PROJECT WHITE Spectra

By Nikodem Drabik

Cyber-Security

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# Introduction

This document is a report for my project form Comp 1004. I am intending to create a website to help people understand and make it easier to use the online browser. The main user intended is the elder population as they require more help. From my own experience I have found that they are unable to manage how to use the internet and continue to need help even after explaining it multiple times. With this I will be able present them with this website and it will simplify their experience by a great amount, as outlined in my initial idea. Furthermore, one of the greatest weakness a person on the internet can have is a weak password as a result of this I thought about how to help them with this issue and how to maintain that account password. To do this I will implement a password algorithm to help create a secure password. I also thought about how the elderly organise their password. I thought about creating a password manager that allows them to access all their passwords, I thought about how my grandmother does this currently. The method is not so secure but very user friendly, as she writes them all down in note form in a notebook and stores them in a draw. She is aware what is where and its very easy for her to understand. I thought about implementing this a digital version, so the user has an easy way of accessing her data on the computer and her phone. However, this will require some prototyping to get it right.

# Project Requirements

Critical Functionalities:

User will be able to enter words and generate secure passwords.

Website

Needed Functionalities:

Icons that are clickable

Beneficial Functionalities

Google search API

Section with additional E-Saftey products and links

# Initial Ideas

## Main Menu:

Have a main hub that leads to all the features of my desired product and other things like so.

Idea:

Have a similar functionality to a browser such as google with being able to boot it up instead of Google and make it simpler.

## Possible Target Users:

### Elderly:

The first target users will be the elderly as they struggle to keep safe on the internet and are one of the main victims of online scams. This website is intended to minimise the risk by “holding their hand” while they explore the internet.

### Tech inept:

This website will also help people who struggle with the internet as a while. This can be caused by age, disabilities, or lack of willingness to learn the internet. This means that they need a “dumbed” down UI to be able to access all they need in a very quick and easy way that is not to closeted but has everything they need. This website hopefully will be the perfect solution for these people as it will have everything to kick start their journey on the internet every time, they turn on their device.

### Children:

This may be the solution also for parents with young children allow them to use the device. This can be achieved by having the base website however the parent or guardian may be able to remove some of the functions and create a child specific interface that allows children to navigate the internet much safer than if they were to do it without an assistant website like the one, I may create.

### Neurodivergent:

This project may end up also being good for individuals with Neurological issues that struggle to use the internet. With the way I hope to simplify the overall experience and already creating an environment that is easy to navigate people with such problems may be able to use it. However I am unable to verify if this would in fact be a viable solution for them.

## Password:

Create a password generator that allows users to input a few pieces of information that are meaningful to them. The password algorithm will use this data to create a password that not only will have a high level of security but will also be easy to remember for the user which may allow them to not use a password manager but instead memorize it. I think this may be a more secure way of keeping a password.

### Vulnerabilities:

There are many vulnerabilities that I foresee for this item. The act of saving the password to a website and things like such. The reason for this if the user is attacked with a malicious virus that has a built-in cookie grabber and this may and is most likely to lead to a lot of passwords being leaked. However, the need to no longer store the passwords on websites will mean no vulnerability as such.

### Example:

Tested by PasswordMonster.com

Data inputted -> Plymouth University 2023

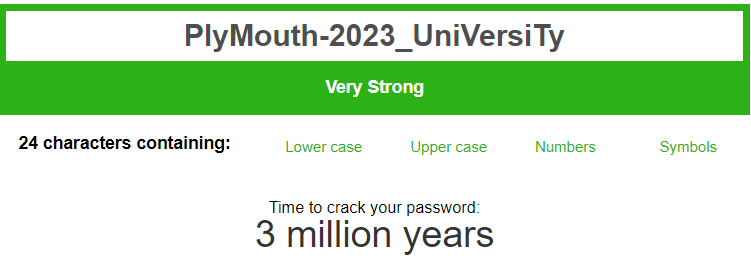
A screen shot of a computer screen

Description automatically generated

Basic Generated Password -> Plymouth-2023\_University

A green and white rectangular box with black text

Description automatically generated

Strongest Generated Password -> PlyMouth-2023\_UniVersiTy

As you can see the strength is greatly increased. I will work out how to calculate the syllables of words and capitalise each syllable to increase security and each space will have a different special character.

