Advanced Web Coursework 2

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1 Introduction

The basic idea of my web app was to make a user based URL compression site. Users of the site can compress a URL as they wish and track all of the URLs they own, including the clicks each of their individual links gets. Users can also remove their URLs as they wish, freeing up space or preventing access to their links once they are no longer needed. The main home page and it's main function can be seen in **figures 1.1 - 1.3**.

figure 1.1 - Main Page while logged in.

figure 1.2 - Main Page with link to be compressed.

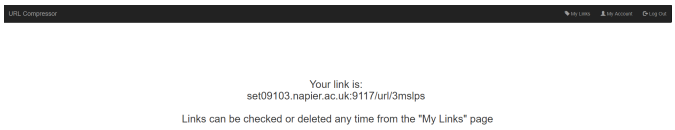

figure 1.3 - Main Page displaying compressed link.

If not logged in, the user will be met with the page seen in **figure 2**.

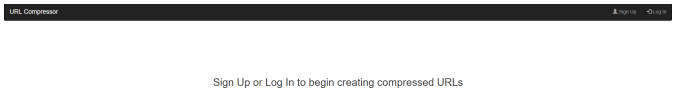

figure 2 - Main Page while not logged in.

2 Design

The user system of the site, although seemingly basic on the surface level was the key point of focus for the project for me. This was due to the mass amount of data that would be stored if the site was used in a real-world situation, having the potential to store approximately 40 billion unique links (in its current form). To do this securely I first created the user sign up/log in system used on the site. The page used to take in user details can see seen in **figures 3.1 - 3.5**.

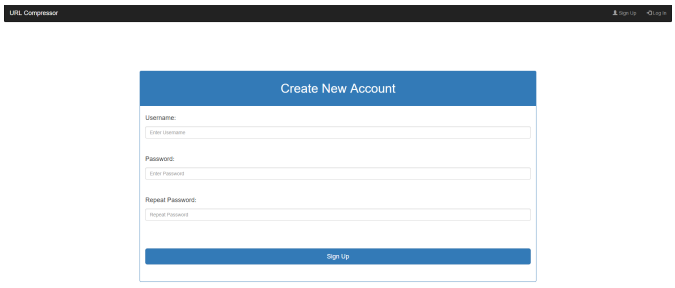

figure 3.1 - Sign Up page.

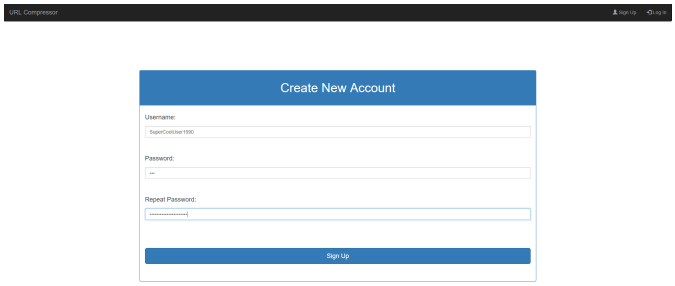

figure 3.2 - Sign Up page with passwords that don't match.

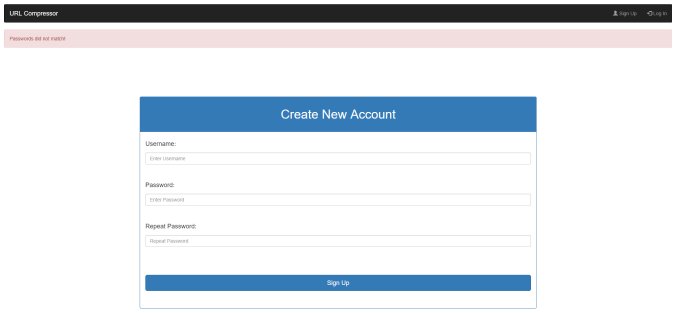

figure 3.3 - Sign Up page with passwords that don't match (return).

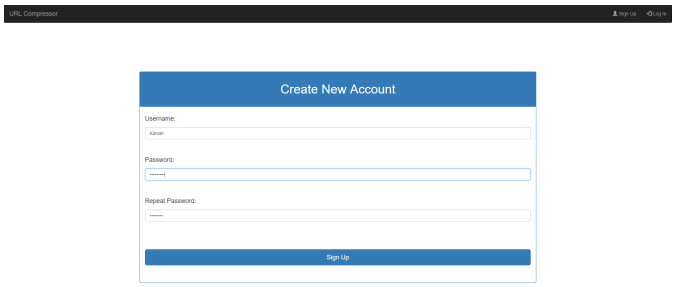

figure 3.4 - Sign Up page with a Username that is already taken.

