CWP Website Designing Report

RE11-T14A

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GitHub link: https://github.sydney.edu.au/INFO2222-2021S1/RE11-T14A3

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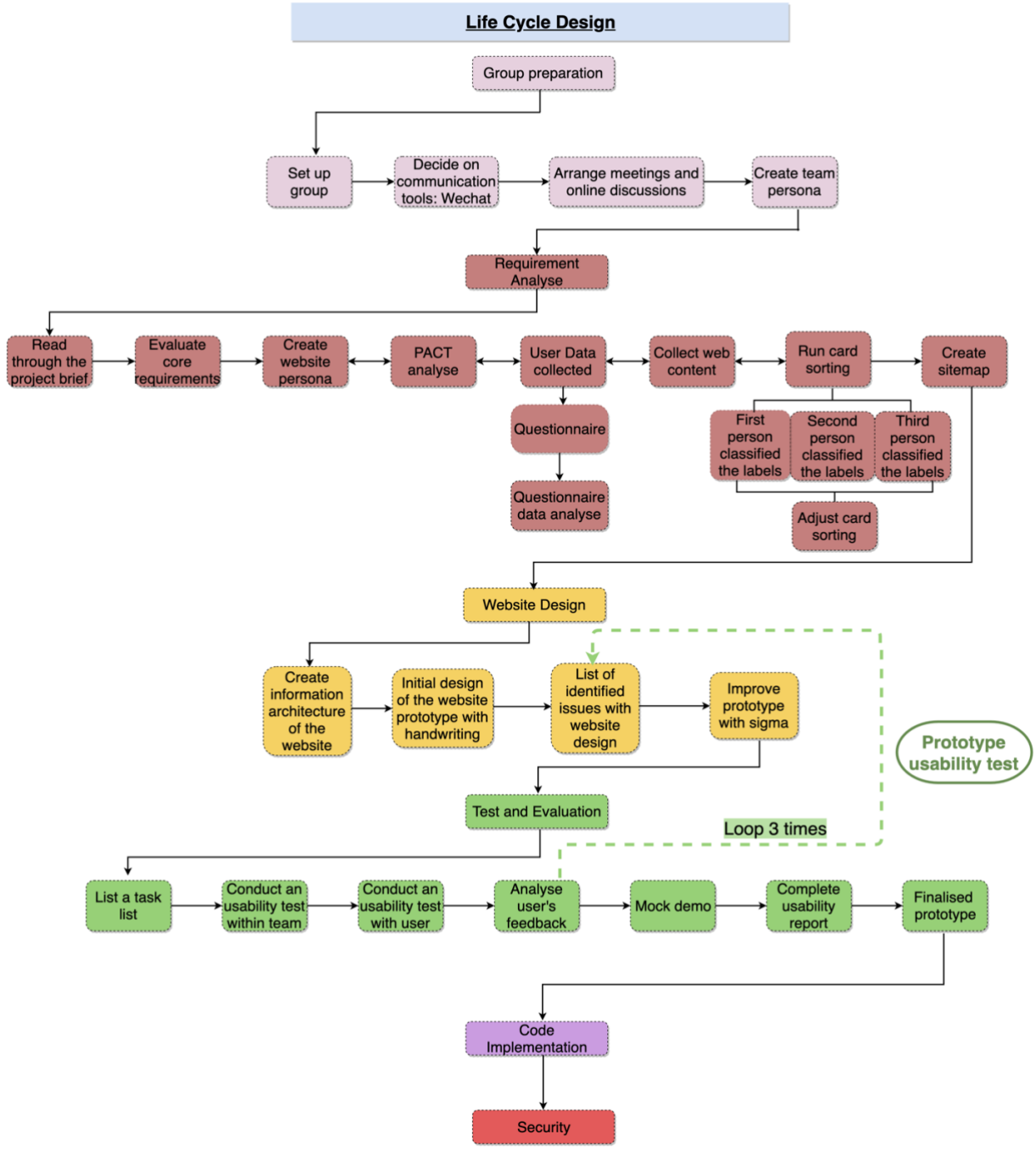
1. Introduction

1.1 Life cycle diagram



Appendix

Group persona: https://github.sydney.edu.au/INFO2222-2021S1/RE11-T14A3/blob/master/group%20persona.png

Website persona: https://github.sydney.edu.au/INFO2222-2021S1/RE11-T14A3/blob/master/website%20persona.png

PACT analysis: https://github.sydney.edu.au/INFO2222-2021S1/RE11-T14A3/blob/master/PACT%20Analysis.pdf

Website content: https://github.sydney.edu.au/INFO2222-2021S1/RE11-T14A3/tree/master/content

Questionnaire: https://docs.google.com/forms/d/1gZ2mrEHFaf_V80NK1-facShaREbus_fDdsmTrzTntJg/edit#responses

Card sorting: https://padlet.com/fayexuefeihe/gy2yqk7wuldtzose

Sitemap: https://github.sydney.edu.au/INFO2222-2021S1/RE11-T14A3/blob/master/sitemap.png

Wireframe: https://github.sydney.edu.au/INFO2222-2021S1/RE11-T14A3/blob/master/wireframe.pdf

Information architecture: https://github.sydney.edu.au/INFO2222-2021S1/RE11-T14A3/blob/master/Information%20architecture.png

Prototype: https://www.figma.com/file/yFaRxksO6pTZ3IMofAb3nE/Website?node-id=0%3A1

1.2 Techniques and tools

In the project's preparation phase, we confirmed that our online meeting tools were WeChat and zoom, and we shared code in GitHub.
In the requirement analysis stage, we used Google Forms to produce a questionnaire for investigating user preferences. PACT analysis and persona were modified based on the survey results. Padlet was used to plan and perform card sorting on three actual users.
In the website designing stage, GitMind was used to draw the website's information architecture; GoodNote was used to design the wireframe, and Figma was used to draw the prototype.
The programming basics we used including CSS, HTML, JavaScript, and Python. Our website server was based on Bottle.

. Process of Design

2.1 Phase 1: User Investigation

2.1.1 PACT analysis

We have done the PACT analysis which summarizes the intention of our website, as it determines the requirements of our educational website. The persona created is aligned to the content of this analysis, the full text of analysis is included in the Appendix.

Summary of our PACT analysis

People: Our website provides motivations for them since there is no unit providing formal learning experience from scratch for them. In terms of front-end knowledge, our target users are almost laymen. It can be assumed that they are quite capable of self-learning and have above average IQ and energy to learn the skills our website offers.
Activity: Exercises will be offered to help our target customers practice knowledge they have just learnt from the blogs.
Context: Students should be able to easily access our website on campus, at home, at the internet cafe and workplace.
Technology: Students can access our website on different resolutions, operating systems (windows, Mac OS or Linux) and browsers (Chrome, Safari and Firefox). Furthermore, we are trying to design an app to move our website onto users' phones.

Consequently, when we design our personas, we also make it consistent with the previous PACT analysis. According to the “people” and “context” parts of the previous PACT analysis and the responses in the questionnaire distributed to USYD students, the persona should represent the user group who have some relatively solid programming knowledge, therefore in the persona, the representative user is a third year student who major in Advanced Computing, who aim to self-learn web development.

2.1.2 Website persona

Fictional name	Billy Kings
Photo	
Demographics	- 21 years old - Male - A third year student in University of Sydney - Studying in Bachelor of Advanced Computing - Three years programming experience - Familiar with Python, java, Html and CSS - Has good self-learning ability and motivation - Spends majority of time on the web development
Major responsibilities	- Learning relevant IT knowledge - Get excellent results in school
Goals and tasks	- Familiar with web development - Build a website to share his knowledge with his friends - Get high distinction of a web design class - Acquire the basics of CSS, HTML, JavaScript and Web application framework - Desire to challenge more difficult courses
Quote	“I will build the best website in the world! ”

According to PACT analysis, we initially described the image of Billy Kings, including age, gender, occupation, hobbies, goals, etc. Then we narrowed down the characteristics of Billy Kings based on the responses of the questionnaire. For example, Billy is a third-year student at the University of Sydney who majors in advanced computing, which means our website's content will not include basic programming knowledge.

2.1.3 Card sorting

Purpose for card sorting session

We want to figure out whether the set of category names we have determined provides an effective way to organize a given collection of content, and how our participants agree on which cards (with content on it) belong to those categories.
It will give us information about which topic should be developed with more content, and what kind of practices or examples we should provide.

