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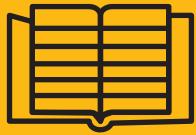
Web Update Document of ELECHOOSER

Hang Sun
Computer Science
SWJTU-UoL Joint School



Prepared for Intro to The Web Technologies
XJCO1021
Coursework 2

Student ID SWJTU : **2020110158** UoL : **201487827**



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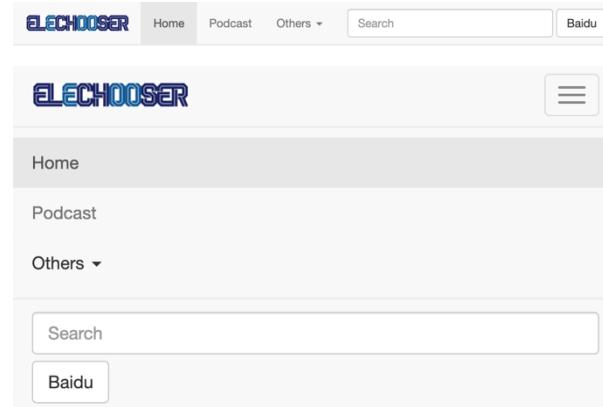
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1. Designs, Benefits and Justifications of Updating

| Summary of Web Updates | | |
|--------------------------------|-----------|---|
| Adding the Bootstrap framework | JS Plugin | Responsive overhead navigation bar |
| | Css style | Change to bootstrap button |
| | | Bootstrap thumbnail component |
| | | Bootstrap Glyphicons font icon |
| | | Responsive Grid System |
| Change of Html+Css | | Original navigation bar that disappears as the window size is reduced |
| | | More complex style headings |
| | | A more sophisticated responsive photo wall |
| | | Modify original css code to fit smaller screen size |
| | | New geolocation navigation module |
| | | The new responsive video wall |
| | | Reduce the size of the page title module |
| Adding Javascript | | New switchable picture wall |
| | | Responsive news image module |
| | | Bottom warning about using external web services |
| | | Automatic return to top of page button |
| | | Text message hiding and display |
| | | Audio player for switching, pausing and playing |
| | | Setting up the features of the Baidu Maps api |
| Adding JQuery Modules | | Click on the image to bring up the details window |
| | | Video switching at the click of a button |
| | | Most images enlarge on mouse hover |
| | | Responsive podcast wall |
| More Fonts | | Auto-scrolling mobile pictures |
| | | Holiday |
| | | Polo |
| | | Uniform |
| | | Vice |
| New Functions | | Campton |
| | | Audio Player |
| New Layouts | | Home Page, Smartphone Page, Pad Page |
| Adding a new page | | Podcast |
| External Web Services API | | Baidu Map Navigation |
| | | Baidu Search |
| | | Bilibili Videos |
| Html Advanced Features | | Geolocation: Baidu Map |
| | | Web Storage: Show audio play count |
| | | Showing the time of this moment |

1.1 Bootstrap

1.1.1 New Navigation bar



This navigation bar allows the home page, podcasts to be placed in the primary menu and other pages in the secondary menu, while integrating the Baidu search framework. When the window is reduced in size, only the logo on the left side and the expand button on the right side are displayed. The buttons can be clicked and then dropped down to show the full information.

Benefits of The Change

1. Make the navigation bar suitable for different screen sizes
2. Improve uniformity between different web pages
3. Search bar for user convenience
4. More aesthetically pleasing
5. Always fixed at the top of the screen, so that users can easily leave the page

Justification for Updating or Designing

The original navigation bar is not friendly to small screens. The navigation bar in bootstrap is easy to use and is not easily influenced by other designs in the web page.

1.1.2 Bootstrap Button

All the buttons on this site have been upgraded to Bootstrap buttons, they have essentially the same size, change color on mouse hover to be noticeable to

the user and finally the buttons all have the same size rounded corners to improve aesthetics.

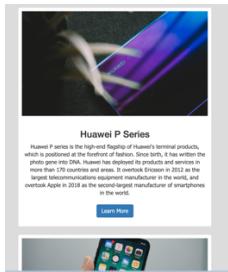
Benefits of The Change

1. Improving aesthetics
2. More uniformity across all pages
3. Comfortable feedback to users after clicking or hovering
4. Cleaner code writing

Justification for Updating or Designing

Bootstrap offers a wide range of buttons and the ability to change size and style by changing the properties of the Class, making it easier and more aesthetically pleasing.

1.1.3 Thumbnail Component



This component is composed of pictures, text descriptions and buttons arranged in sequence. This web page uses three components in a div in parallel to show the basic introduction of three mobile phones.

Benefits of The Change

1. The length of the three components is always the same
2. More responsive web page requirements

Justification for Updating or Designing

Firstly, the three divs in this section originally change in length as the window changes and are very untidy. Even the third div would be misshapen when the page became too small. Finally, the new version of the component is basically the same style as the original but maintains a stable appearance. A new button has been added to direct interested users to the mobile phone description page.

1.1.4 Glyphicons Font Icon

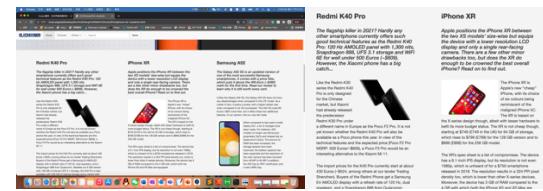
Bootstrap provides a rich set of font icons that can be referenced very easily. This site references toggle symbols for users to switch between images.

Benefits of The Change : Beautiful and convenient

Justification for Updating or Designing

The site was originally intended to use a greater than and less than sign to indicate both left and right, with a professional icon style to make the meaning clearer.

1.1.5 Responsive Grid System



The grid system is very convenient to allow a few divs in parallel to meet the requirements of a responsive page, making this page display better on smaller devices. The grid system is used extensively in this webpage.

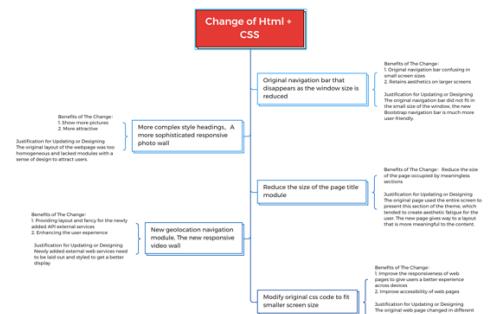
Benefits of The Change

1. Displayed properly on different sizes
2. Improved uniformity across pages

Justification for Updating or Designing

The grid system is one of the easiest and most effective ways to create responsive pages, so it was adopted for this site.

