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The Design and Development of an Interactive Web Portal for a Sports Health Service Provider: A Case of Helsingin Urheiluhieronta Oy

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**The Design and Development of an Interactive Web Portal for a
Sports Health Service Provider: A Case of Helsingin Urheiluhieronta
Oy**

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Ronald Clark

Developing Helsinginurheiluhieronta Website

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The internet is a world of information and activities. Individuals, groups, and companies all use the internet for promotions of self, interests, and business. The evolution of the internet's use has exploded in the 21st century. Each day, more and more users are being introduced to the internet and using the internet for day to day activities.

The focus group of internet use will be on businesses in this article. Today, because of the internet, businesses are able to operate in multiple places and reach many more potential customers than prior to the internet's existence. With the development of websites and web applications, the user's web experience has changed drastically. Users can order products and services worldwide through the use of websites and web applications.

Helsinginurheiluhieronta is one such business that provides services to users through it's website at the click of a button. Helsingin urheiluhieronta is a business that provides physiotherapy services to potential customers. The main discussion in this article will be a description of the process of building Helsingin urheiluhieronta's website based on the company's business model, customer needs, owner needs, and services provided. Many of the industry's best practices with regard to web development and web design will be discussed in this article. There will also be a laymen's version of the systems development lifecycle discussed in this article to display the technologies and methodologies used in this development.

Helsingin urheiluhieronta is an up and running development. This article is a reflection of the completed work. The web solution was started and completed by PakFlo, a technology company located in Espoo, Finland. The owner of the company is Ronald Clark a businessman striving to compete in the technology business.

Ronald Clark

Developing Helsinginurheiluhieronta Website

Vuosi 2016 Sivumäärä 41

Internetin maailma koostuu tiedoista ja toiminnoista. Yksilöt, ryhmät ja yritykset käyttävät internetiä edistääkseen itseään, kiinnostuksen kohteita ja liiketoimintaa. Internetin käyttö on kehittynyt räjähdysmäisesti 2000-luvulla ja päivittäin yhä useampi käyttäjä tutustuu internetiin ja käyttää sitä jokapäiväisiin toimiin.

Tässä opinnäytetyössä internetin käytön fokuksena ovat yritykset. Tänä päivänä yritykset voivat toimia useissa eri paikoissa ja tavoittaa enemmän potentiaalisia asiakkaita internetin ansiosta. Verkkosivujen ja verkkoapplikaatioiden kehittyessä käyttäjien verkkokokemukset ovat muuttuneet radikaalisti.

Helsingin Urheiluhieronta tarjoaa verkkosivujensa käyttäjille palvelujaan yhdellä hiiren klikkauksella. Helsingin Urheiluhieronta on yritys, jonka palvelutarjontaan kuuluu fysioterapiaa potentiaalisille asiakkaille. Tämän opinnäytetyön tarkoituksena on selvittää kuinka Helsingin Urheiluhieronnan verkkosivut laadittiin ottaen huomioon yrityksen liiketoimintamallin, asiakkaiden ja omistajien tarpeet ja palvelutarjonnan. Työssä esitellään alan parhaimmat verkkokehitys ja -suunnittelukäytännöt. Myös maallikon versio järjestelmäkehityksen elinkaaresta tuodaan esille tässä opinnäytetyössä sillä sen perusteella päädyttiin erilaisiin teknologia- ja menetelmävalintoihin.

Helsingin Urheiluhieronnan verkkosivut ovat nyt täydessä toiminnassa ja tässä opinnäytetyössä tutustutaan valmiiseen tuotteeseen. Espoolainen it-alan yritys Pakflo on verkkoratkaisujen käytäntöönpanija. Yrityksen omistaja on liikemies Ronald Clark jonka pyrkimyksenä on kilpailla it-alalla.

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Abbreviated Terms

CMS	Content Management System
SEO	Search Engine Optimization
E commerce	Electronic commerce
SDLC	Systems Development LifeCycle
UML	Unified Modeling Language
AC	Access Control
UI	User Interface
HUH	Helsingin UrheluHieronta
CSS	Cascades Styles Sheet
IP	Internet Protocol or Internet Protocol Address
ISP	Internet Service provider
HTML	Hypertext Markup Language
IE	Internet Explorer
JS	Javascript

1 Introduction

The web has been around for quite some time now. As trends come and go in other areas of life, the web also has trends that come and go. The technology advocates like to think of it as advancement or the evolution of technology. At one point during the evolution of the web came websites. A simple platform for a person or entity to have a presence on the web and its own set address those visitors can use to view ones web platform. Now, in what is known as the digital age, websites are the face of the internet. People and companies are constantly adding new websites or updating existing websites to meet today's demands of what is to be a proper web presence.

The importance of a website particularly for businesses is absolutely essential. Businesses in today's markets need websites to expand advertisement, reach global markets, and make business more efficient. So the importance has become tenfold to what it was a decade ago. Expanding a business's advertising allows it to reach new markets and demographics that could potentially produce new customers and generate more revenue. People in different geographical regions could not be prospective customers without a website that they could access to learn about the business.