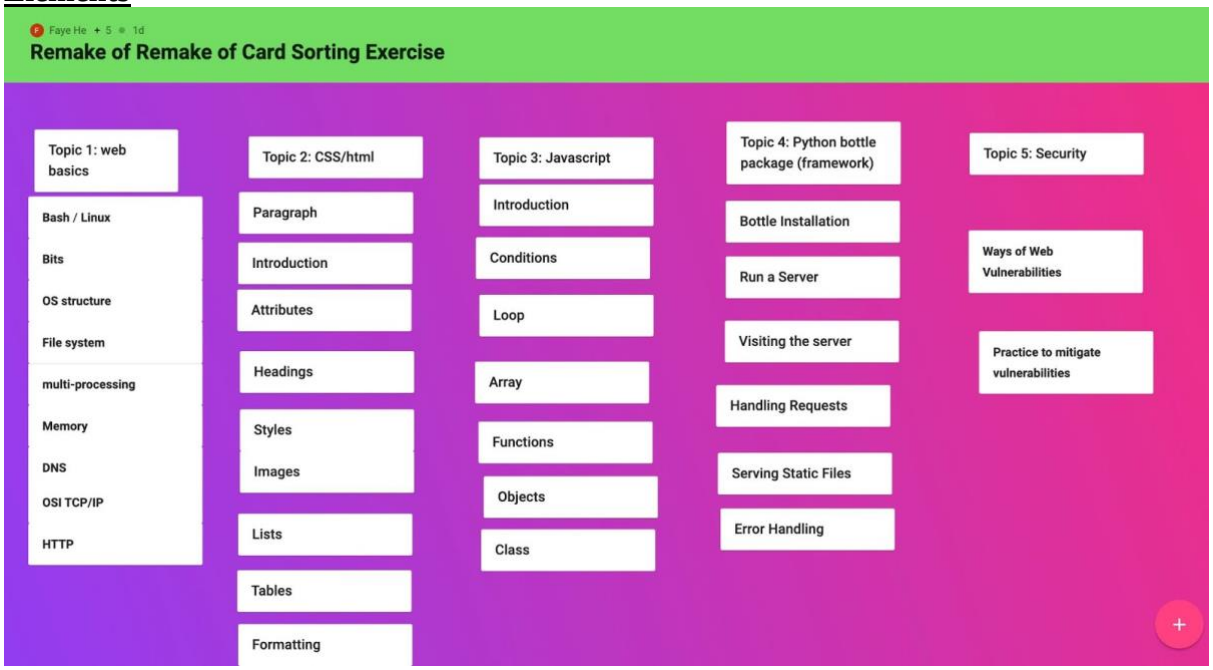
Open sort or closed sort and reason

We had an idea of what contents we should put in our website and how they should be categorised. However, we are not sure if we have grouped it correctly and if our users agree with our categorisation. By conducting this exercise on a number of our target users, it should give us a clear indication if we categorised them correctly

The way we decide the list of items to test

Depending on our target users' requests (get from personas, PACT and data analysis), we did some research and picked up the most popular topics for each category and added them to our card. For the content on each card, each one of our group members are responsible for one category (5 categories in total, HTML/CSS, JavaScript, Bottle, Security, Web Basics).

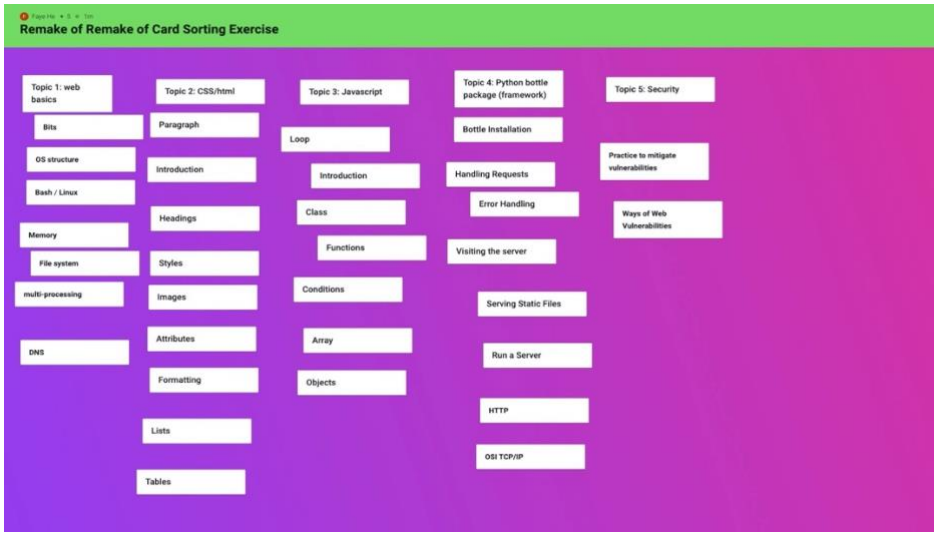
Elements



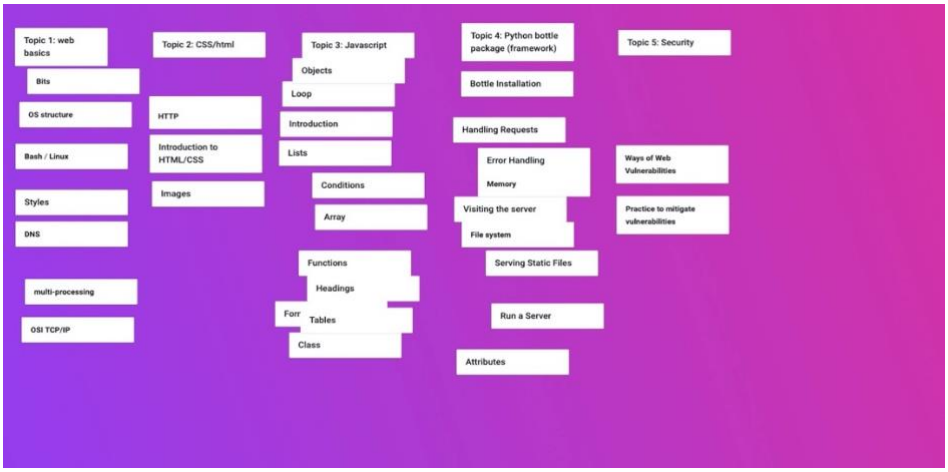
Original version

Process

We found 3 persons who satisfied the persona to attend the card sorting. They are Mike, Jason and Wong. We disrupted sort in the same way and asked them to remake, and we got 3 versions of results. The discussion result is shown in the below part.



Version 1 tester: Mike



Version 2 tester: Jason

Version 3 tester: Wong

Results of the card sorting

In every test, elements of security could be sorted greatly, except Wong made a mistake about bash/Linux. So, we believe that the target users of our website have necessary basic knowledge about web security, and we should give more effort to the other topics or the advanced level of security.

As for the web basics part, the testers always have little mistakes for some cards, like Http, Memory, File system, Bash/Linux. The worst one is Http (all mistakes), however, we believe it is very important for our target users to learn and master Http, since it is the most basic protocol of the internet. Our conclusion is that we still need to give enough and friendly content for the web basics topic. The reasons are that people still have misunderstandings in some critical and basic knowledge and systematic teaching is more conducive for users to develop a professional knowledge system.