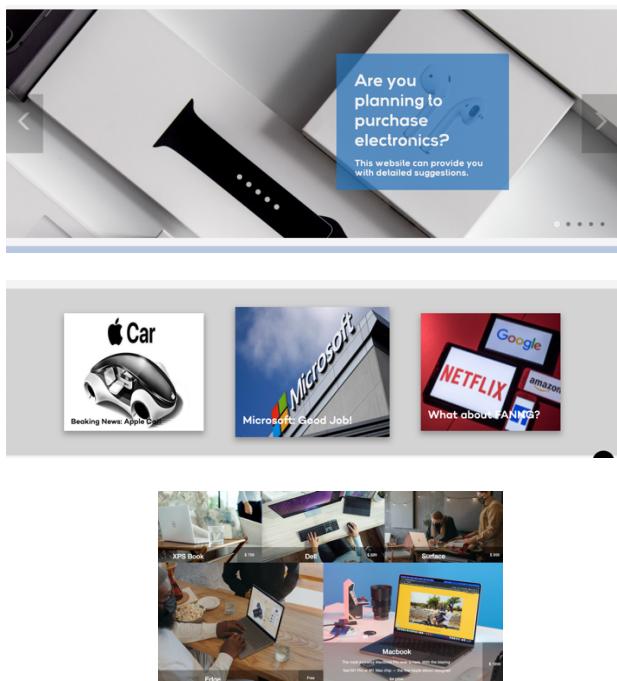
1.2 Change of HTML & CSS



See Appendices for Details of HTML & CSS

1.3 JavaScript

1.3.1 New Switchable Picture Wall & Responsive News Image Module



These two sections are mainly used to display images, both of which can respond to the user's mouse hover and provide feedback such as zooming in on the image, changing the background color and displaying text.

Benefits of The Change

1. Improve the user experience
2. More fancy, less visual fatigue
3. Show more information

Justification for Updating or Designing

The original webpage mainly reused the same style and layout, while the image display section did not provide feedback to the user, using this design allows the user to experience a sense of interactivity and immersion.

1.3.2 Bottom Warning About Using External Web Services

Benefits of The Change

Running this website requires the use of Baidu Map and other companies' public API interface, please confirm whether you accept [SEE MORE](#) [ACCEPT](#)

Display API copyright and official API links, reflecting the website's awareness of respecting copyright, etc.

Justification for Updating or Designing

Inspired by the cookies option that pops up on the home page of many websites, it was necessary to let users know the brand to which the API belongs as this

website does not use cookies but uses an external web service.

1.3.3 Automatic Return to Top of Page Button



Benefits of The Change: Convenient for users to go back to the top of the page to switch pages

Justification for Updating or Designing

Some pages are overloaded with content, especially on mobile where it takes time to scroll up the page, the quick swipe button saves the users' time.

1.3.4 Text Message Hiding and Display

 So which one is the right tablet for you? ([Click Here](#))
It has Apple's A13 Bionic chip, which first appeared inside the iPhone 11, circa 2019, but still an upgrade from the last vanilla iPad iteration. But yes, it's not as powerful as the newer chips in the iPad Air and just-updated iPad mini.

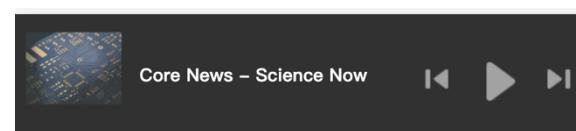
Benefits of The Change

1. Space saving layout
2. Improves interaction between user and page
3. Display more text information

Justification for Updating or Designing

The original module presented a large amount of text directly without giving the user the opportunity to choose. The update allows users to select the details they want to know according to their preferences.

1.3.5 Audio Player for Switching, Pausing and Playing



Benefits of The Change

1. More convenient operation logic
2. User-friendly audio switching
3. Pause the audio at any time

Justification for Updating or Designing

The original audio is embedded in the web page only as the most basic audio style, which is not user-

friendly, this player is improved based on the design concept of common music players.

1.3.6 Setting Up the Features of The Baidu Maps API



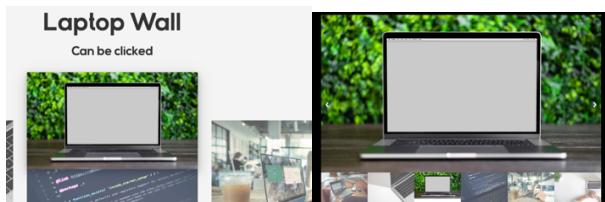
Benefits of The Change

1. Convenient for users to view details, switch views and more on Baidu Maps
2. Display copyright information for Baidu Maps
3. Convenient for users to zoom in and out of the map scale

Justification for Updating or Designing

The default properties of the API do not support zooming in and out and so on, which is very detrimental to the user's access to navigation information, and the changed page will give the user a similar experience to that of using a map app.

1.3.7 Click on The Image to Bring Up the Details Window



Benefits of The Change

1. Easy for users to zoom in on images
2. the ability to switch between images without closing the window after zooming in
3. Significantly improves the functionality of the website

Justification for Updating or Designing

For technology portals, the presentation of images is particularly important. New pop-ups displaying images allow users to get to know the details of the product and thus achieve the goal of attracting users.

1.4 JQuery

1.4.1 Video Switching at The Click of Buttons



Benefits of The Change

1. save layout space
2. improve user interaction with the web
3. Facilitate users to find videos according to their preferences

Justification for Updating or Designing

The original video module simply arranged each video in parallel, giving the user a very confusing look and feel. The updated module adds button tabs to show only the videos the user wants to watch and can be switched freely.

1.4.2 Most Images Enlarge on Mouse Hover

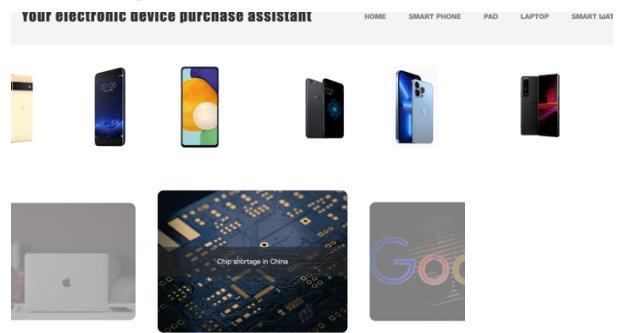
Benefits of The Change

1. Give users appropriate feedback
2. Optimize human-computer interaction design

Justification for Updating or Designing

The original image module does not respond to the user and affects the sense of user experience.

1.4.3 Responsive Podcast Wall & Auto-scrolling Mobile Pictures



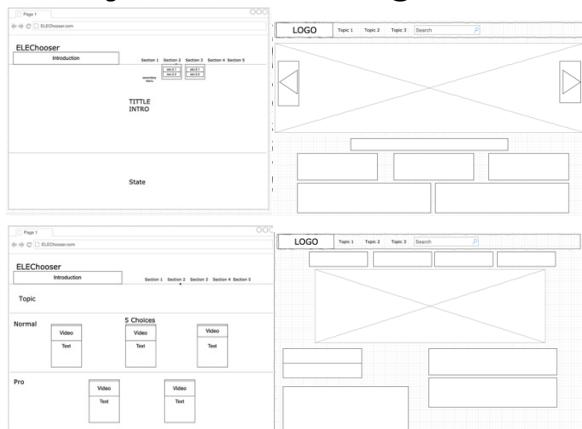
Benefits of The Change

1. dynamic presentation of images in different formats
2. Aesthetic effect

Justification for Updating or Designing

Using only css static display images will make users aesthetically tired, a dynamic photo wall will allow users to better appreciate the page.

1.5 More Fonts, New Functions, New Layouts & New Page



The latest version of the page has added more fonts to bring each section closer to the text. A new music player has been added to the new pages, which is the most important feature of the Podcast pages and allows the user to switch between audio freely and have the same experience as the music player. The new layout makes the page more readable and simpler.