A business can reach new heights from having a web presence. The growth potential and efficiency can become exponential with the edition of Ecommerce. Ecommerce is online retail; the business of selling online goods has grown in the double digits for over a decade (Funk 2009, 81). The edition of Ecommerce has made the actual business accessible to markets all over the globe contributing to growth and efficiency. In the United States alone, it is reported that Ecommerce is at over \$130 billion a year with plenty of room to grow (Funk 2009, 81). So it is clear what the effects of having a web presence can do for a business's health.

1.1 The Company

Helsingin Urheiluhieronta or Helsinki Sports Massage was started in 2011 by four friends who had an ambition to be the best sports massage clinic in all of Helsinki. The company has been in business for five years now and has grown from one clinic to three clinics. Eerikinkadun Urheiluhierontasudio is the parent clinic with two daughter clinics HUH-Esport Bristol and K-E-H-O Klinikka. All of these clinics are located in Helsinki. Helsingin Urheiluhieronta speclizes in prehabilitation and rehabilitation treatments that help clients to prevent injury and recover from injury.

The company's policy is to treat clients to the best of their abilities and to have an environment that is of an healing ambience. They also strive to have a network of like minded

practitioners who can assist in areas where knowledge may be limited. This gives all of their clients the best possible chance of receiving premium care.

1.2 The Project

The company had an existing website that it wanted to replace. The old website was lacking a many ways to be suitable for a company whose business is growing and has ambition to add online sales to the website. A CMS or Content Management System used to manage text, images, sounds and videos (Hendengren 2010, 174) would be in need for this project. The old website was developed for the CMS WordPress. WordPress started out as a system for managing blogs (Hendengren 2010, 174), but evolved into formidable CMS that can house most any website. Specifically, the website was not mobile device responsive, not optimized with SEO, lacked Ecommerce editions, and did not meet other current design best practices.

The task for this project was to deliver another more current WordPress web solution that would not lack these major aspects and have possibilities for future additions without major changes. The timeframe for the development process was 3 months. During this time period, the entire development process would need to be completed and a working final solution ready to implement.

1.3 Project Goals

The project had many goals that needed to be fulfilled. The ultimate goal being to please the customer and in pursuing this, the smaller goals would also be fulfilled. Other goals that were in compassed in the ultimate goal included, improving the layout, color scheme and responsiveness to mobile devices. There was also a need for an online store to display and sale products, an improved appointment booking system and google analytics to monitor traffic.

All of the above improvements were desired in a website that would be run using WordPress. Due to the company's ambition to expand its business, there was a timeline of January 1st to March 31, 2015. Helsingin Urheiluhieronta would be opening two new locations and the new website would be a big marketing tool to help those locations to gain exposure.

1.4 Project Risks

There are risks that are involved with every project. The project manager's job is to identify, analyze and respond to the risks present through the life of the project and respond in the best interests of the project goals (Schwalbe 2010, 422). This project presented many risks such as development failure, client availability, client indecision, and time restraints.

This project was the first professional project for the developer so the success rate was statistically lower than that of a seasoned professional developer. The combination of a small time window and lack of experience added stress to the development process. The clients lack of knowledge of the systems development lifecycle (SDLC) added more pressure as the client did not make himself available as much as needed. This lack of availability slowed the development process because of the need to seek client's approval throughout the development process. Indecision was another risk to the project being completed within the timeframe allotted. The client had trouble deciding on options for the website and this proved to be time consuming. The most imminent threat to the project was the destruction of the timeline.

2 Qualitative Research

This project required the analysis of technologies and approaches for the best and most efficient solution. A qualitative approach to the research was chosen for those reasons. Qualitative research has its roots deriving from anthropology, sociology, humanities, and evaluation (Creswell 2014, 13). There are many research designs within qualitative research. The research design used during this project was case studies. Case studies depend heavily on evaluation. In this particular instance, the evaluation of an technological situation was the case study's focus. Case studies are typically bound by time and activity, so the researcher collects data in the form of observations during a sustained period of time (Creswell 2014, 14). According to (Agrawal, 2016) in figure 1, these observations can be in the form of many outcomes.