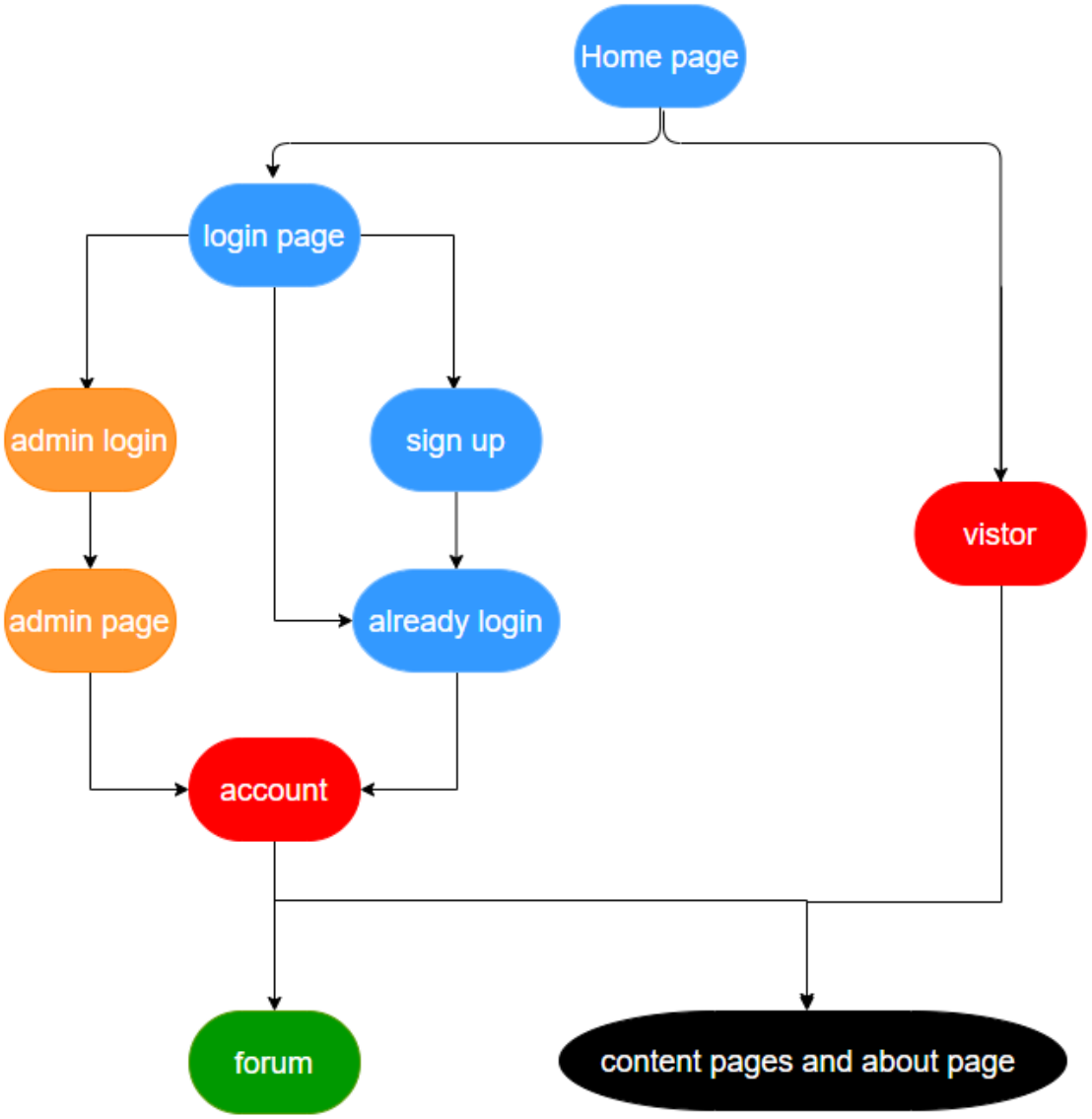
Well, the CSS/html tests show a lot of information, and now we treat Mike as a super user since his accuracy rate is high. The other 2 testers made a number of mistakes on it, which means our target users have little understanding about CSS/html, and it can also prove the conclusion we got in the web basic part (html's expression was the worst). We need to provide extra content and attention for this topic and design kinds of quizzes to help users learn CSS/html quickly and effectively.

The JavaScript part looks good by now. but for Jason and Wong, it seems that they sort all cards with little understanding into JavaScript topics. And it gave us information that these 2 testers knew the basic JavaScript knowledge but they are not sure about what is not belonging to it, which means they need systematic study for it.

The python bottle package part is good as expected, because python is always the first programming language that university students learn. But we doubt that maybe testers are just familiar with the words like "error handling, run" but did not know the actual meaning of the bottle package. So we choose to teach it in the same way as web basics.

2.2 Phase 2: Prototype Design

2.2.1 Information architecture of the website



Information architecture

We use iterative process to implement our design. We distributed a questionnaire to peer USYD students to research and collect our website's content. From the responses, we determined the features to implement on our website.

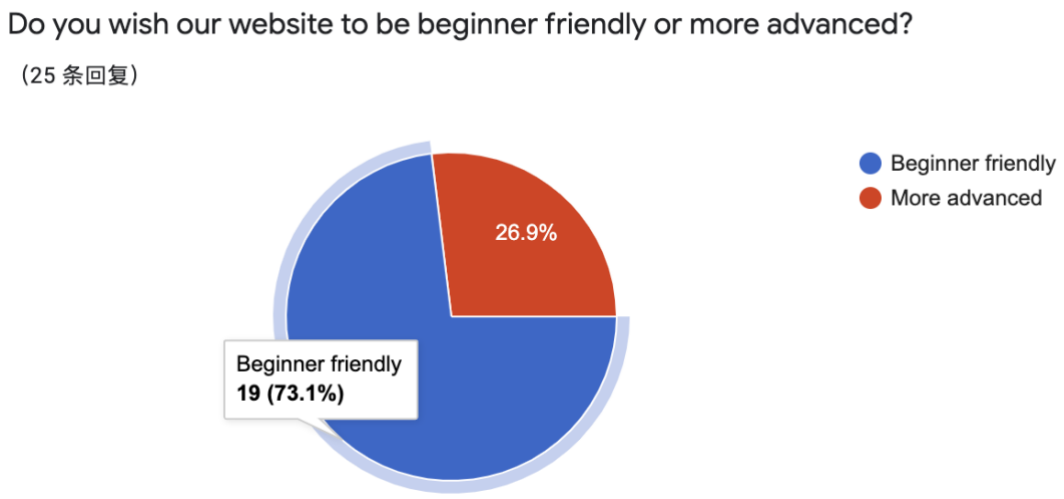


Figure 2.1

According to the pie chart above(Figure 2.1), we found that a more significant portion of our target users expected our website to be beginner-friendly. We determined that our website should focus on simplicity, straightforward learning, and providing simple code examples and exercises so that our target user could start from a basic level.

Hence in our implementation, our website feature includes simple examples aiming for explanation (Figure 2.2) and an online editor for the user to execute codes experimentally (Figure 2.3).

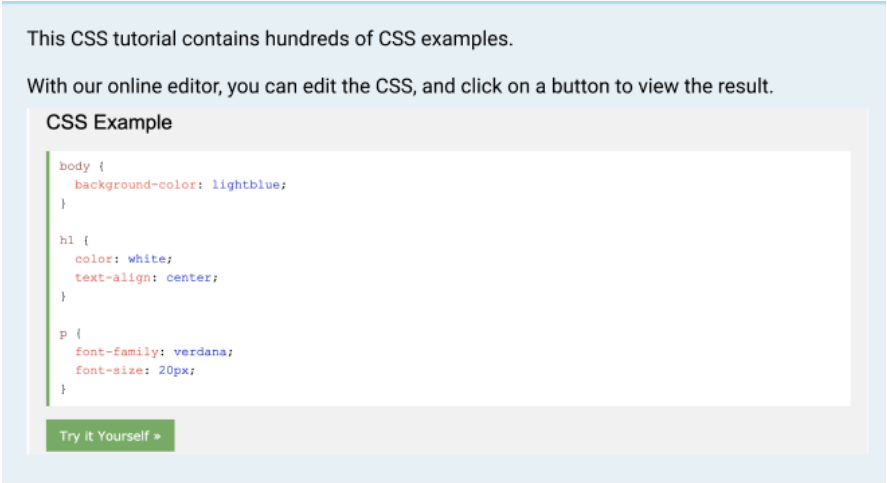


Figure 2.2

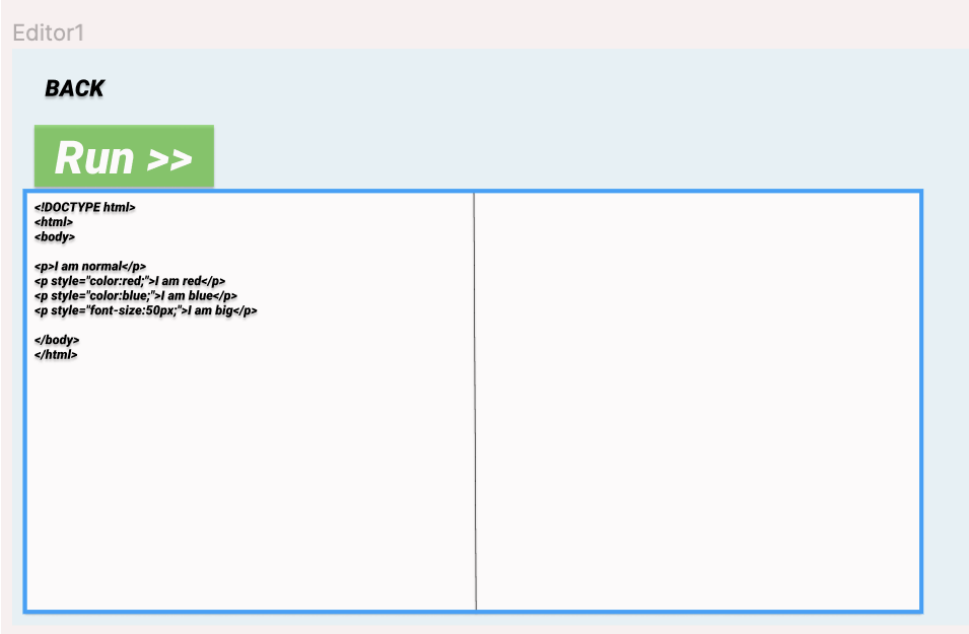


Figure 2.3

We also determined the aspects of web-development programming that our website covers from the questionnaire's responses (Figure 2.4 & Figure 2.5).