1.6 External Web Services

1.6.1 Baidu Map

The Baidu Map API first uses the advanced HTML feature Geolocation to obtain the user's location, then passes the location to the Baidu Map server to obtain navigation information to reach a specific location, and then displays it through the API.

Pros:

1. more intuitive suggestions for users on how to buy
2. Improve the functionality of the web page
3. Humanized display of the most suitable path for the user

1.6.2 Baidu Search

This page embeds Baidu search into the webpage, allowing users to search for the information they want more quickly. Sometimes non-expert users may encounter content that they cannot understand, and the search box provides them with a window to link to the outside.

Pros:

1. Enhancing functionality
2. facilitate external searches for users

1.6.3 Bilibili Videos

This site integrates several videos from bilibili and allows you to view the pop-ups in the videos while watching them, enhancing the sense of interaction between the user and the site.

Pros:

1. You can switch between videos at will
2. Show pop-ups

1.7 Html Advanced Features

1.7.1 Geolocation: Baidu Map

The website uses Geolocation to obtain information about the user's location at the moment, and by uploading the location information to the Baidu Maps service to obtain further information and even provide navigation for the user.

1.7.2 Web Storage: Show video play count

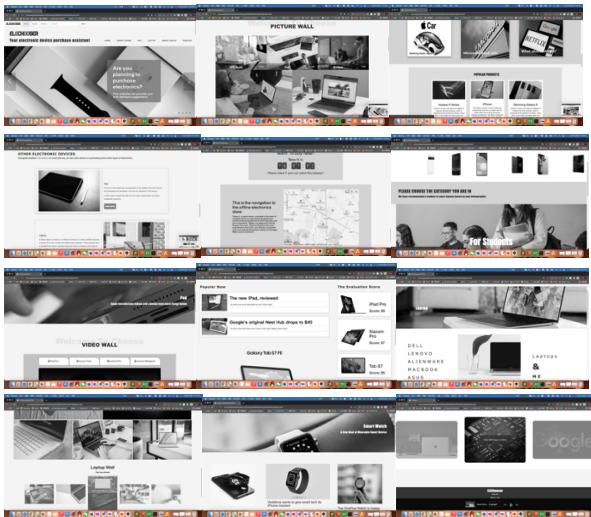
The number of times the user watches the video is monitored and the user is signalled to move to the next section when the entire video has been watched.

1.7.3 Showing the time of this moment

Get the time information to show the user the current time and prompt the user to check if public transport is still running (to buy electronics).

2. Evaluation & Test

2.1 Accessibility Evaluation



2.1.1 Grayscale Test

In greyscale mode, the site is displayed as before, with no interruption of background and content.

For the new features:

The new functions can be displayed normally in grayscale mode, but for video modules, grayscale mode may affect the video display effect.

2.1.2 Picture Accessibility Test

All images in the HTML file contain Alt attributes to facilitate access to information by people with disabilities or physical disabilities and those with limited hardware.

2.2 Usability Evaluation

2.2.1 Test Plan:

When testing web pages, this will be done in the following general directions: UI testing, link testing, compatibility testing and function testing.

2.2.2 Test Result:

UI Test:

Consistent web page style **YES**

Consistent page size **YES**

Consistent size and position of logo images on each page **YES**

Correct title on each page **YES**

Correct copywriting **YES**

fonts, sizes and colours are consistent **YES**

pages are proportionally smaller or have scroll bars when the window is reduced **YES**

The style of the reduced size is consistent from page to page **YES**

The original version did not have a consistent strategy for window reduction across all modules

Buttons are same in size, styled in a consistent manner and spaced consistently **YES**

Page colours are uniform **YES**

Front view and background colours are well matched **YES**

Navigation text is displayed on the same line **YES**

All images are loaded correctly **YES**

Images display correctly in different browsers and resolutions **YES**

Mouse over button effect works, disappears after moving out **YES**

Link Test:

No unlinkable content or dead links **YES**

Image links work **YES**

Click on the link in the title to go to the corresponding article details page **YES**

Clicking on the [more] on the home page to go to the corresponding page correctly **YES**

Navigation links to the correct page, and can jump to the corresponding page **YES**

Compatibility Test:

Browser compatibility:

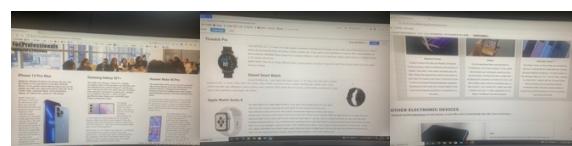
IE, Edge, Chrome, 360, QQ, Firefox, Sogou, Opera.



Edge

Opera

Sogou



360

QQ

Firefox



Chrome

This page is generally compatible with all major browsers

Tests at different resolution screens:

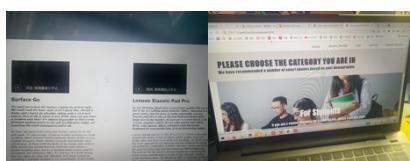
- 32-inch 2k display (Philips) **YES**
- 27-inch 1080p display (KOAKIA) **YES**
- 15-inch Retina display (MacBook) **YES**
- 13-inch 2k display (Huawei MateBook) **YES**
- 14-inch 1080p display (Lenovo) **YES**



Philips

KOAKIA

MacBook



Huawei

Lenovo

Tests at different operating systems:

- Mac OS Big Sur **YES**

- Windows 10 **YES**

Proof images are visible in macbook and lenovo images.

Function Test:

Information is obtained normally **YES**

Images are displayed correctly **YES**

Audio playback is working properly **YES**

New Function Test:

Baidu Map API is worked properly **YES**

Bilibili video playback is working correctly **YES**

All dynamic responses are running properly **YES**

The CSS validates without errors or warnings **YES**

[stylelint] 验证完成, 共发现0个问题。

2.3 The impact on website of the new features.

1) The stability of the layout of this website has been improved and the confusion of the layout has been significantly reduced across different devices and different window sizes.

2) Many dynamic effects have been filled within the website so that users are less prone to visual fatigue. The new version of the website has introduced a lot of JavaScript to implement more dynamic effects.

3) More in line with WCAG requirements, usability has been enhanced in the improvement programme, for example

- a) Addition of content adapted to smaller screens.
- b) Providing positioning navigation for users
- c) Visibility of pop-ups and comments from others in the video

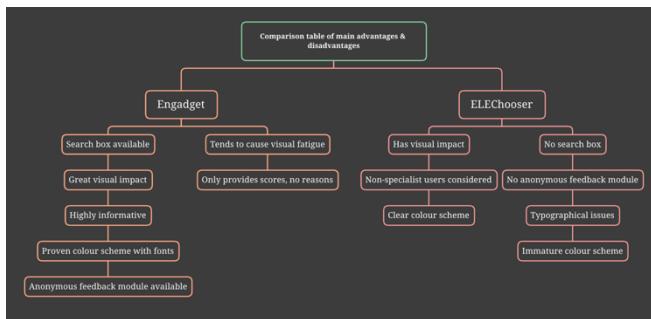
4) In the new version, a search module has been added to make it easier for users to access information quickly.