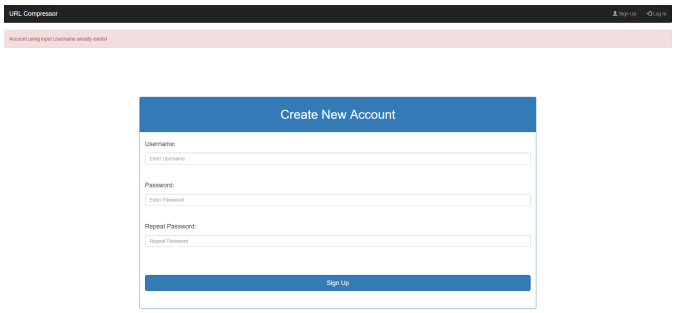

figure 3.5 - Sign Up page with a Username that is already taken (return).

Once a valid Username and Password are created, the Password is encrypted using the Python Flask component "Bcrypt" and is then saved to a user database within the server.
After a new user account is made, the user is redirected to the log in page. This page contains validation, which does not give away which component of any failed log in attempts was incorrect. This helps to prevent basic forms of logical hacking. This can be seen in **figures 4.1 - 4.3**.

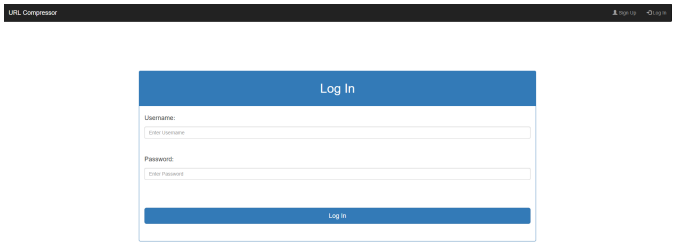

figure 4.1 - Log in page.

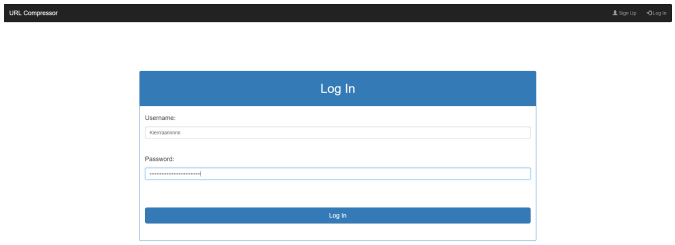

figure 4.2 - Log in page with incorrect login details.

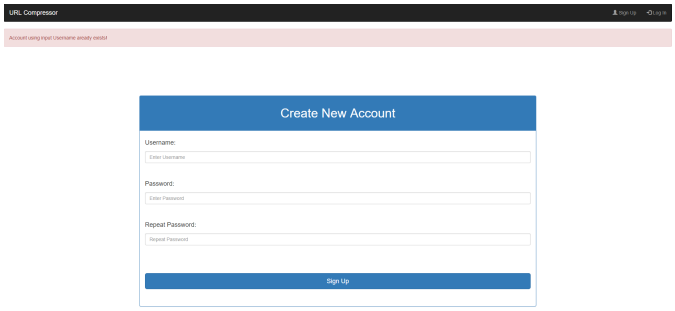

figure 3.5 - Log in page with incorrect login details (return).

Once logged in, users will be directed to the variant of the home page seen within **figure 1.1**. From that page, logged in users have a few new options.
Firstly, a logged in user can make compressed links. The links have a random 6 character extension, made using a character set of 40 unique characters (allowing around 40 billion different combinations). Each extension is checked using an SQL query to ensure there are no conflicts between links. Each link's database entry has 4 fields;

- Compressed, the generated 6 character extension, which is used as the primary key of the table.
- Original, which is the original URL to be used in the redirecting.
- Owner, which is the username of the creator of the link, to be used in the "My Links" section of the site.
- Clicks, an integer counter that is set to 0 on creation and is incremented by 1 each time the corresponding Compressed Link is clicked.

Another of the things a logged in user can do is access the "My Links" page. The page stores each of the compressed URLs a user has made, alongside each of their original

URLs, a counter to show how many times each link has been clicked and lastly a delete button on each link, allowing the user to remove links they no longer wish to have open. The page alongside an example of the delete button can be seen in **figures 5.1 5.2**.