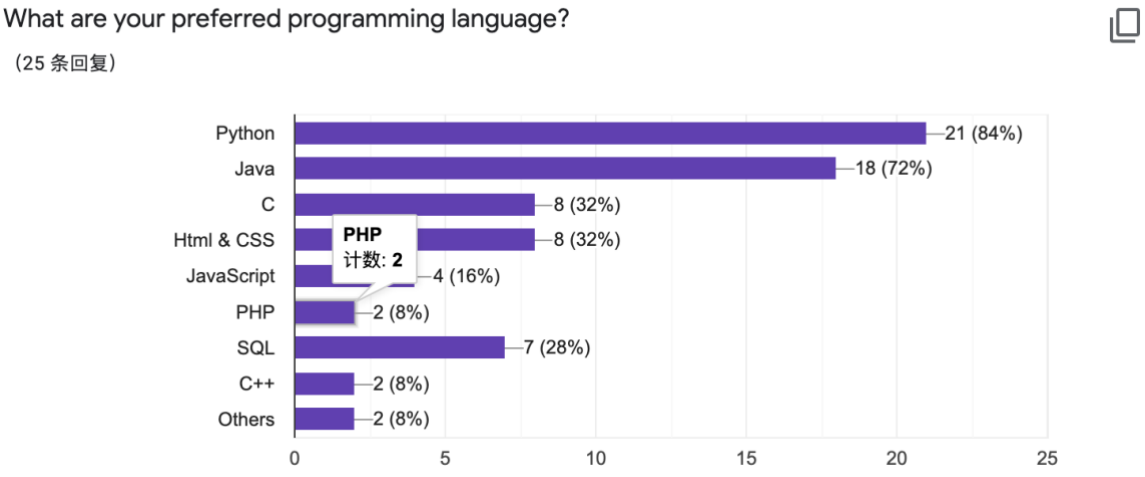


Figure 2.4

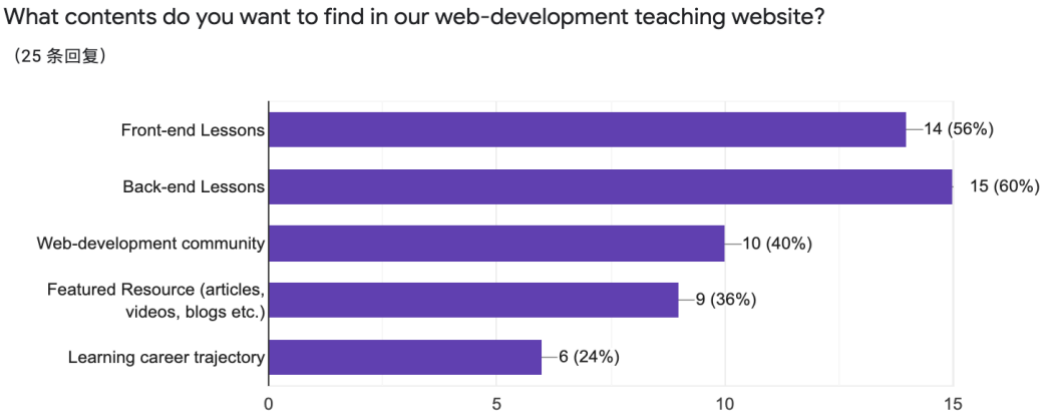


Figure 2.5

According to the responses shown in Figure 2.4 and Figure 2.5, our target users expect to learn front-end and back-end lessons, and their most preferred programming language is Python. Based on these requirements, our website introduces HTML, CSS, JavaScript, which serve for front-end web development, and Python Bottle, which serves for back-end web development.

These are also core features mentioned in Project Brief. We also planned to construct a discussion forum as a core feature where students shall exchange their learning experience in such an online community and add two different aspects to introduce some basic background knowledge about web development and web security.

2.2.2 Initial design of Prototype

Iteration 1

We then entered the designing stage of the iterative process. After our websites' contents were determined, we then conducted a closed card sorting as listed in phase 1 User Investigation and created a corresponding sitemap according to the feedback from the participants. Getting feedback helps us to categorize the content of our website better.

To start the design phase, we have decided to design a website wireframe to set our website's skeletal framework. It helps us organize every aspect of our website's contents (including HTML, CSS, JavaScript, Web Basics) and provides the basis for prototyping.

We have taken the guidelines from 10 Usability Heuristics for User Interface Design (Jakob, 1994) into consideration. We follow these heuristics when we design our website because we want our website to be easily accessible to every user, regardless of their differences.

Figure 2.6 (Heuristics)

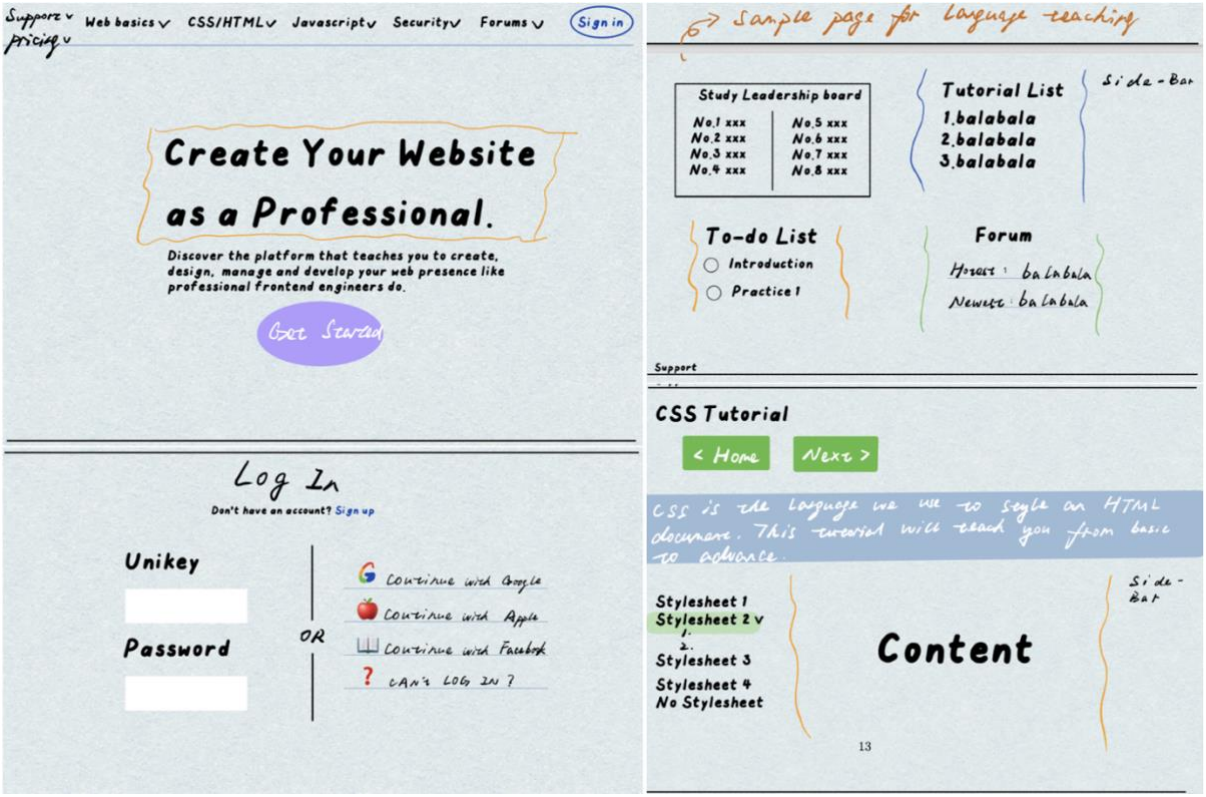


Figure 2.7 (Wireframe)