5) A more sophisticated colour scheme with more options for different content to improve the aesthetics of the site.

6) To improve the uniformity of the pages, the new version will standardise the strategy for handling width variations, reducing the size to the original proportions and adapting the mobile version of the pages as far as possible.

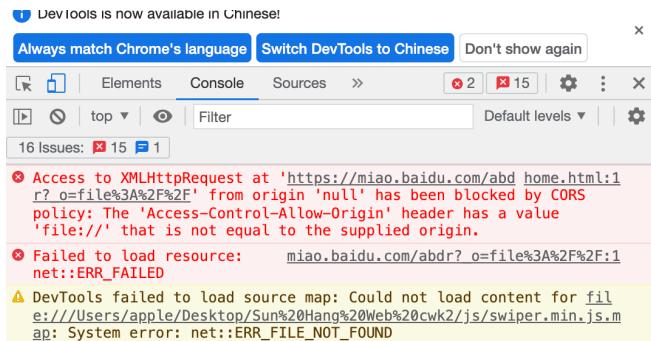
2.4 Approach to Testing the Implementability of New Features

About putting the Baidu map navigation module, after comparing the local location with the location shown on the webpage, the positioning is basically accurate; the navigation route is consistent with the APP navigation in the mobile phone. The video playback service plays normally on most devices and browsers. The dynamic effects used in the compatibility test were displayed correctly on different devices; the Baidu search module was correctly directed to external links; clicking on the image to display a larger version of the window was correctly displayed or closed by clicking on the top right corner, etc.



Comparison table of main Pros and Cons of LAST VERSION

At the same time, most of the shortcomings of the original version in relation to Engadget have been improved or corrected after the new features that have been added to the new version.



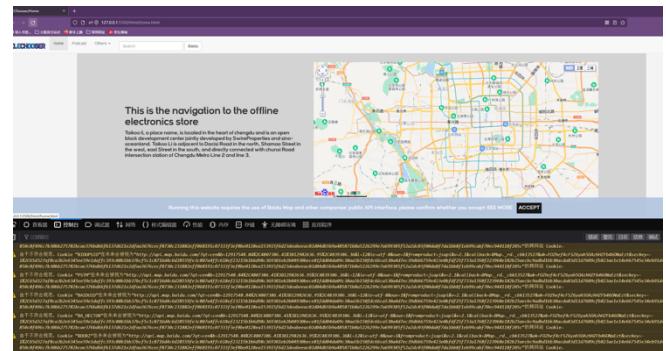
Home Page

```

DOMException: Blocked a frame with origin "https://www.bilibili.com" from accessing a cross-origin frame.
  at https://www.bilibili.com/blackboard/html5mobileplayer.html?id=97405242&bvid=BV1Y7411R7Fu&cid=166287809&page=1:175
DOMException: Blocked a frame with origin "https://www.bilibili.com" from accessing a cross-origin frame.
  at https://www.bilibili.com/blackboard/html5mobileplayer.html?id=376579242&bvid=BV1804y1X7L&cid=367000210&page=1:166:36
DOMException: Blocked a frame with origin "https://www.bilibili.com" from accessing a cross-origin frame.
  at https://www.bilibili.com/blackboard/html5mobileplayer.html?id=69844402&bvid=BV1iE41107s8&cid=121028613&page=1:166:36
DOMException: Blocked a frame with origin "https://www.bilibili.com" from accessing a cross-origin frame.
  at https://www.bilibili.com/blackboard/html5mobileplayer.html?id=77028897&bvid=BV14J411R7Mg&cid=131751573&page=1:166:36
  
```

Pad Page

The only errors displayed in the console are on the home page and the pad page, both due to API errors, which have been tested because these APIs are officially not allowed to run on the PC, and they will disappear when switching to the server side.



No error on the server side

2.5 Considerations for Adding Other Features & Their Impact

1. Implementing an onsite search that allows users to find the information they want within the site
2. Allow for self-selected devices to be compared, with automatic table generation and support for downloading to a local location. This can greatly increase the ease of experience for the user, allowing them to compare their favourite devices side-by-side.
3. Allowing users to select their own mobile phone outlets, thus providing them with navigation to different addresses, which allows for greater freedom in the map module.
4. Designing new mobile pages directly, rather than adapting computer pages to mobile, can provide a better experience for mobile users.

2.6 References of Web Pages

- Wikipedia. *iPhone, Pad, Galaxy S, Laptop, Smart Watch, Huawei P* [Online]. [Accessed 2 October 2021]. Available from: <https://en.wikipedia.org/wiki/IPhone>
- Engadget Reviews on classic products [Online]. [Accessed 2 October 2021]. Available from: <https://www.engadget.com/>
- Mat Smith *The New iPAs Reviewed* [Online]. [Accessed 2 October 2021]. Available from: <https://www.engadget.com/the-morning-after-the-new-i-pad-reviewed-111604927.html>
- Palladino *Google's original Nest Hub drops to \$40 at Best Buy* [Accessed 2 October 2021]. Available from: <https://www.engadget.com/google-nest-hub-first-generation-40-deal-best-buy-151238609.html>
- Pictures in websites. [Online] [Accessed 8 October 2021]. available from: <https://unsplash.com>

3. Architecture of The Web

3.1 The Basic Structure of the Web

A clear understanding of the basic structure of the web is a prerequisite for exploring deeper issues such as the role of the web server and the client. After understanding and exploring, we can define the World

Wide Web (Web) as a collection of interconnected

documents. In other words, it is a system of interlinked, hypertext documents that runs over the Internet (McGill University, 2007).

Users can use a web browser to view web pages that may contain multimedia files such as text, images and video, and hypertext links enable switching and navigation between these sections. In addition, hypermedia files can be linked with images, audio, animation and video etc. The Web basically operates in the common client-server format on the Internet. In this case, the server is the computer program that stores and transfers files to other computers on the network, while clients are programs that request files from the server when requested by the users. For users, the browser allows them to browse the retrieved files; for Developers, they can write hypertext documents using Hypertext Markup Language (HTML), which is assigned to an online address called a Uniform Resource Locator (URL).

3.2 The Roles of Web Browsers and Web Servers

As the case of client-server format, a majority of ways to configure a web application follow the same basic structure: a client, a server, and a database.

The Web Browser (Client)

Whilst it could be considered whole user's device as the "Client" piece of the client-server model, the Web client typically refers to the Web browser in the user's device.

The Web browser is the application that allows users to find, access, display and view websites. It is

primarily used to display and access websites on the Internet and content created using programming languages such as Hypertext Markup Language and Extensible Markup Language. The browser primarily converts Hypertext Transfer Protocol (HTTP) web pages and websites into human-readable content.

Its primary function is to render HTML; when a browser loads a web page, it processes the HTML, which may contain text, links and references to images and other items such as CSS and JavaScript functions, and then displays these objects in the browser window.

Essentially, a browser is a software application that allows users to access information on the World Wide Web. When a user requests a web page from a specific website, the web browser requests the content from the web server and displays it on the user's device. In other words, the user must have a web browser installed to connect to the website's server and view its web pages.