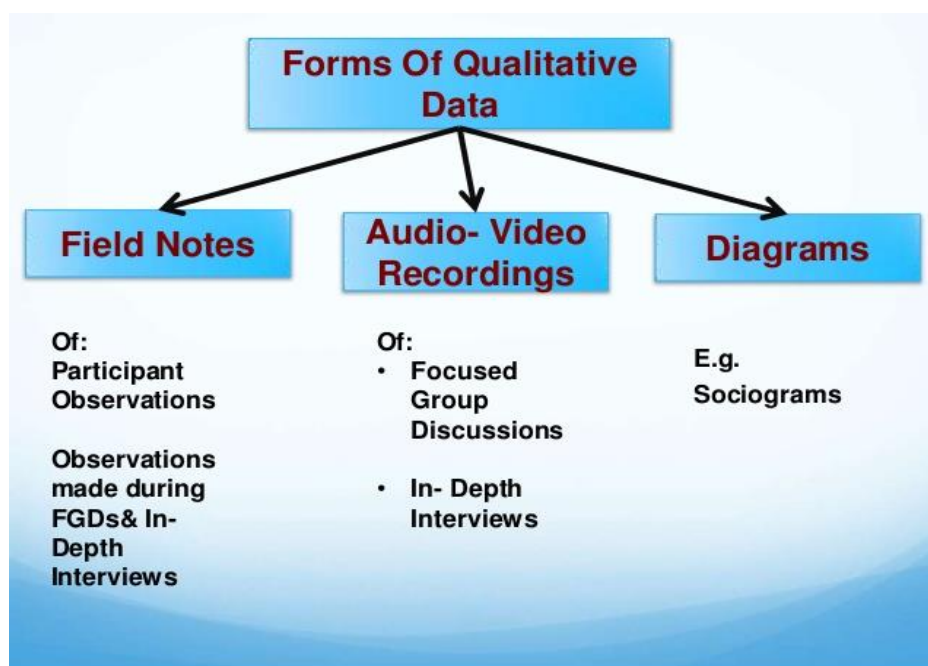


Figure 1: Outputs of Case Studies

These outcomes were used as the backbone of the plan to create the solution for HUH website.

2.1 The Methods

The methods that were used to carry out the overall case study included interviews, benchmarking, service design, and unified modeling language. These are very effective methods in obtaining a vision of how the solution will become a reality. They provide ideas and insight of what the client wants, needs and how the system should function. These types of information will lead to an enhanced and satisfying user experience.

2.1.1 Interviews

Interviews are an efficient way to learn about the client, the users and the solution. In depth interviews have long been a method of qualitative research, they are sometimes also referred to as focused interviews, unstructured interviews, non-directive interviews, and semi-structured interviews (Liamputtong 2005, 56). These various names are aimed toward the same meaning in in-depth interviews with only small differences. One of the most effective interview styles in qualitative interviews is a conversational style. The conversational style interview was used in this project of constructing the HUH website. An in-depth interview was given to both the CEO Aarnio and chairman of the board Häkkinen (2015) (2015) for the HUH company. These interviews brought much perspective on their wants and needs with regard to the new website. In all the interviews proved to be a very effective technique to acquire knowledge to help build the solution.

2.1.2 Benchmarking

Benchmarking is a method of comparison. It measures the time a package takes to process a number of transactions (Shelly 2012, 306). This is referred to as a benchmarking test. These tests are conducted in a controlled environment. They are a good way to measure performance of two or more products in a standard environment (Shelly 2012, 306). (Rasior, 2016) shows some steps that are performed in a benchmarking test in figure 2.



Figure 2: Benchmarking Steps

Benchmarking was very useful in this project to help determine which different pieces of software worked best together and how they affected the overall solution.

The user wants the best experience possible and the client wants the most efficient solution possible. By benchmarking different technologies in one environment, it gave results that were helpful in choosing the most optimal solution. This makes benchmarking a very powerful tool when deciding how to build a solution.

2.1.3 Service design

Service design comes after the problem is understood from the planning phase. The purpose is to create a physical design that will meet the requirements that are outlined by the client as necessities (Shelly 2012, 333). This includes the user interface design, data design, and system architecture. The deliverables for this stage is the system design specification (Shelly

2012, 333). (Scarano, 2016) gives an example of the service design process in figure 3.