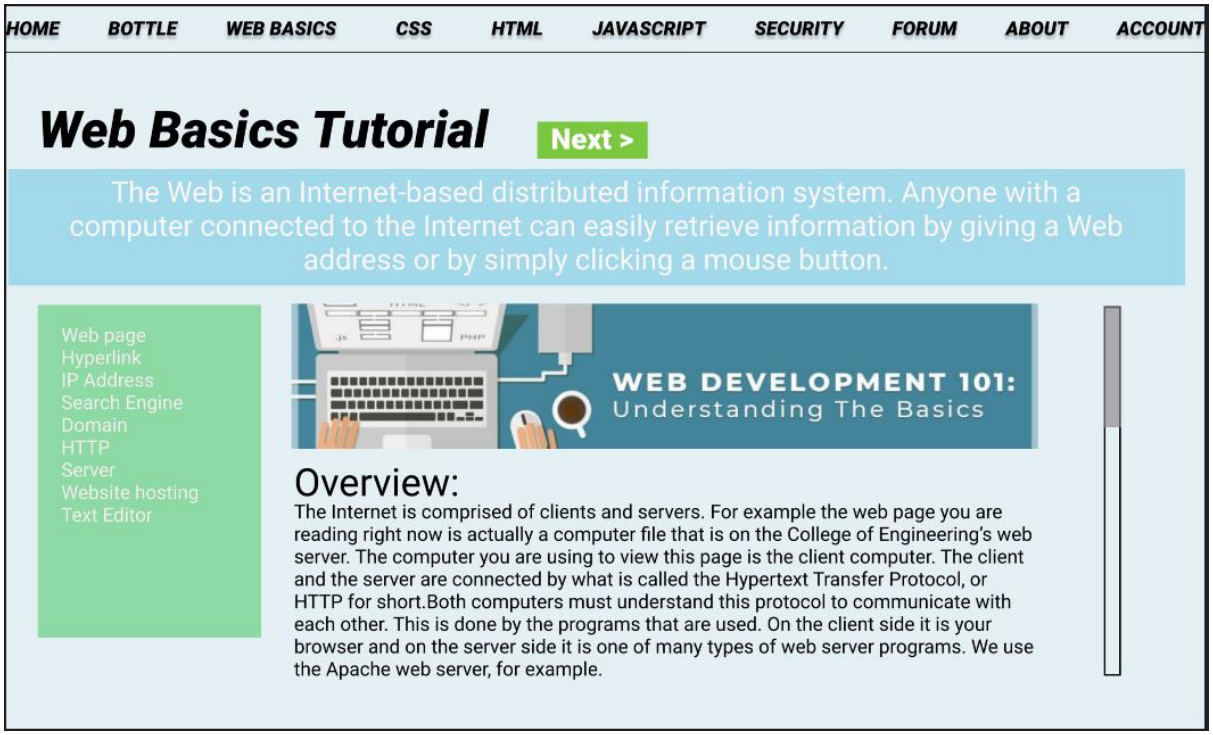
The wireframe above depicts the basic layout and structural guidelines, and it has a close visual style to our final prototype. As can be seen in the wireframe, the current design contains features such as login/signup, homepage, content page, and forum and leader board.

During the design process, our team decided to first focus on the aesthetic aspect.
We then choose to apply **Principle 8**, which states that we should keep the content and visual design focused on the essentials. **Principle 8** ensures that our content of the website supports the users' primary goals. For example, on the bottom right content page, we only include things that apply to the context of CSS Tutorial and nothing else.

We also applied **Principle 4**, which states, "Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform and industry conventions." This is to ensure that users will face no unnecessary difficulties when browsing our website. They should expect a similar experience as they had on other websites. We achieved this by having the site navigation bar located at the top of the page like most other websites on the internet (as shown on the top left page of the wireframe). The login page has a similar style and arrangement as other websites; our users should have no difficulty navigating the page.

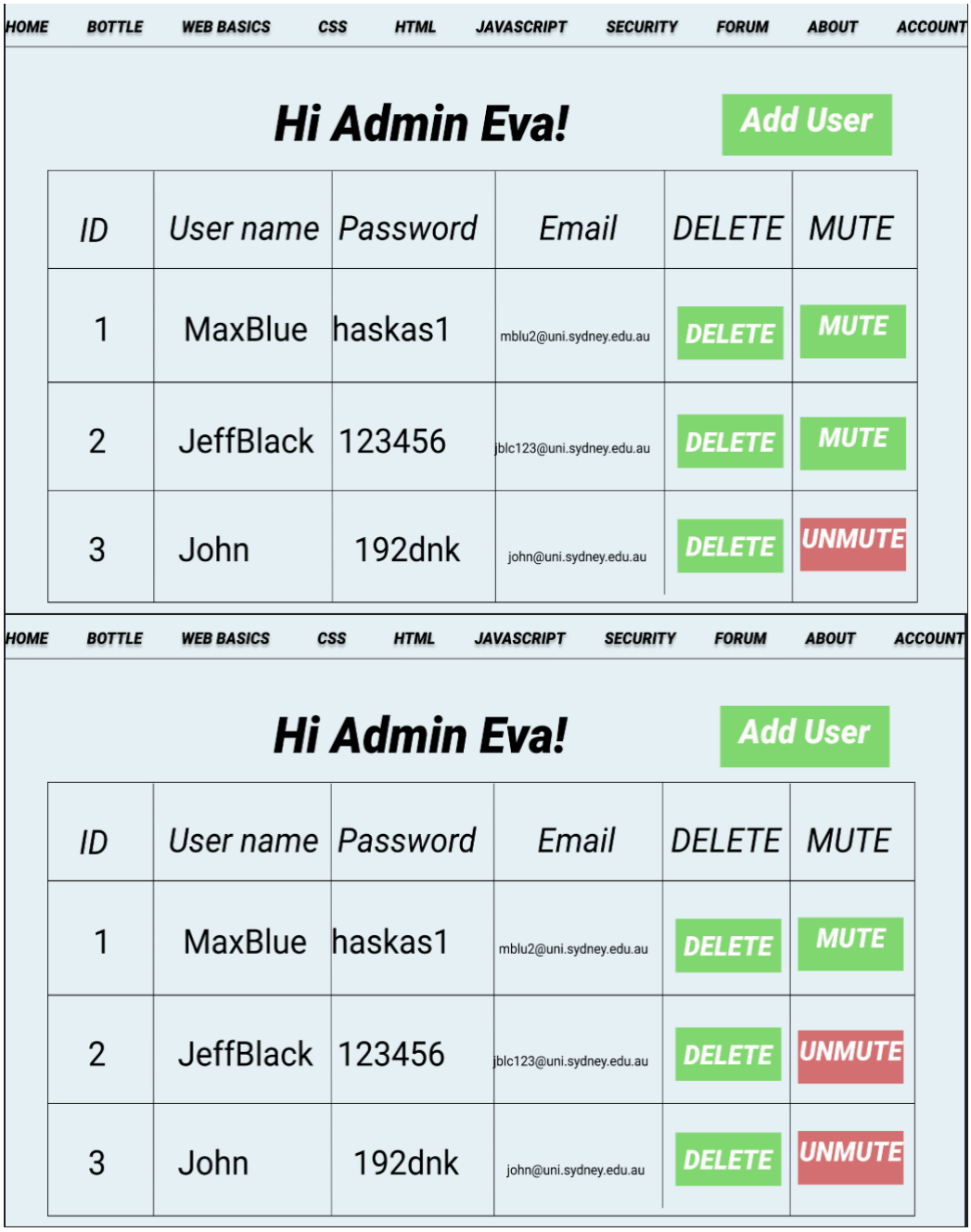
Iteration 2

In terms of the general design, our design improves on **Principle 8** by introducing more contrasting colours to differentiate different content groups. In return, this would increase the usability of our website as users can read and navigate better.