The client is what the user interacts with. So "client-side" code is responsible for most of what a user actually sees. This includes:

1. Defining the structure of the web page
2. Setting the appearance of the web page
3. Implementing a mechanism for responding to user interactions

Structure: The layout and content of the webpage are defined by HTML which stands for Hyper Text Markup Language. It allows user to describe the basic physical structure of a document using HTML tags. Each HTML tag describes a specific element on the document. For example:

```
body class="bg-light">
  <nav class="navbar navbar-default navbar-fixed-top">
    <div class="container-fluid">
      <div class="navbar-header">
        <a href="#" class="navbar-toggle collapsed" id="navbar-toggle" data-toggle="collapse" data-target="#bs-example-navbar-collapse-1" aria-expanded="false">
          <span class="sr-only">Toggle navigation</span>
          <span class="icon-bar"></span>
          <span class="icon-bar"></span>
          <span class="icon-bar"></span>
        </a>
        
      </div>
      <div class="collapse navbar-collapse" id="bs-example-navbar-collapse-1">
        <ul class="nav navbar-nav">
          <li class="active"><a href="#">Home</a><br><small>(current)</small></li>
          <li class="dropdown">
            <a href="#" data-toggle="dropdown" role="button" aria-haspopup="true" aria-expanded="false">Others <span class="caret"></span></a>
            <ul class="dropdown-menu">
              <li><a href="#">Smartphone.html">Smart Phone</a></li>
              <li><a href="#">Podcast.html">Podcast</a></li>
              <li><a href="#">SmartWatch.html">Smart Watch</a></li>
              <li><a href="#">SmartSearch.html">Smart Watch</a></li>
            </ul>
          </li>
          <li><a href="#">separatior" class="divider"></li>
          <li><a href="#">reference-list.html">References</a></li>
        </ul>
      </div>
    </div>
  </nav>
```

- The content within the “`<h1>`” tag describes the heading.
- The content within the “`<p>`” tag describes a paragraph.
- The content within the “`<button>`” tag describes a button.
- And so on...

A web browser uses these HTML tags to determine how to display the document.

Appearance: To define the appearance of a webpage, web developers use CSS, which stands for Cascading Style Sheets. CSS is a language that lets users describe how the elements defined in your HTML should be styled, allowing changes in font, color, layout, simple animations, and other superficial elements. User could set styles for the above HTML page like this:

```
.btn-design-2:hover:after {
    -webkit-transform: scale(0);
    -ms-transform: scale(0);
    transform: scale(0);
}

.btn-design-2:before {
    top: 0;
    left: 0;
    right: 0;
    bottom: 0px;
    background: #3b5de7;
}
```

User interactions: Lastly, JavaScript comes into the picture to handle user interactions. For example, if users want to do something when a user clicks your button, you might do something like this:

```
accept.style.bottom = "-8.5rem";
};

var photos3 = document.querySelector("#photos-3");
var photos3a = document.querySelectorAll("#photos-3>a");
var photos3img = document.querySelectorAll("#photos-3>img");
for (var i in photos3a) {
    photos3a[i].onmouseover = function () {
        photos3.style.backgroundColor = "lightgray";
        this.style.animationName = "larger";
        this.style.transition = "1.5s";
        this.style.width = "420px";
        this.style.height = "353.68px";
    };
}
```

The Web Server

A web server program plays the role of a server in a client-server model by implementing one or more versions of HTTP protocol. And it is a computer program that distributes web pages as they are requisitioned. Its basic goal is to store, process and deliver web pages to users. This intercommunication is done through the Hypertext Transfer Protocol (HTTP). These web pages are mostly static content, including HTML documents, images, style sheets, tests, etc. In addition to HTTP, the web server also supports the SMTP (Simple Mail Transfer Protocol) and FTP (File Transfer Protocol) protocols for sending e-mails as well as file transfer and storage.

The main job of a web server is to display the content of a website. A web server is called an Intranet server if it is not available to the public but is used internally. When access to a website is requested by adding a URL or web address to a web browser, the browser sends a request to the Internet to view the corresponding web page at that address. A Domain Name Server (DNS) converts this URL into an IP address, which in turn points to a web server.

The web server is asked to present the content site to the user's browser. All websites on the Internet have a unique identifier, an IP address. This Internet Protocol address is used to communicate between different servers on the Internet.



Figure 1. Server side flow.



Figure 2. Client side flow.

Connection & Difference of Web Browser and Server

The web browser and server are primarily used to establish a network connection. The client makes a

request for a web file or service. The message from the web browser to the web server is called an HTTP request. When the web server receives the request, it searches for the appropriate page and uses HTTP to send the files therein to the browser and send them back over the network.

| Sr. No. | Key | Web Browser | Web Server |
|---------|------------------|--|--|
| 1 | Purpose | Web Browser is a software which is used to browse and display pages available over internet. | Web server is a software which provides these documents when requested by web browsers. |
| 2 | Process | A web browser sends request to server for web based documents and services. | Web server sees and approves those requests made by web browsers and sends the document in response. |
| 3 | Process | Web browser sends an HTTP Request and gets a HTTP Response. | Web server receives HTTP Request and sends a HTTP Response. |
| 4 | Processing Model | Web browser has no processing model. | Web server follows three major processing models: process based, thread based or hybrid. |
| 5 | Data Storage | Web browser stores user data in cookies in local machine. | Web server provide an area to store the website. |
| 6 | Installation | Web Browser is installed on user's machine. | Web server can be installed anywhere but it needs to be on a network or on local computer. |
| 7 | Example | Google Chrome | Apache Server |

The Difference of Web Browser & Web Server

The database

Databases are the basements of web architecture which are critical to a solid foundation. A database is a place to store information so that it can easily be accessed, managed, and updated. When a visitor requests a page, the data inserted into the page comes from the site's database, allowing for the real-time user interactions we take for granted on sites like Facebook or apps like Gmail.

The Client-Server Model

This idea of a client and server communicating over a network is called the "Client-Server" model. It's what makes viewing websites and interacting with web applications. The Client-Server model is just a way to describe the give-and-take relationship between the client and server in a web application. It's the details of how information passes from one end to the other where the picture gets complicated.

3.3 The Differences Between the Web and the Internet

Web

The World Wide Web is a way of accessing information through the medium of the Internet. It is a model for sharing information built on top of the Internet. The web uses the HTTP protocol, just one of the languages used to transmit data over the internet. Web services, which use HTTP to allow applications to communicate to exchange business logic, use the web to share information. The web also uses browsers to access web files called web pages, while these pages are connected to each other by hyperlinks.

Internet

The Internet is a network infrastructure. It connects millions of computers around the world to form a network in which any computer can communicate with any other computer, if they are all connected to the Internet. The information that travels over the Internet does so through various languages known as protocols.

Main Difference

The Internet is a global network, and the Web is a collection of information accessed through the Internet. In other words, the Internet is the infrastructure, and the Web is the service on top of that infrastructure. At a high level, the Internet can be thought of as the hardware and the Web as the software.

3.4 How the Web Is Linked Together Making an Interconnect Collection of Documents Relating to HTML Elements

Web pages are linked together using URL (uniform resource locator), which is the addressing scheme to find a document; HTTP (hypertext transfer protocol), which connects computers together; and HTML (hypertext markup language), which formats pages containing hypertext links.