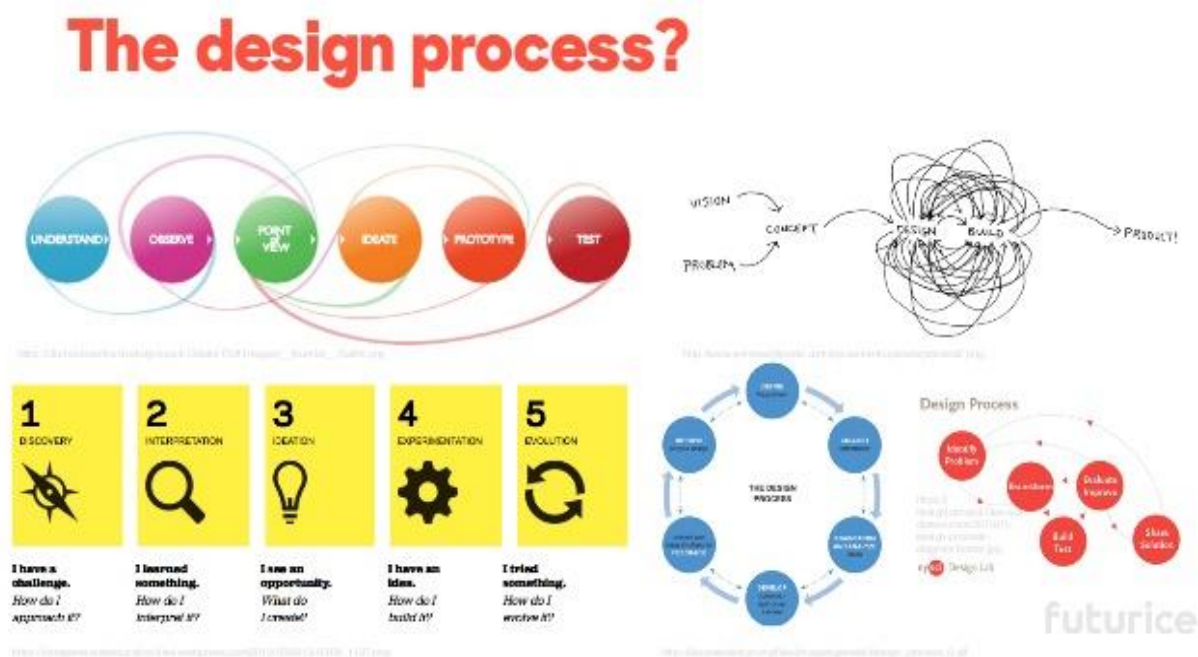


Figure 3: Service Design Process

These steps were critical in delivering a user interface (layout and view of the user), data design (database type that stores the solution data), and system architecture (overall system workings) that appealed to the user and client.

2.1.4 Unified Modeling Language

Diagrams provide a visual way to map out system needs and uses. There are many ways to diagram a system including using Unified Modeling Language. Unified modeling language or (UML) is a form of diagramming that use an array of ways to map out a system. Some of these diagrams include class diagrams, use case diagrams, state diagrams, activity diagrams and implementations diagrams (Pooley 1999, 54). Each of these diagram types uses specific system information to characterize a targeted part of the system or the entire system. A few examples of this are the use of classes and objects to create a class diagram. When creating an activity diagram the creator is mapping the users experience from start to finish. It serves as a directional process diagram. Use case diagrams need actors (users) and actions (user actions) to map possible actions in the system by users. The usefulness of UML is essential when trying to visualize a systems entire function and interactions with the users. This makes UML a powerful tool for any systems developer.

2.2 Development Methodology

The research also helps to determine what development methodology best fits the project. An Agile approach was chosen for this project. Agile methods are relatively new in development. A traditional approach such as structured analysis builds an overall plan that suits the construction of a system (Shelly 2012, 25), similar to how a blueprint is used to construct a building. Agile methods, is based on prototypes, these prototypes are built incrementally and adjusted according to the users requirements (Shelly 2012, 25). The process is a cycle of revisions that are implemented into the earlier versions until a final solution is reached. The process runs on feedback from each revision and all the steps are affected by the prior steps (Shelly 2012, 25).

The origin of agile methods can be traced back to Japanese auto firms that boosted productivity by using this flexible development method (Shelly 2012, 25). Figure 4 from (Cyntechsys,2016) gives a clear picture of the process and steps

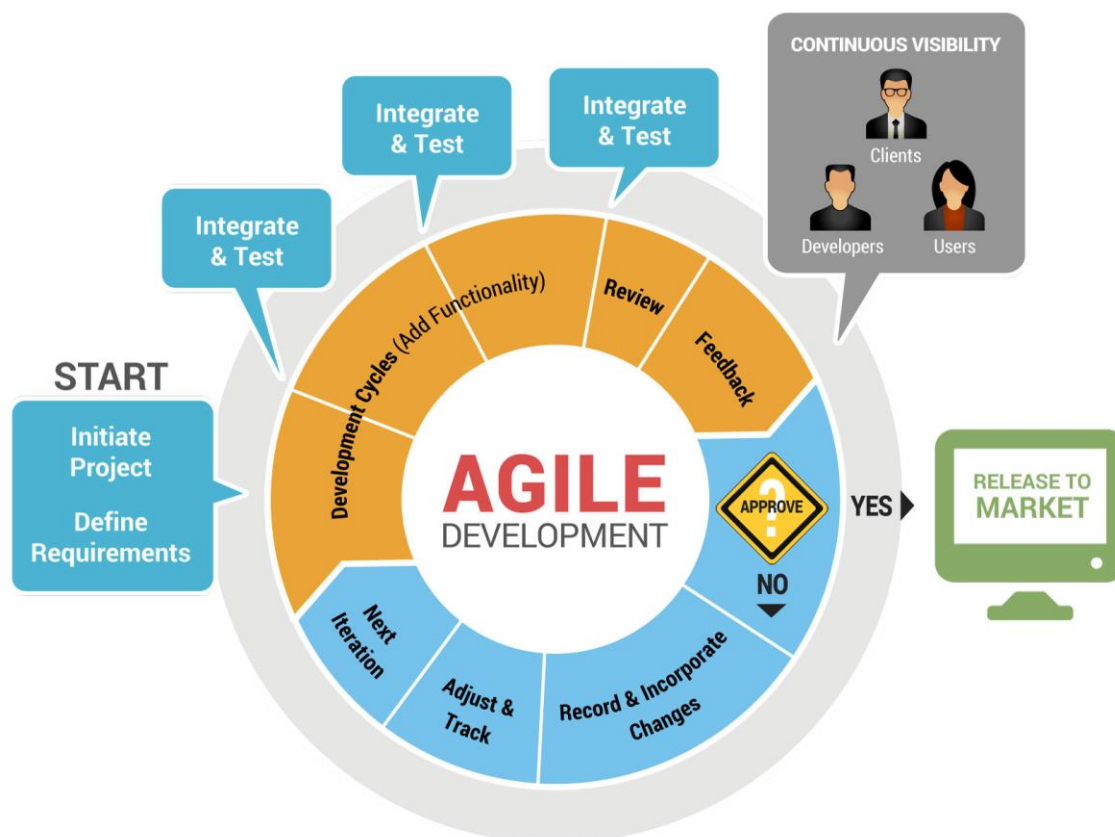


Figure 4: Agile Development Process

It can be seen how an agile method is useful in developing a system in a short or limited timeframe. The cycle is quick and efficient which gives the client peace of mind that the project will be completed within the given timeframe.