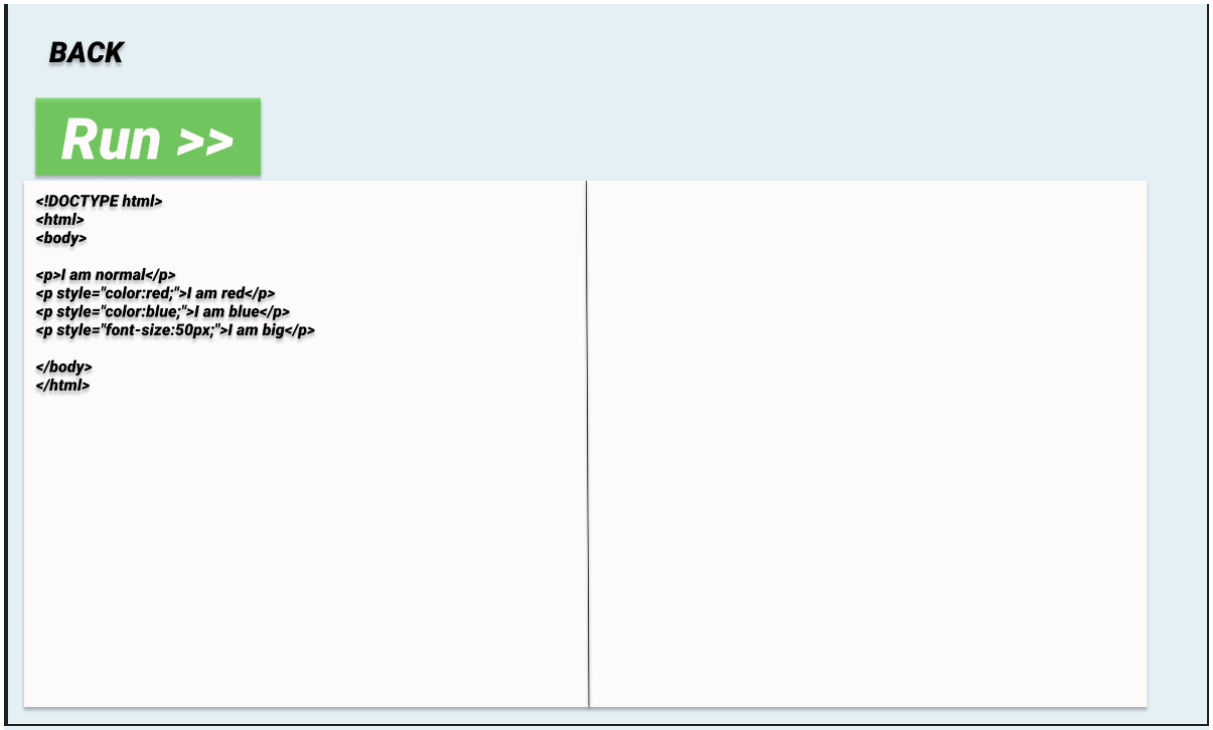


Using the content page as an example, green colour is used to represent navigation within the page. The blue colour represents an introduction to the content. The header above represents navigation within the website.

In the admin functionality page, we applied **Principle 1**, which states, “The design should always keep users informed about what is going on, through appropriate feedback within a reasonable amount of time.”

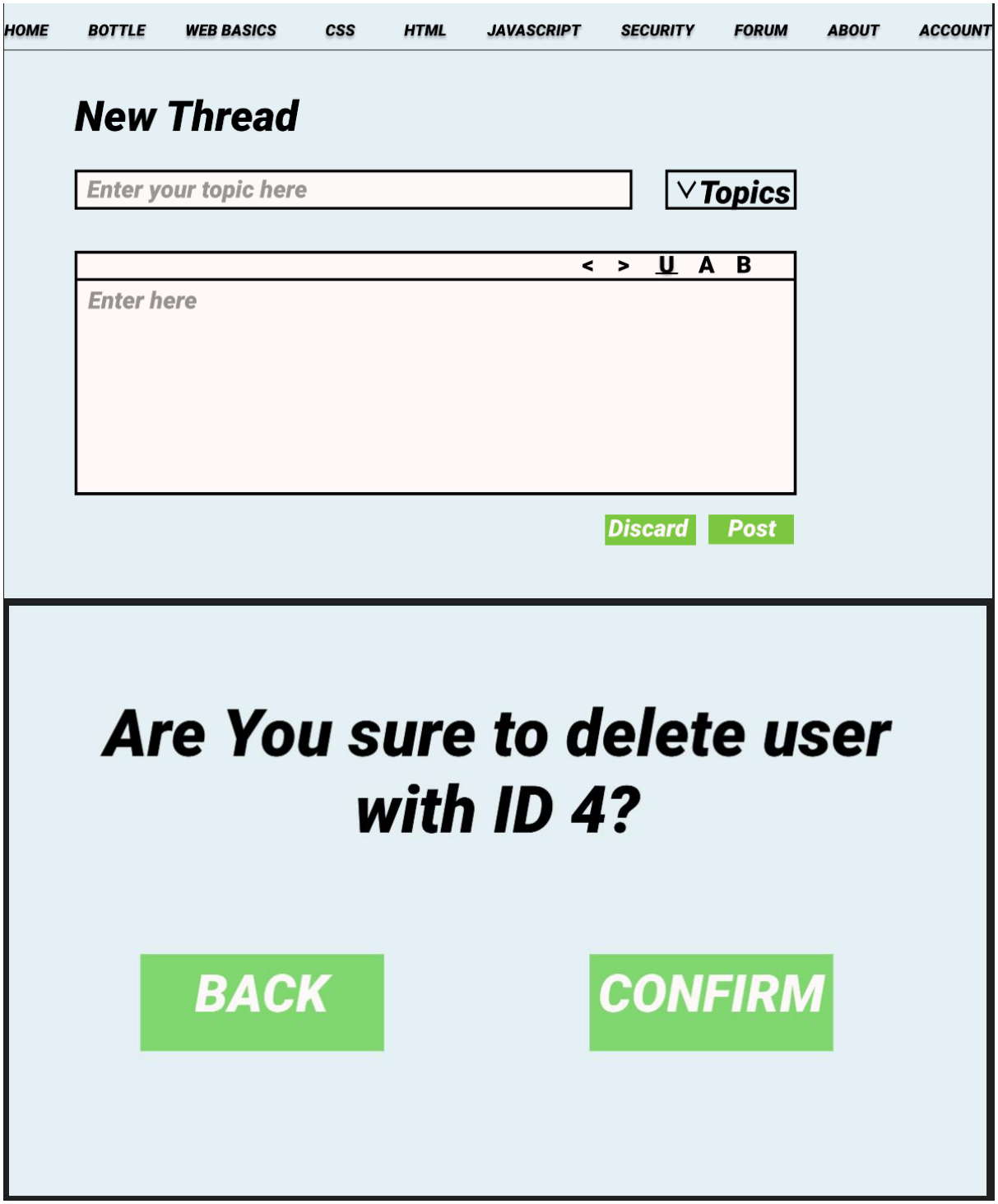


By clicking on the MUTE button on user 2, the user will immediately see the feedback where user 2's mute button has transitioned to an unmute button. Our team has designed a new functionality that allows users to test HTML code rendering right on our website to help users reinforce their learning. This functionality complies with **Principle 6**, which states, "Minimize the user's memory load by making elements, actions, and options visible. The user should not have to remember information from one part of the interface to another. Information required to use the design (e.g., field lab, els or menu items) should be visible or easily retrievable when needed."



We even provided a sample code so that the user does not have to enter the code manually to test the code taught in the content. When the user clicks on the Run button, the code's output will directly display on the right side of the webpage. It also complies with Principle 1, where feedback is immediately available.

Sometimes users may wander into a page where they are not expected to; we then give them away to immediately back out of the current page so that users still have control of the website and avoid getting stuck and feeling discouraged. This coincides with **Principle 3**, which states, "Users often perform actions by mistake. They need a marked "emergency exit" to leave the unwanted action without having to go through an extended process."



Both the discard and back buttons are ways to exit from the current action without modifying the content. The navigation bar on top of the webpage also serves the same purpose where the user can go to any other pages at any point.

2.2.3 Issues with our website design

Iteration 1

After completing the wireframe design, we know we need to check the usability of our website and see if there are any improvements we can make. As such, we approached one of our target users and conducted a usability testing session. The process is shown in Section 3.1 First Usability Testing. The issues identified were the leader board feature is not desirable as it introduces competition, which may not be friendly to all users. The forum functionality is too small in terms of size, and it would be great if it has its page.

Meanwhile, compared to the prototype, a wireframe is much faster and convenient to create. However, it does not include the animation that allows the testing users to interact, which places some limitations in the first user evaluation session.

Iteration 2

We then use the current prototype to perform the second usability testing on a number of our target users. The process is also shown in Section 3.1, Second Usability Testing. The designs this time are generally more well-liked and receive appraisals from our users. However, there are still issues which we can improve on.
For example, our user had suggested that we should include more suggestive buttons on the homepage to allow for login, signup and admin login.

2.2.4 Design Improvement

Iteration 1 to Iteration 2

The significant improvement is the transformation from a drawn wireframe to a working prototype with interactions between the webpage and the user. This allows us to conduct the usability test much more accessible, and the result is much more meaningful.

We also made improvements based on the feedback given by the usability tester. For example, we have separated the forum functionality as an individual page and a header's place to access the forum. The leader board functionality is also removed.