For HTML

Creating links

Create the HREF link attribute code in HTML to display the text of the link and a stop sign. For example: your website. When the user clicks on this link, the browser jumps to the corresponding page, so the different pages get connected to each other and together they form a huge network.

If the linked sites are part of the same website, there is no need to enter the full URL for the HTML link. For example, if the creator wanted to link to the first page, he could write: Page 1.

Linking images

Text links are not the only option for linking between pages. Images can also be linked to different web pages. You can add hyperlinks to a photo by inserting it in HTML, highlighting it and using the linking tool. This can be done by replacing the text with code to refer to your photo. So it should read: .

Setting up site navigation

When building a website, the most important text links on any page are the links to other pages. Site navigation is usually done through drop-down boxes located at the top of each page. When creating navigation, a more advanced CSS language is often required.

Bookmarks for hyperlinks

Hyperlinks do not always have to point to a separate website, or even to a separate page on a website. They can also be used to redirect visitors to another part of the same page. This usually occurs in long articles or blog posts where there is a table of contents at the top and the user clicks on each item to go directly to the corresponding section.

These hyperlinks work in a similar way to bookmarks in Word documents. To create a link that sends the

visitor to the rest of the page, you first need to create a bookmark in the copy using the "id" attribute. So it will be <h2 id="Bookmark1">first bookmark</h2>. Once the bookmark is set up, it will go to the top of the page and add that link. The code is: Jump to first bookmark. When someone clicks on the 'Jump to first bookmark' text, the link will go directly to the section where the bookmark was placed.

Linking to documents and PDFs

When this is done, the link is to the document rather than the website. This is usually done by placing "pdf" or "doc" in brackets after the link. To link to a Word document or PDF, you first need to upload the document using the same tools as the development website. You can then link to it as you would any other text link on the site. Enter the code: My File [DOC].

Elements and Attributes Might Be Related to Link the Web

- The link Element
- The href attribute
- The target attribute
- The header Element
- The rel and rev attributes
- The title attribute
- The type attribute

3.5 The Different Types of Relations Between HTML Documents

The web is divided into many types of links, like inner joins, outer joins and cross joins.

1. Inner joins (typical join operations, using comparison operators like = or <>). Includes equal joins and natural joins.

An inner join uses the comparison operator to match rows in two tables based on the values of columns common to each table. For example, retrieve all rows

in the students and courses tables that have the same student identification number.

The next join type, INNER JOIN, is one of the most commonly used join types.

An inner join only returns rows where the join condition is true.

In our example, an inner join between our movies and directors tables would only return records where the movie has been assigned a director.

The syntax is basically the same as before:

```
SELECT *
FROM movies
INNER JOIN directors
    ON directors.id = movies.director_id;
```

Our result shows the three movies that have a director:

| id | name | director_id | id | name |
|----|---------|-------------|----|------------|
| 1 | Movie 1 | | 1 | John Smith |
| 2 | Movie 2 | | 1 | John Smith |
| 3 | Movie 3 | | 2 | Jane Doe |

(3 rows)

Since an inner join only includes rows that match the join condition, the order of the two tables in the join don't matter.

If we reverse the order of the tables in the query we get same result:

```
SELECT *
FROM directors
INNER JOIN movies
    ON movies.director_id = directors.id;

```

| id | name | id | name | director_id |
|----|------------|----|---------|-------------|
| 1 | John Smith | 1 | Movie 1 | |
| 1 | John Smith | 2 | Movie 2 | |

| 2 Jane Doe | 3 Movie 3 | 2 |
|--------------|-------------|---|
|--------------|-------------|---|

(3 rows)

Since we listed the directors table first in this query and we selected all columns (SELECT *), we see the directors column data first and then the columns from movies—but the resulting data is the same.

This is a useful property of inner joins, but it's not true for all join types—like our next type.

2. Outer joins.

An outer join can be a left outer join, a right outer join or a full outer join.

When specifying an outer join in the FROM clause, it can be specified by one of the following sets of keywords.

1) LEFT JOIN or LEFT OUTER JOIN

The result set of a left outer join includes all the rows of the left table specified in the LEFT OUTER clause, not just the rows matched by the join column. If a row of the left table has no matching rows in the right table, all the select list columns of the right table in the associated result set rows are null values.

2) RIGHT JOIN or RIGHT OUTER JOIN

A right outer join is the reverse of a left outer join. All rows of the right table will be returned. If there is no matching row in the left table for a row in the right table, then a null value will be returned for the left table.

These next two join types use a modifier (LEFT or RIGHT) that affects which table's data is included in the result set.

Note: the LEFT JOIN and RIGHT JOIN can also be referred to as LEFT OUTER JOIN and RIGHT OUTER JOIN.

These joins are used in queries where we want to return all of a particular table's data and, if it exists, the associated table's data as well.

If the associated data doesn't exist, we still get back all of the "primary" table's data.

It's a query for information about a particular thing and bonus information if that bonus information exists.

This will be simple to understand with an example. Let's find all movies and their directors, but we don't care if they have a director or not—it's a bonus:

```
SELECT *
FROM movies
LEFT JOIN directors
  ON directors.id = movies.director_id;
The query follows our same pattern as before—we've just specified the join as a LEFT JOIN.
```

In this example, the movies table is the "left" table.

If we write the query on one line it makes this a little easier to see:

... FROM movies LEFT JOIN directors ...

3) FULL JOIN or FULL OUTER JOIN

A full outer join returns all the rows in the left and right tables. When a row has no matching rows in another table, the select list column of the other table contains the null value. If there are matching rows between tables, the entire result set rows contain the data values of the base table.

Now that we have some data to work with let's look at the FULL OUTER JOIN.

A FULL OUTER JOIN has some similarities to a CROSS JOIN, but it has a couple key differences.

The first difference is that a FULL OUTER JOIN requires a join condition.

A join condition specifies how the rows between the two tables are related to each other and on what criteria they should be joined together.

In our example, our movies table has a reference to the director via the director_id column, and this column matches the id column of the directors table. These are the two columns that we will use as our join condition.

Here's how we write this join between our two tables:

```
SELECT *
FROM movies
FULL OUTER JOIN directors
  ON directors.id = movies.director_id;
Notice the join condition we specified that matches the movie to its director: ON movies.director_id = directors.id.
```

Our result set looks like an odd Cartesian product of sorts:

| id | name | director_id | id | name |
|------|---------|-------------|----------|------------|
| 1 | Movie 1 | | 1 | John Smith |
| 2 | Movie 2 | | 1 | John Smith |
| 3 | Movie 3 | | 2 | Jane Doe |
| 4 | Movie 4 | | NULL | NULL |
| 5 | Movie 5 | | NULL | NULL |
| NULL | NULL | | 5 | Bree |
| | | | | Jensen |
| NULL | NULL | | 4 | Bev Scott |
| NULL | NULL | | 3 | Xavier |
| | | | | Wills |
| | | | (8 rows) | |

The first rows we see are ones where the movie had a director, and our join condition evaluated to true.

However, after those rows we see each of the remaining rows from each table—but with NULL values where the other table didn't have a match.

Note: if you're unfamiliar with NULL values, see my explanation here in this SQL operator tutorial.