3 Development Tools & Concepts

Many tools were used throughout the development of HUH website. These tools were encompassed into the agile development style that was previously discussed in section 2.2. The overall concept for development was speed and efficiency. These conceptual goals were imperative in meeting the client's timeframe for completion. Some of the tools that were used include use case diagrams, wireframes, prototypes, security technologies, CMS, and hosting environment. Each of these had their own unique role in the development of this solution. The usefulness of each tool will be shown in the following sections.

3.1 Modeling

Modeling the system is critical to understand how it needs to work. One efficient way to model an entire system or sub systems within a system is with use case diagrams. Use case diagrams are one type of diagram that comes from UML that was discussed in section 2.1.5. They specifically show the behavior of the system from the user's point of view (Pooley 1999, 93). A user can be defined as anything external to the system that interacts with the system. Use case modeling helps with three daunting tasks that are involved with systems development; capturing requirements, planning iterations of development and validating systems (Pooley 1999, 93). Another good aspect of use case diagrams is that they are easy to understand for the layman. Many times in development projects, the client is not very technologically inclined so there is trouble understanding certain functionalities in the system. (Ambler, 2014) shows the simplicity of use case diagrams in figure 5 below.

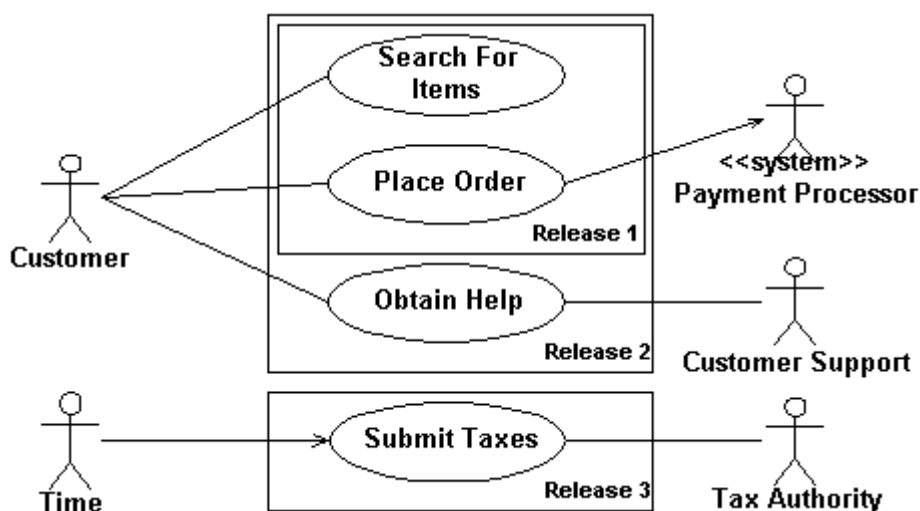


Figure 5: An understandable use case diagram

The diagram illustrates a systems function in a way anyone could understand. This is key to the developer and client relationship because it makes communication simpler. These dia-

grams also help development teams in situations where developers are located in different locations. It can be sent to all parties and be easily understood by all.

3.2 Wireframes

Wireframes are another tool used to help simplify development. A wireframe is actually a sketch or blueprint of a webpage that shows the layout or structure (Morris 2013, 226). They help to give a preliminary vision of the system user interface (UI) to the developer and client. Things that are included in wireframes are the logo, navigation, content and footer(Morris 2013, 226). (Boag, 2013) provides an example of a wireframe in figure 6 below:

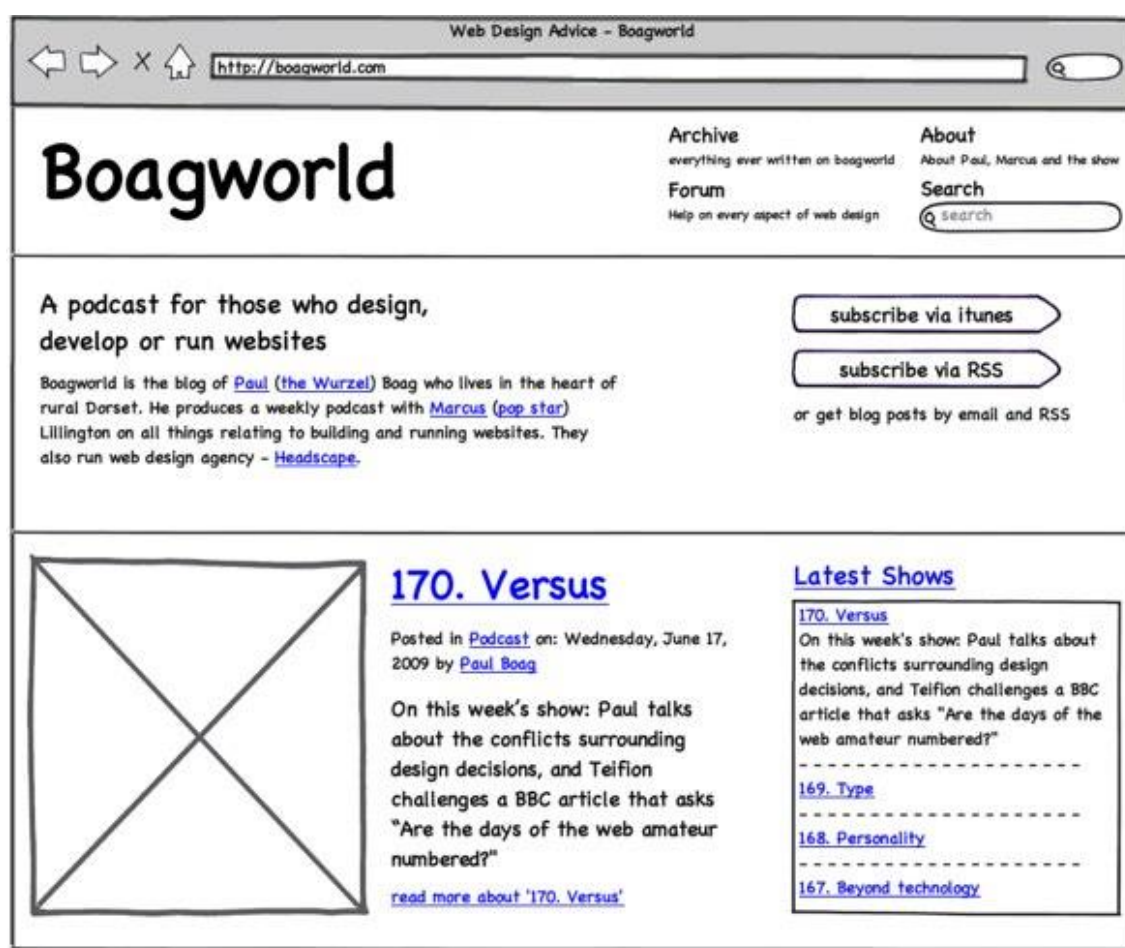


Figure 6: Wireframe example with elements included

It shows the beginning stages of how the website layout could look and how some of the elements may look in their respective locations. This is very beneficial from a visual prospective to the developer because it provides a viewable prelim cascades styles sheet (css). CSS is used to create the layout of a webpage and having a visual from wireframes can be helpful.

3.3 Prototyping

One key concept used in the agile development method is prototyping. Prototyping is the entire basis of the agile methodology. It goes to the client's wish of efficiency and speed in the development process. Prototyping tests the system concepts; provides an opportunity to analyze input, output, and UI before things are finalized (Shelly 2012, 20). The main benefit of prototyping is that it speeds up the development process. It can be used as a benchmark to evaluate the final solution(Shelly 2012, 20).

3.4 Security

Security has to be observed during the development process as well. The website has its own copy written content and database that needs to be protected. The focus is to protect the confidentiality, integrity and availability (CIA) of the system(Shelly 2012, 589). Figure 7 from (Williams, 2016) illustrates CIA:

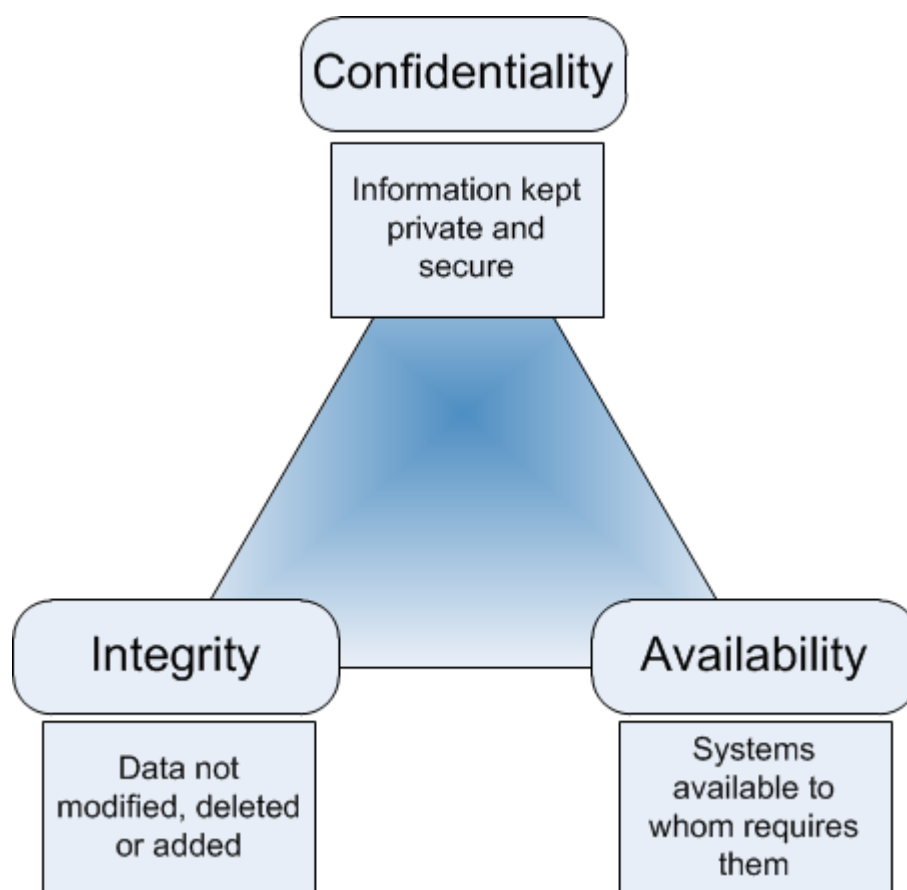


Figure 7: CIA and what it protects

Confidentiality protects information from being disclosed without authorization and protects privacy. Integrity prevents malicious users from changing or creating new information(Shelly

2012, 590). The website needs to be available for use to authorized users so this is the role of availability. Overall, the goal of security is to protect the system and keep it reliable as shown in figure 8 by (Wireman, 2016).



Figure 8: Handling risks to an application

Implementing security within the prototypes can give a better idea of potential risks and how well they can be protected against those risks.

3.4.1 Access Control

The HUH system is being run on a CMS called WordPress so access control is a key element to its security. The CMS itself will be discussed in a later section but access control is essential in keeping the system safe. The biggest threat to access control in this system is password cracking attacks. Some password cracking countermeasures that were taken into account were password strength minimums, auditing to monitor password attacks, and account lock-downs for failed attempts. For the security of the website, only the surface will be touched on this subject. The combination of these countermeasures makes it difficult for attackers to compromise the CIA of the website.

3.4.2 Black hat Protection

Hackers are known as either white hat or black hat hackers. The difference between the two is that white hat hackers are ethical hackers. They have permission to attack or test a system's ability to protect itself. Black hat hackers are the Lex Luther to white hat hackers. Black hat hackers are trying to illegally access systems for personal or financial gain(Beaver 2010, 10). Internet protocol address (IP) blocking is one countermeasure to black hat attack-

ers. IP blocking allows a system to block out a set of IP addresses that can potentially be used or have been used to attack the system. This limits the regions of attack and helps to narrow the range of accessing IP addresses.

3.4.3 System Backups

No strategy of security is full proof so there needs to be disaster crisis measures that are put into effect in case something goes wrong. Systems can crash from attacks, application malfunctions, etc.. The best way to recover from disaster is to have a system backup. Backups are copies of data that the system holds (Shelly 2012, 607). Backups can be done in many ways. They can be done in time intervals or continuously. They can also be full backups, differential backups, incremental backups, and continuous backups (Shelly 2012, 607). Backups can be stored in many places including tape, hard drives, optical storage and online (Shelly 2012, 607). A good backup policy helps to mitigate disaster and get systems back up and running in a short timeframe.

3.5 Content Management System

A CMS is basically a way to manage content. This is a basic definition of it but in more depth it used to write, edit and publish work online (Hendengren 2010, 174). The type of content can be written content, video, sound, and images. The CMS is usually constructed so that it is highly flexible and user friendly. There are many examples of CMS that are available to use including Joomla, Drupal, WordPress, etc.. Many of them are used to house and construct websites as well. In the case of the HUH website the CMS WordPress was used. WordPress will be discussed further in section 3.5.1.

3.5.1 WordPress

As mentioned in the previous section, WordPress was used to house the HUH website. WordPress was originally for blog publishing only but has evolved into a full fledge CMS (Hendengren 2010, 174). The benefits of WordPress are that it is open source and free, fast and easy to use, easily extendable, easy to design and develop plugins for, excellent with text, and good with images (Hendengren 2010, 174). The HUH site needed something that would allow fast prototyping for development, good enough security features provided by plugins, easy maintenance by the site administrator, and easy use for the client. These features made WordPress the perfect fit for this project.

3.5.2 Themes

Themes are used in many CMS including WordPress to separate design of a site from the code of the CMS. A theme has a template folder with template files and any other files that may be essential (Hendengren 2010, 58). There are only two files that are absolutely necessary for a theme to work and those are the style.css and index.php files. The index.php file contains the header that identifies the theme and the style.css contains the theme layout (Hendengren 2010, 58). WordPress has thousands of themes that can be used to build websites. Most themes have a great deal of flexibility with what can be changed or added to the theme. This allows developers or designers to appeal to client wishes.

3.5.3 Plugins

Plugins are used to extend functionality within the WordPress theme (Hendengren 2010, 145). The main plugin file needs to be a php file with a unique filename or folder name if a folder of many files is necessary (Hendengren 2010, 146). The php file needs to be able to be identified by WordPress as a plugin file so it functions properly. There are many plugins that can extend a WordPress install in an almost infinite amount of ways. Plugins are how a WordPress website implements its functionality or features for the visitor to use or to help the developer perform tasks.