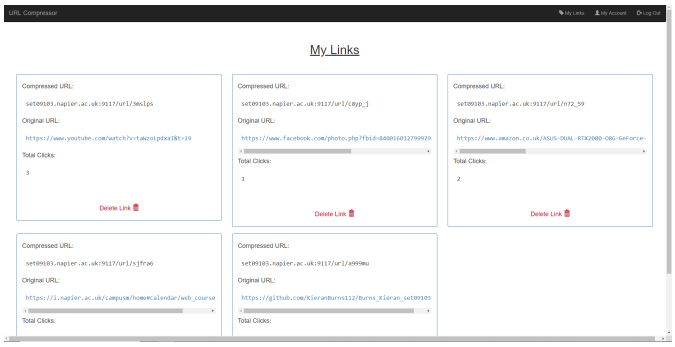

figure 5.1 - My Links page.

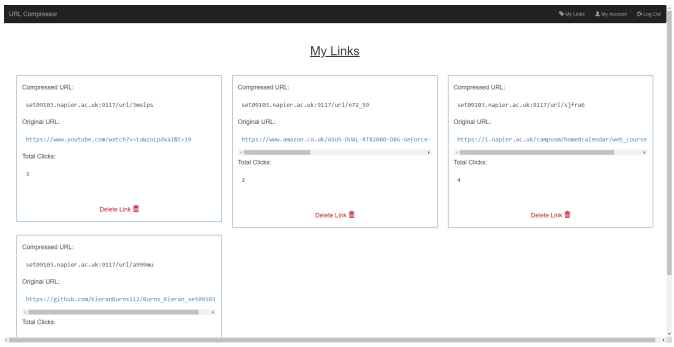

figure 5.2 - My Links page after clicking delete on the second link.

The last of the key features accessible once logged in is the account options page, where users can change their Password or Delete their account. This can be seen in **figure 6**.

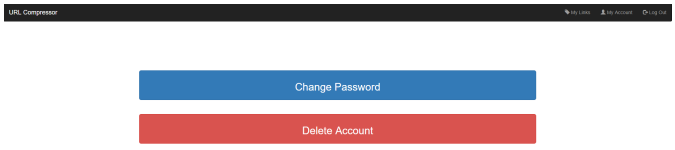

figure 6 - My Account page.

Upon clicking "Change Password", the user is redirected to a password change page which functions very similarly to the Sign Up page, including hashing the new password once it's confirmed as being valid. This can be seen in **figures 7.1 - 7.4**.

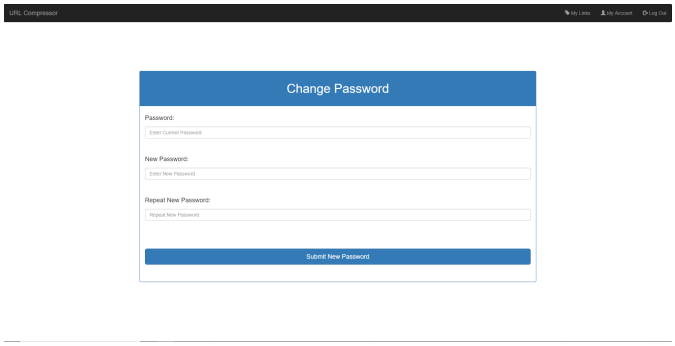

figure 7.1 - Change Password page.

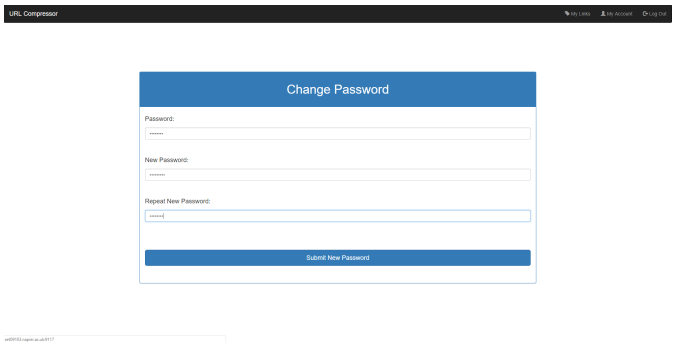

figure 7.2 - Change Password page with passwords typed.

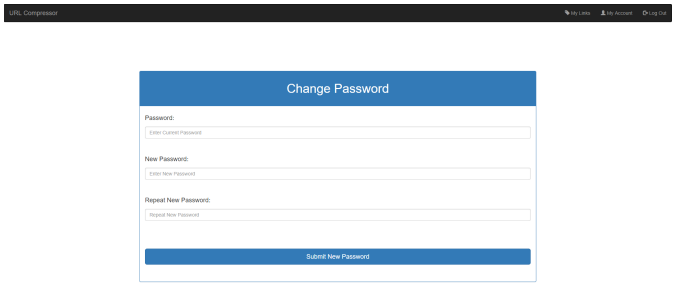

figure 7.1 - Change Password page with non-matching new passwords (return).