We also see another difference between the CROSS JOIN and FULL OUTER JOIN here. A FULL OUTER JOIN returns one distinct row from each table—unlike the CROSS JOIN which has multiple.

3. Cross joins

A cross join returns all the rows in the left table, and each row in the left table is combined with all the rows in the right table. A cross join is also known as a Cartesian product.

Tables or views in the FROM clause can be specified in any order by inner joins or complete outer joins; however, the order of the tables or views is important when specified by left or right outer joins.

The simplest kind of join we can do is a CROSS JOIN or "Cartesian product."

This join takes each row from one table and joins it with each row of the other table.

If we had two lists—one containing 1, 2, 3 and the other containing A, B, C—the Cartesian product of those two lists would be this:

1A, 1B, 1C

2A, 2B, 2C

3A, 3B, 3C

Each value from the first list is paired with each value of the second list.

Let's write this same example as a SQL query.

First let's create two very simple tables and insert some data into them:

```
CREATE TABLE letters(
    letter TEXT
);
```

```
INSERT INTO letters(letter) VALUES ('A'), ('B'), ('C');
```

```
CREATE TABLE numbers(
    number TEXT
);
```

```
INSERT INTO numbers(number) VALUES (1), (2), (3);
```

Our two tables, letters and numbers, just have one column: a simple text field.

Now let's join them together with a CROSS JOIN:

```
SELECT *
FROM letters
CROSS JOIN numbers;
letter | number
```

| A | 1 |
|---|---|
| A | 2 |
| A | 3 |
| B | 1 |
| B | 2 |
| B | 3 |
| C | 1 |
| C | 2 |
| C | 3 |

(9 rows)

This is the simplest type of join we can do—but even in this simple example we can see the join at work: the two separate rows (one from letters and one from numbers) have been joined together to form one row.

While this type of join is often discussed as a mere academic example, it does have at least one good use case: covering date ranges.

We can also specify the relationship between the current and the linked document use the link attribute:

alternate: It specifies the alternative link of the document (i.e. print page, translated or mirror).

author: It defines author of the link

dns-prefetch: It specifies that the browser should preemptively perform DNS resolution for the target resource's origin

help: It specifies a link to a help document. Example:
`<link rel="help" href="/help/">`

icon: It specifies import icon in a given document

license: It specifies a link to copyright information for the document

next: It provides the link of next document in series

pingback: It specifies the address of the pingback server

preconnect: It specifies the target should be preemptively to the origin resource

prefetch: It specifies that the target document should be cached.

preload: It specifies that the browser must preemptively fetch and cache

prerender: It specifies that the browser should load

prev: It specifies the previous document in a selection

search: It specifies the search tool for the document.

stylesheet: It imports a style sheet

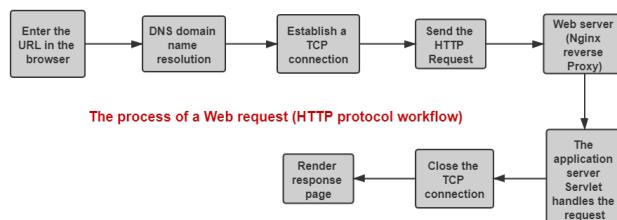
The Hypertext Transfer Protocol (HTTP) is a communications protocol that allows hypertext markup (HTML) documents to be sent from a Web server to a client's browser. HTTP is an application layer object-oriented protocol, because of its simple, fast way, suitable for distributed hypermedia information system. After several years of use and development, has been constantly improved and expanded. Currently in use in the WWW is version 6 of HTTP/1.0.

4.2 Characteristics

1. Support "client-server" mode.
2. Simple and fast: when the client requests service to the server, it only needs to send the request method and path. Common request methods are GET, HEAD, and POST. Each method specifies a different type of contact between the client and the server. Due to the simple HTTP protocol, the PROGRAM size of THE HTTP server is small, so the communication speed is very fast.
3. Flexible: HTTP allows the transfer of any type of data. The Type in transit is marked by content-Type.
4. Connectionless: Connectionless means limiting the processing of only one request at a time. After the server has processed the customer's request and received the customer's reply, it disconnects. In this way, transmission time can be saved.
5. Stateless: HTTP protocol is a stateless protocol. Stateless means that the protocol has no memory for transactions. The lack of state means that if subsequent processing requires the previous information, it must be retransmitted, which can lead to an increase in the amount of data transferred per connection. It does not know that the two requests are from the same client. To solve this problem, Web applications introduce a Cookie mechanism to maintain state. On the other hand, the server answers faster when it does not need previous information.

4.3 The operation of the HTTP protocol when the server requests a Web page

4.1 Concept of HTTP protocol



1. The browser uses DNS to resolve the domain name to the corresponding IP address
2. According to this IP address on the Internet to find the corresponding server, establish a Socket connection
3. The client server sends HTTP protocol requests for document resources in the server
4. On the server side, there is actually complex business logic: there may be multiple servers pointing to which server to process the requests, which requires a load balancing device to evenly distribute all users' requests
5. Whether the requested data is stored in a distributed cache or a static file, or in a database;
6. When the data is returned to the browser, the browser parses the data and finds that there are some static resources such as CSS, JS, or images and makes another request, which may be on the CDN, then the CDN server will process the user's request.
7. Client is disconnected from server. The client interprets the HTML document and renders the graphic results on the client screen.

4.4 Request

The Request message is divided into three parts. The first part is called the Request line, the second part is called the HTTP header, and the third part is the body. There is an empty line between the header and the body. The Method in the first line represents the request Method, as compared to the "POST", "GET", path-to-resource table shows the requested source, and Http/version number represents the version number of the Http protocol. When the "GET" method is used, the body is empty. The Http protocol defines many ways to interact with the server. There are four basic methods, namely GET, POST, PUT, and

DELETE. GET, POST, PUT, and DELETE in HTTP correspond to the four operations of checking, modifying, adding, and deleting the resource. The most common ones we see are GET and POST. GET is typically used to GET/query resource information, while POST is typically used to update resource information.

4.5 Response

Similar to the structure of the Request message, the structure of the Response message is also divided into three parts. The first part is called Request line, the second part is called Request Header, and the third part is the body. There is also an empty line between the header and the body. The HTTP/version-number table shows the version number of the HTTP protocol, and the status-code and message are the status codes. The first line in the Response message is called the status line and consists of the HTTP protocol version number, status code, and status message. The status code is used to tell the HTTP client whether the HTTP server is producing the expected Response. Five types of status codes are defined in HTTP/1.1. The status codes are composed of three digits, the first digit defining the category of the response.

4.6 HTTP Error Codes

200 OK- The most common is the successful response status code of 200, which indicates that the request was successfully completed and the requested resource was sent back to the client.

302 Found redirection, the new URL will be returned in Location in Response, and the browser will issue a new Request using the new URL.

304 Not Modified means that the last document has been cached and can be used again.

400 Bad Request client Request and syntax error, cannot be understood by the server.

403 Forbidden servers received the request, but refused to serve it.

404 Not Found The requested resource does Not exist.

500 Internal Server Error an Unexpected Error occurred on the Server.

503 Server Unavailable Server is currently unable to process the client request and may be back to normal after a period of time.

5. Comparison of HTML & CSS

CSS

Cascading Style Sheets, fondly referred to as CSS, is a simple design language intended to simplify the process of making web pages presentable.