Other improvements are primarily on the details of the current design. For example, a navigation bar is added to every page of our prototype. This feature enables the users to move around in the website more easily. More pages are added to showcase the login/signup functionality and other functionalities.

2.3 Phase 3: Test Usability

2.3.1 Evaluation process

Our group conducts the user evaluation through two usability testings. Usability testing is testing our website's functionality by giving tasks to real users in our target group. Both usability testings were done early in the development process using our wireframe.

The first wireframe is a hand-drawn version, while the second stimulates the functionalities of real websites meaning that buttons are clickable and will redirect users to the corresponding page.

Preparation Process:

We have set the goal of those two usability testings to be observing whether the contents were easy to understand and the buttons were easy to be found. Both testings would be moderated by us remotely on Zoom and would have one participant each time.

Our group came up with the task list through brainstorming. After that, we would fine-tune the task list by running pilot studies on our friends who were also in the target group. We gave those tasks to the user in a solid and specific form.

To measure the prototype usability, we had decided to use some quantitative metrics like the time taken to finish each task, whether the participant had accomplished the set goals, whether the user made a mistake. Some subjective ones like how the user felt about our design and functionalities are also asked.

During the Usability Testing

We first introduce what our website is for and let the user guide us exploring the website. During the testing, no clues will be given from the group member interacting with the user. Other members will record the behaviours and feedback given by the user. After he or she has completed all the tasks, our group will ask the user subjective questions like "Do you feel our website is easy to navigate?" or "Do you have difficulty understanding the contents?".

After the Usability Testing

When the testing is done, we will go through each functionality that has been tested. Drawing conclusions from the usability testing, we decide on the following three outcomes:

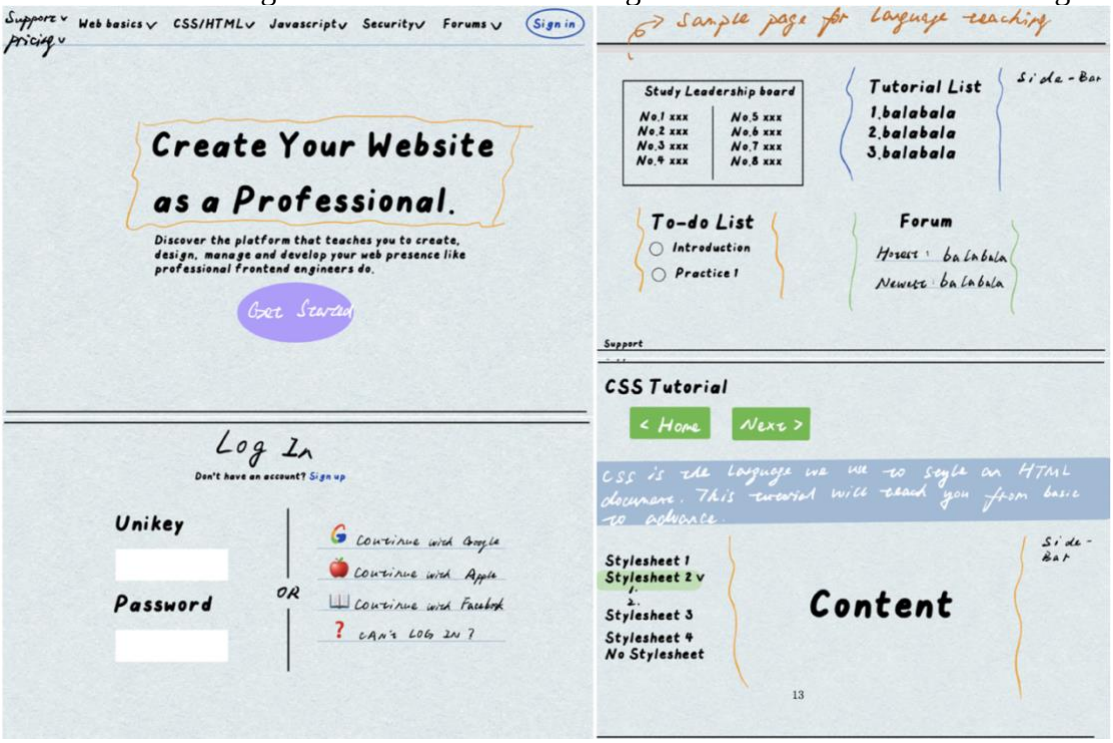
- whether it has met or even exceeded our expectations and will be ready for the development?
- Whether the functionality is shippable but should be improved for better user experience? If so, what is the problem and who should be responsible to improve it?
- Should we just discard the functionality?

2.3.2 First usability testing

Preparation Process

Since all group members have drawn their design as one of the artefacts for week 4's logbook, we had a meeting to review each wireframe. Then we decided which one is the most suitable one to be presented to our user during the usability testing.

The following is the showcase of the design that we used for the first testing:



We have come up with the task list shown as follows:

1. Sign in to our website using Google account;
2. Get into CSS tutorial 1;
3. Get into CSS lecture introduction of CSS;
4. Do some practice exercise of CSS;
5. What should be done if unable to login;
6. Post a new thread with the title "why it doesn't work?'

During the testing

We shared screen with our user and recorded his reaction. The user dictated how he completed the tasks and we recorded the time taken and his feelings about the process.

After the testing

As for the quantitative measurement, the participant has accomplished all the goals set in seconds. The time taken for completing each task are 2s, 3s, 6s, 3s, 7s. For the subjective part, we asked how he felt about our wireframe and what can be improved. He felt that the colour chosen for the website was aesthetically appealing and the contents were easy to understand. However, it would be discouraging to see the leaderboard in the home page and it would be better if the forum had its own page, instead of being squeezed in the corner of the home page. Thus, we decided that it will be a separate page for the forum.