### Example 2:

Tell a story but hash the words for example E=3 S=$ O=0 A=@ i=!.

Example:

Dave = D@v3

Samuel = $@mu3l

### Issues to overcome:

There are several issues I will need to overcome to make this system to work. The greatest one is to work out how to separate the word into syllables. There are two options I can see.

1. Manually separate the word into syllables by the user.
2. Have a library or a operation that is able to get the word and then separate it.

This will be an issue as the English language is notorious for its complicated spelling and weird rules and making a program which is able to manage it all will be hard. So far, I have tried to find a simple formula that is able to calculate how many syllables there are. However, for example I am unable to use vowels as a marker as for example Dog and Cat are both 1 syllable yet a vowel is in the middle. During my short research the best way to calculate the words syllables’ is to clap however a program is unable to do so. As a result, I will need to have a deep dive on the English language.

1. Brute force attack with human or ai assistance that is aware that the word is split by syllables and as a result all it needs to do is to find the correct word combination. However hopefully due to the large number of words as well as the addition of special characters this will increase the difficulty.

## Google Search

https://developers.google.com/custom-search/v1/overview

To assist my end user and make it easier for my end user to navigate the web. The benefit of this is that instead of them needing to use GOOGLE.com or trying to search for website via the URL they can do it directly on my interface.

I researched if this was possible and how this works. From looking on google I found Google’s Custom Search JSON API. This API has the function to search just like a google search bar which is perfect for what I need to implement into my program. This API allows me to have 100 free searches per day maximum. This is not beneficial for large application, when the product is finished, and it would be used on a large scale I will need to invest into the google scheme where I would have to pay $5 per 1000 queries up to 10,000 queries per day. To make this possible in the future I may need to implement a type of advertisement to cover these costs as I am not willing to cover them.

## Central Website Hub:

Create an area with a secure connection to many websites used by people. This is designed to eliminate the accidental entering of the wrong website.

### Websites:

Google

Facebook

eBay

Amazon

YouTube

Wikepedia

Weather app of their choice:

BBC (UK)

pogoda.onet (PL)

User Email Service:

User will be able to choose between PL and UK email providers as they use both.

Gmail.com

Yahoo.com

Outlook.com

O2.pl

Wp.pl

Choice of grocery stores:

ASDA

TESCO

WAITROSE

MORISSONS

SAINSBURY

Banking:

Barclays

Halifax

LLoyds

Polish Banks TBD

Others to be added.

# Sprint 1

In this sprint I decided to begin prototyping what my websites looks like and to see what kind of information would be useful and to visualise what will be on the website. As I will endeavour into this first sprint I will layout step by step any research I conducted on the web as well as initial designs of my website. This sprint will lay down a foundation for my single page application that I can build on later with following sprints.

## Layout:

While doing research for HTML and website designs, I came across many articles which debate on the best layout for a website. The two most popular ones are the F scan and the Z scan. They are both very similar in the amount of data they cover when scanning a website with your eyes. This is an important aspect of a website as you want to maximise the amount of space you have and knowing where the customer looks when using it is important when deciding how to lay out the website.

Following these theories will allow me to create an eye pleasing and easy to read website.

## First Prototype.

A screenshot of a computer

Description automatically generated



This is my initial prototype of my website as displayed when designing the webpage I looked at the research I performed regarding webpage design. I decided to utilise the F scan pattern to ensure my website is well designed.

A screenshot of a computer

Description automatically generated



The most utilised areas of my website are in the “golden” area where the peoples eyes tend to track towards. This will make the website have a much greater ease of use and as a result lead to a better experience.

### Improvements:

My prototype looks not aesthetically pleasing to the eye. I will need to create some colour scheme for it to improve the overall look of the website. This will also in my opinion improve the user experience as I do not like using website which look very minimalistic.

Secondly, I do not like the layout of the website icons on the right. At this current point I do not have a way of improving them however with time and research I believe I can put them in a more visually appealing location.

After doing this first website designed, I felt something was wrong with the way it was laid out. After looking at other websites and analysing their layout I found out the reason for that feeling. The reason it seems wrong is that websites often have all their information laid out in the centre early reaching the sides and as a result they have white space around the sides. As a result of this my next design I will utilise this new information to make it more uniform looking.