There are some key advantages of learning CSS:

- Create Stunning Web site - CSS handles the appearance part of a web page. Using CSS, engineers can control the color of the text, the style of fonts, the spacing between paragraphs, how columns are sized and laid out, what background images or colors are used, layout designs, variations in display for different devices and screen sizes as well as a variety of other effects.
- Control web - CSS provides powerful control over the presentation of an HTML document. Most commonly, CSS is combined with the markup languages HTML or XHTML.
- Learn other languages - Once understand the basic of HTML and CSS then other related technologies like JavaScript, php, or angular are become easier to understand.

Additionally, CSS is one of the most widely used style language over the web. Some of its features are listed below:

- CSS saves time - Engineers can write CSS once and then reuse same sheet in multiple HTML pages. Users can define a style for each HTML element and apply it to as many Web pages as users want.

- Pages load faster - If using CSS, users do not need to write HTML tag attributes every time. Just write one CSS rule of a tag and apply it to all the occurrences of that tag. So, less code means faster download times.

- Easy maintenance - To make a global change, simply change the style, and all elements in all the web pages will be updated automatically.

- Superior styles to HTML - CSS has a much wider array of attributes than HTML, so users can give a far better look to your HTML page in comparison to HTML attributes.

- Multiple Device Compatibility - Style sheets allow content to be optimized for more than one type of device. By using the same HTML document, different versions of a website can be presented for handheld devices such as PDAs and cell phones or for printing.

- Global web standards - Now HTML attributes are being deprecated and it is being recommended to use CSS. So, it's a good idea to start using CSS in all the HTML pages to make them compatible to future browsers.

At the same time, by sharing the same css file, website maintenance costs will be greatly reduced. By changing the style of a category once, you can change the style of that category in all pagebs.

HTML

HTML, which is short for Hypertext Markup Language, is the code that is used to structure a web page and its content. For example, content could be structured within a set of paragraphs, a list of bulleted points, or using images and data tables. HTML is not a programming language; it is a markup language that defines the structure of your content. HTML is used to define the structure of how documents are related on the web. In addition, it consists of a series of elements, which users use to enclose, or wrap, different parts of the content to make it appear a certain way or act a certain way. The enclosing tags can make a word or

image hyperlink to somewhere else, can italicize words, can make the font bigger or smaller, and so on.

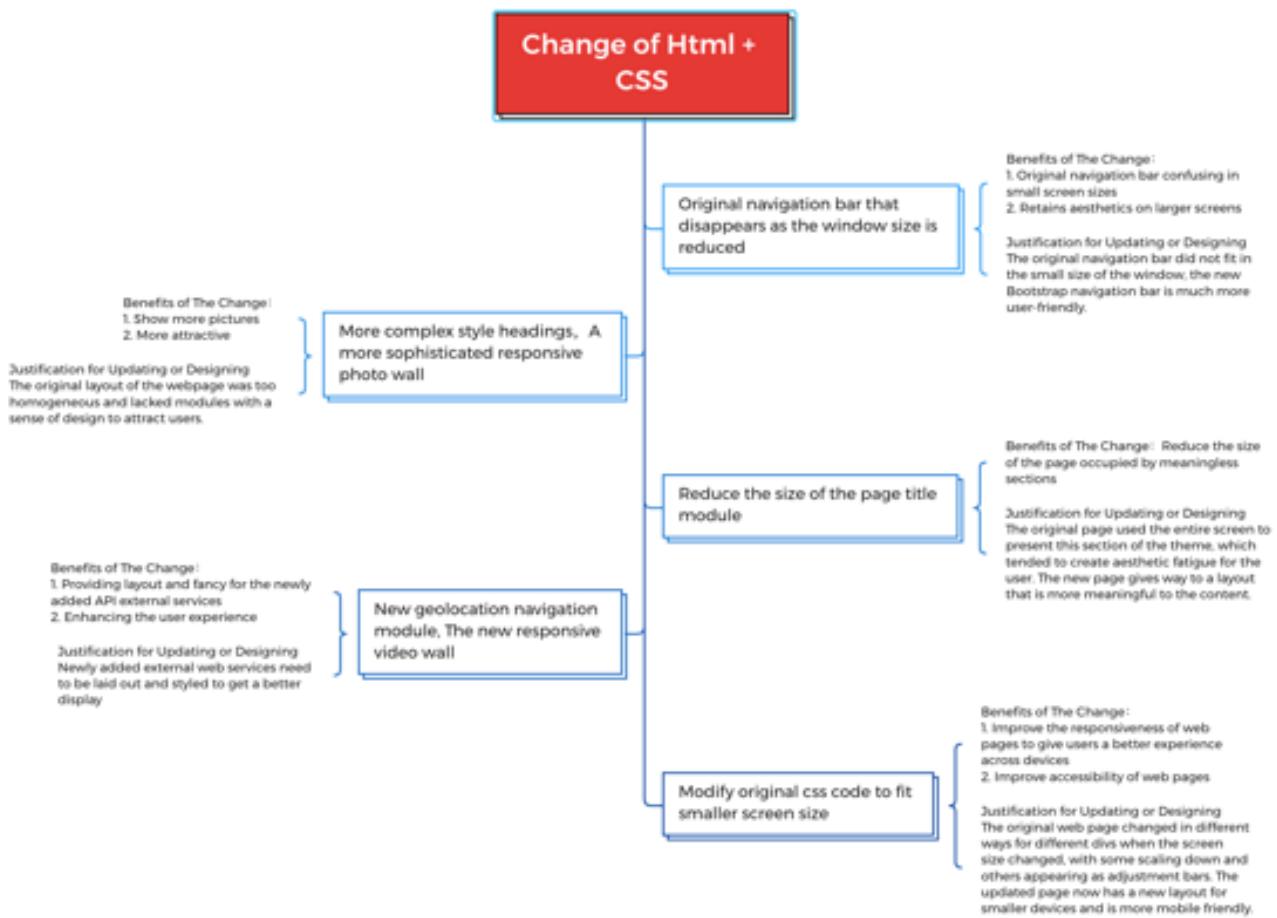
| S.NO. | HTML | CSS |
|-------|--|---|
| 1. | HTML is used to define a structure of a web page. | CSS is used to style the web pages by using different styling features. |
| 2. | It consists of tags inside which text is enclosed. | It consists of selectors and declaration blocks. |
| 3. | HTML doesn't have further types. | CSS can be internal or external depending upon the requirement. |
| 4. | We cannot use HTML inside a CSS sheet. | We can use CSS inside a HTML document. |
| 5. | HTML is not used for presentation and visualization. | CSS is used for presentation and visualization. |
| 6. | HTML has comparatively less backup and support. | CSS has comparatively higher backup and support. |

References of Answers

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Kasireddy, P. 2015. Freecodecamp. 17 December. *How the Web Works Part II. Client-Server Model & the Structure of a Web Application*. [Online]. [Accessed 1 January 2021]. Available from:<https://www.freecodecamp.org/news/how-the-web-works-part-ii-client-server-model-the-structure-of-a-web-application-735b4b6d76e3/>

Appendices



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12 / 2021

Web Update Document Of ELECHOOSER

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