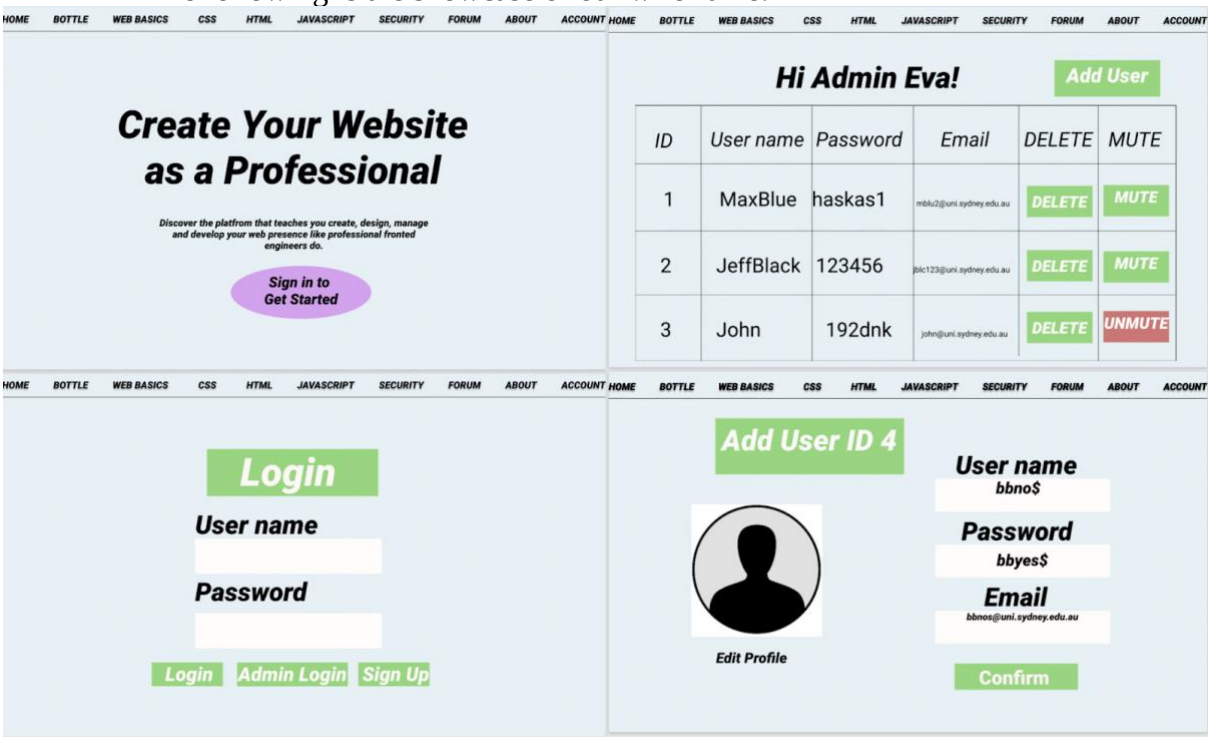
2.3.3 Second usability testing

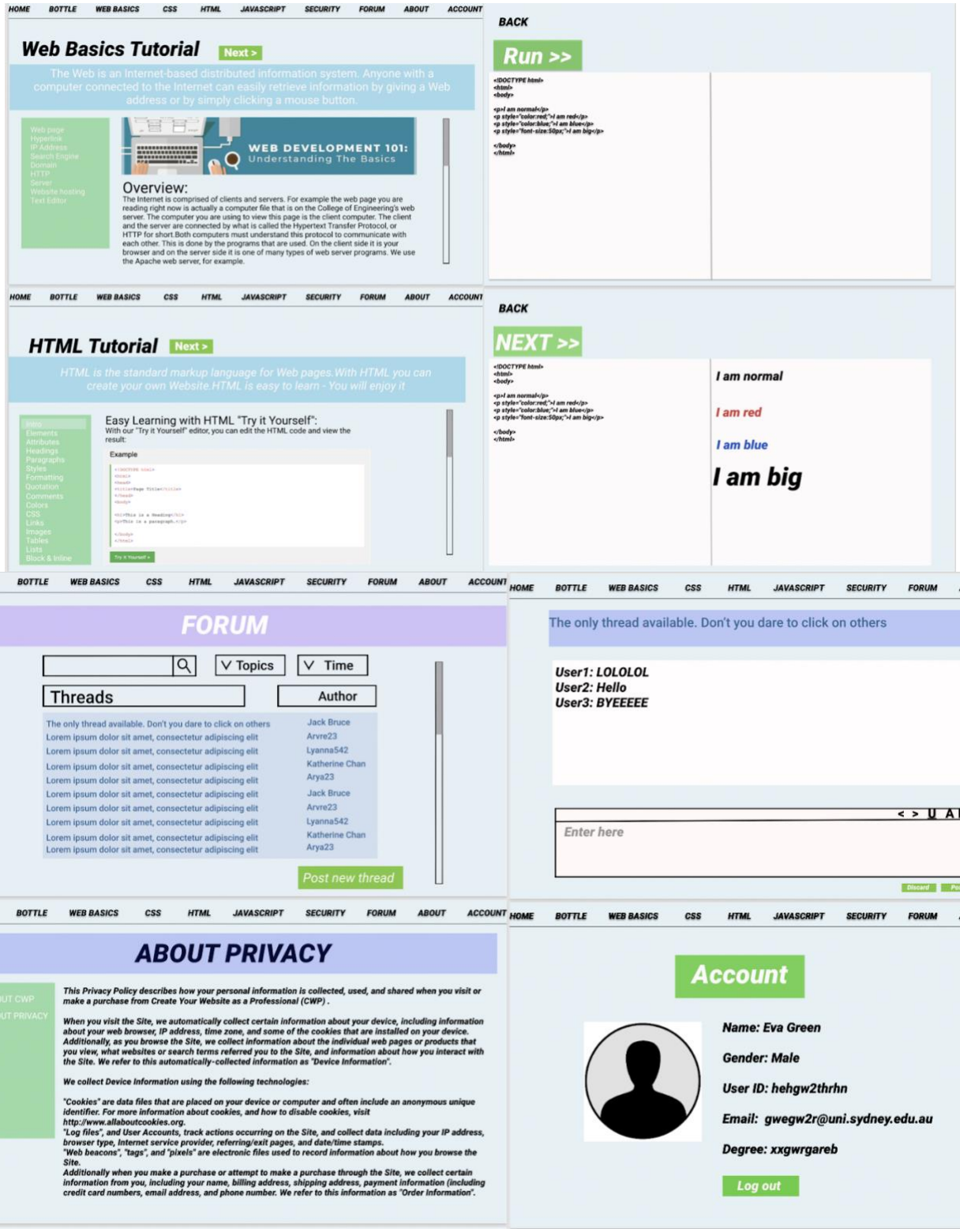
Preparation Process

By employing the first usability testing, we reckon that our UI design meets our expectations. To make our wireframe interactive, we refined our hand-drawn version. After this, we created an online version using Figma based on the design of the hand-drawn one. Thus, buttons are clickable and will redirect users to the next page.

By the practice of conducting accessibility testing, we made some colour changes so that texts on our website should be high-contrast for users with low vision. Also, we have decided that the font should be big enough. For each page, there should be a sidebar and heading for a better navigating experience.

The following is the showcase of our wireframe:




HOME BOTTLE WEB BASICS CSS HTML JAVASCRIPT SECURITY FORUM ABOUT ACCOUNT
Web Basics Tutorial
Next >
The Web is an Internet-based distributed information system. Anyone with a computer connected to the Internet can easily retrieve information by giving a Web address or by simply clicking a mouse button.
WEB DEVELOPMENT 101:
Understanding The Basics
Overview:
BACK
Run >>
HTML Tutorial
Next >
HTML is the standard markup language for Web pages.With HTML you can create your own Website.HTML is easy to learn - You will enjoy it
Easy Learning with HTML "Try it Yourself":
NEXT >>
I am normal
I am red
I am blue
I am big
FORUM
Topics
Time
Threads
Author
Post new thread
The only thread available. Don't you dare to click on others
User1: LOLOLOL
User2: Hello
User3: BYEEEEE
Enter here
ABOUT PRIVACY
Account
Name: Eva Green
Gender: Male
User ID: hehgw2thrhn
Email: gwegw2r@uni.sydney.edu.au
Degree: xxgwrgareb
Log out

After brainstorming, our group has gone through the tasks by ourselves. Then we invited some friends to conduct pilot studies for refining the task list. We gave the participants these tasks in a specific format. Each one is about to click the correct button and to be redirected to the corresponding page.

The following is the task list for the second usability testing:

1. Sign in as the Admin;
2. Mute user 2 as the Admin;
3. Unmute user 2 as the Admin;
4. Add an user as the Admin;
5. Delete user 4 as the Admin;
6. Find out information about own account;
7. Logout from the current account;
8. Navigate to the page to login to an account and log in;
9. Logout from the current account;
10. Navigate to the page to sign up for an account and sign up;
11. Find out our introduction about our website;
12. Find out the privacy policy about our website;
13. Find out the main page of content about Bottle;
14. Find out the main page of content about HTML;
15. Try running the two HTML examples;
16. Find out the main page of content about CSS;
17. Find out the main page of content about JavaScript;
18. Navigate to the next page of content in the JavaScript section;
19. Find out the main page of content about Security;
20. Find out the main page of content about Web Basics;
21. Navigate to the forum and view the first thread;

During the testing

We introduced what our website is for to the user. Then we shared the screen with the user and let her guide us through the prototype. The participant dictated the steps of how she completed the task. While two of us were interacting with her, others took notes by observing her behaviour and feedback. Again, we gave no clues to the user during the process.

After the testing

As for the quantitative measurement, the participant has accomplished all the goals set in seconds. We asked the user whether she had difficulty understanding the contents and navigating herself through different pages for the subjective part. She liked the colour choices (especially the white text on the bottom colour of green) and felt that the heading listing all the knowledge content, forum, home page, and navigation sidebar were helpful.

However, users suggested that we should put the editor on it for the exercise page. We also found her confused since logging in, signing up, and administrative logging is all on the same page and can only be redirected by clicking on the only button on our website's homepage.

Our conclusion drawn from the second usability testing is that we should include three separate buttons: login/sign up / admin login on the homepage, each linking to an individual page responsible for that particular functionality.

3. Conclusion

3.1 Achievements to project requirements

We have completed all the artefacts mentioned in the project brief, including PACT analysis, investigation protocol and findings, website persona, card sorting, the information architecture of the website, prototype of the website, and usability evaluation. We performed the results of the above activities, and improve related issues based on the analysis. In the next stage, we need to implement code based on the prototype and deploy the website to do the project's security portion as soon as possible.

3.2 Limitations

1. Since our prototype has a lot of functions, we are confused whether we can develop excellent code to support our designs.
2. We have made a simple version of code and git pushed it into GitHub but there is still lots of work that needs to be done.
3. The security part’s process is 0%.

4. Reference

Jakob Nielsen (Apr. 24, 1994) 10 Usability Heuristics for User Interface Design. https://www.nngroup.com/articles/ten-usability-heuristics/

PACT Analysis. (2021). Retrieved 13 April 2021, from https://github.sydney.edu.au/INFO2222-2021S1/RE11-T14A3/blob/master/PACT%20Analysis.pdf/