### Useful Websites:

#### Haveibeenpwned.com

There are many websites that can assist is keeping safe. For example, haveibeenpwned.com allows you to enter your email address and find out different breaches of data that are highly likely to affect you. This will be one of the websites that I will have to

#### TinyWow.com

This website has many tools that are useful allows users to convert files, modify files, improve work. This website has the power to significantly improve the life of users. Website is perfect for those who are not familiar with their OS and how to perform many functions like changing docs to pdfs and vice versa. This website allows my users to be more productive and safer by having a great tool at their disposal without risking their security by doing their own research which may lead to the downloading of malware.

Others to add

# Backend Code.

I will be using HTML as the base code for my layout it has many functionalities that I need to make this work. It allows me to create links to the desired websites that will have my user redirected to them. Furthermore, I will also use JavaScript to create the code for my password maker.

### Security Issues

An issue that I may need to overcome in the future is the ability to secure the code for the algorithm to create a secure password. As if this is breached then it may create a vulnerability. However, This may also not be an issue

# Software Development Life Cycle.

For a cyber-Security based product, the Software Development Life Cycle is very important. Threats and vulnerabilities are found frequently to many large companies that affect many users of the platform. As a result, making sure my website is up to date with the latest and most beneficial information and passwords generator is useful. For example, computers were not very powerful because of this brute force attacks took much longer and passwords that were 8 characters and had at least 1 number or upper case were sufficient. However, with more powerful machines it takes more secure passwords to make it harder to crack. The current stage of computer processing power my passwords method is strong enough and hopefully for the next few years. However, with the introduction of ai and ai powered software and ai specific chips such those made by AMD. This may lead to the need for longer more complicated passwords.

For such task I think an Agile model for my SDLC will be best suited. An iterative model is much better for adaptability and changing the overall product during the process. I foresee the need to amend many aspects of the code and design of the product. This model resonates best with the task at hand and will allow for the most up to date information and the best security for my users. To add to this with the ever-moving internet there may be a breakthrough that would benefit my intended users in their security on the internet.

I will be doing 1–2 week sprints where I would undertake a task that is needed to complete and adapting the code for my users. This allows me to me to have short burst on specific areas of the project and at the end get back to the user if the new changes directly affect my user.

# User Stories

User wants to access email



# Sprint 2

## Week 1

### HTML Prototype 1

First prototype using HTML and CSS to format the website. After having a go creating a mock website to experiment with all the tools, I will be using I created my first mock User Interface.

### Idea:

The idea for this Webpage is that I will have the page sectioned off to have different things in designated areas. I’m hoping that this first part of the sprint I will have a semi functioning webpage that does some of the functions I want it to do and experiment with features that I am not aware of and possibly utilise to make my webpage more presentable.

#### First Prototype:

A screenshot of a computer

Description automatically generated

#### Explanation:

As you can see this is so far just a mock of the whole website. So far, the buttons are able to be uses and they link to the corresponding website that the icon represents. An issue I have encountered so far is that I require text to have the images be fully encased in the box otherwise they for some reason only get covered halfway.

The Two boxes I have a split of 20% on the left and 80% on the right. I have done this instead of another % split as I like the way it looks, and it seems uniform gives enough space for both areas of Information.

Furthermore, I hope to have a Link section on the left of the screen this will allow my user to click, and it will move them to that section on the page. I have yet to attempt this at this stage and the way this area of the webpage is designed may change to allow me to do this.

I also have need to create an area for my user to unput their queries using Googles API however this will be done in the following sprints and not this one.

## Week 2:

### Idea:

This sprint my goal is to create a Jave Script input for my user to input a piece of data and the program to return some type of data return.

The current idea for the location of this is to place it right at the bottom of the webpage as it will be the least used feature of the website as most people do not create passwords daily.

### Password Creator:

A screenshot of a computer

Description automatically generated

#### Explanation:

Above I have a prototype version of my password generator. So far, I have written a few hints on the web page as well as the actual user interface where the user inputs their data and presses the button that then runs java script code that stored in a different file than the HTML. The button calls a JS unction which then takes in the data in the box to perform my algorithm to it. So far, I have not performed any text encoding to create a secure password nor to ensure that the algorithm is secure and not easily accessible. However, to show that the text box works I have used alert function to appear on the screen. I may use it to alert the user of errors and things done on the screen in the future.

<https://dropbox.tech/security/zxcvbn-realistic-password-strength-estimation>

<https://lowe.github.io/tryzxcvbn/>