to this project I had only experience of going through an existing piece of code that I should just modify to get the wanted result. This project has thought me a lot about working by myself as well as listening my fellow peers that how they’ve done the coding.

I feel like the skill gap between my classmates has been narrowed when doing this project. I myself have learned quite a bit just by listening my classmates. You never knew what kind of a problem was behind the door before you started to work on another part of the site.

I feel like I’ve advanced a lot using HTML and CSS when trying to figure out things by myself. It’s easy to imagine a working site in your head before you start, but actually implementing it as a site that both works and looks great is hard. At least when using HMTL and CSS you can visually see what’s happening so fixing the issues wasn’t that hard.

While working alone on the project was exhausting, it also forced me to lookup everything by myself. If I would’ve had a teammate I might have told the other person to do a tool that I wouldn’t still have an idea how to do it by myself.

# Attachments

Time schedule:

<https://oamk-my.sharepoint.com/:x:/g/personal/t8kaos00_students_oamk_fi/EV0cxUC5P7ZIkz7VfCAnszABm2y8xaF5bi4T84z67eDnDQ?e=XfU7xs>