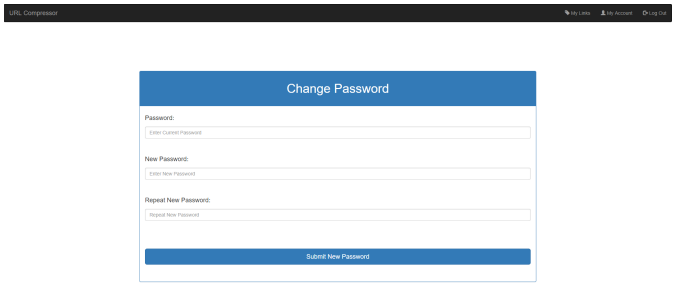

figure 7.1 - Change Password page an incorrect current password entry (return).

Once a password is changed, the user is redirected back home.

If user clicks "Delete Account" from the My Account page, they are redirected to a confirmation page, informing them that their account, along with all associated URLs and data will be permanently removed from the site data stored and cannot be recovered. If a user clicks the confirmation button, their account will be removed and they will be logged out. The confirmation page can be seen in **figure 8**.

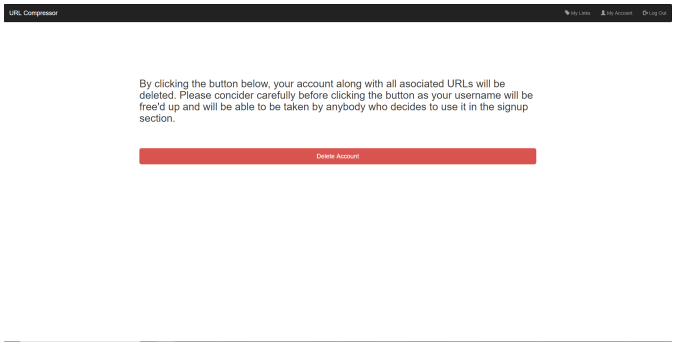

figure 8 - Delete account page.

While logged in, a user can log out at any time by selecting the "Log Out" button at the top-right of page in the task bar. Any site user can also return to the site's home page by clicking on the site name at the top-left of the page in the task bar.

A full diagram of the hierarchy of the site's URLs can be seen in **figure 9**.

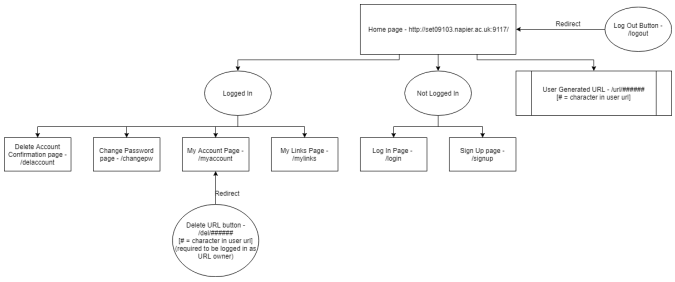

figure 9 - URL hierarchy diagram.

3 Enhancements

There are two main enhancements I would have liked to add to the site to improve its overall utility and quality.
The first of these would be to use more CSS elements to make the site more visually appealing. In its current form it is rather bare-bones as I used bootstrap to quickly build each page so I had more development time to spend on the server side of the project.
The other main enhancement would be to store more click analytics for the users to view based on their owned URLs such as locations links have been clicked from (perhaps with a small map that highlights the most popular areas).

4 Critical Evaluation

I feel as if each of the features implemented in the site work well together due to their somewhat simplistic interconnected nature. Most of the issues I have with the finished product are highlighted within Section 3.

5 Personal Evaluation

I feel as if I have performed decently during the project. I learned more of the capabilities of Python Flask, grasped a good understanding of how and why password Hashing is done, gained a respect for the convenience and utility of Bootstrap and lastly got more worthwhile experience with common tools such as HTML and SQL.
I don't feel as if I encountered any noteworthy challenges during the project as each of the features I implemented only had minor issues during development which were all ironed out quickly prior to the completion of their corresponding sections.

References

bitly.com :-
Main inspiration behind project.

www.w3schools.com :-
Extra learning around the use of Bootstrap.

www.sqlitetutorial.net :-
Extra learning around the use of SQLite.

www.tutorialspoint.com :-
Light extra learning around the syntax of some basic python commands.