3.6 Domain Name

The domain name is the way for people to find a website on the internet. Choosing a good domain name helps visitors understand what your website is about and helps build branding for the domain owner. The name should be something closely resembling another more popular domain or something catchy that a potential visitor will not forget easily. Domains are established into a hierarchy. There are top level domains such .com, .net, .info, .org and there are lower level domains. (Heywood, 1999) shows an example of domain hierarchy in figure 9:

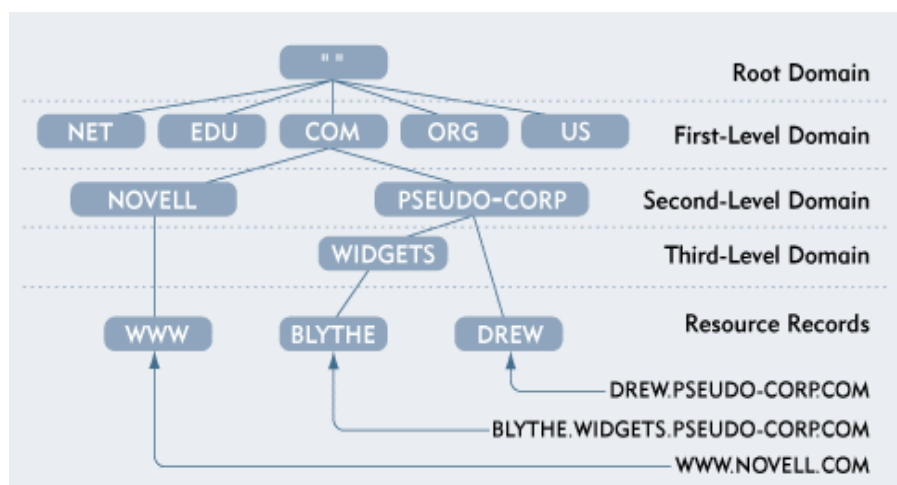


Figure 9: Domain hierarchy

HUH website has the ending .fi which is for Finland. All country ending domains are top level domains. The example above shows an .us for United States as being a top level domain and the same applies for .fi. The top level domains are found faster than lower level domains and this is better for business.

3.7 Hosting

A hosting environment provides space on the internet for storing and accessing websites and other files (Plumley 2011, 17). This type of hosting is referred to as web hosting. There is one other type of hosting and it's called an Internet service provider (ISP) this type just allows access to the internet. A good hosting service has a user friendly control panel and good customer service to troubleshoot problems. It will also be secure and run smoothly so that the website loads quickly when visitors access it.

4 Development Work

This section begins the description of the development work for HUH website. Some of the qualitative research techniques that were discussed will be displayed in practice. The agile methodology will also be displayed in a practical sense. This will be a moderate level of detail of the work that was done to complete the HUH website. An expert level of detail of the inner workings of the website would not be suitable for the intended audience of this document. As mentioned earlier, this project began on January 1, 2015 and was intended to end on March 31, 2015. The development work did not exceed the deadline. It was completed within the given time frame. HUH website was posted online in its hosting environment on March 31, 2015 at approximately 5am.

4.1 Work Outline

The development of this website was done in two iterations of prototyping. The plan was to have a working prototype by the midway point of February 15, 2015 and a final solution by March 31, 2015. Table 1 below gives a description of the planned work schedule.

End points	Cycles	Dates
Start	Iteration 1	January 1, 2015
End	Prototype 1	February 15, 2015
Start	iteration 2	February 16, 2015
End	Final Solution	March 31, 2015

Table 1: Work Plan Timetable

The first iteration was completed approximately February 6, 2015. With the plan set to evenly disperse time, there was still a desire to complete the first prototype earlier in the event that the client would disapprove it and disregard the entire work. Keeping the timeframe in favor of the developer was essential in this case because of such a small timeframe to complete the work.

4.2 First Iteration

The first iteration represents the first cycle of the agile development process. There are the gatherings of information, planning, development, testing, and release stages in this cycle. Table 2 below shows the plan for the first iteration in more detail.

Dates	Actions	Details
January 2-9	Research	Interview of client, benchmarking
January 10-17	Planning	Use casing system, Wire framing the layout
January 18- February 7	Development	Setup development environment, Building UI, adding desired functionality and features
February 8-12	Testing	Checking prototype in web browsers and checking functionality
February 13-15	Release	Prototype shown to Client

Table 2: First Iteration of HUH project

A well-constructed plan makes the process simple and easy to follow. This also keeps the desired efficiency and speed needed to complete the task in the timetable.

4.2.1 First Information Gathering

The first information gathering was about meeting with the client and surveying the field of other websites to see what could be used for the new development. An interview was conducted with the client on January 3, 2016 to get basic information about the requirements and wishes for the website. The questions covered the site layout, colors, functionality, and content. The client was informed that industry best practices would be taken into account in development and implemented. This project was for an actual company, so it was important to let the client feel comfortable about the process and feel somewhat understanding of the

happenings. This was the purpose of the interview. Most of the needed information for the development was received from interviews and feedback from the client. Some benchmarking was done of companies with similar businesses, but the client had a strong idea of how the layout should be so the benchmarking produced minimal input on the first iteration. Below in figure 10 is a sample of some of the information obtained from the interview with the client.

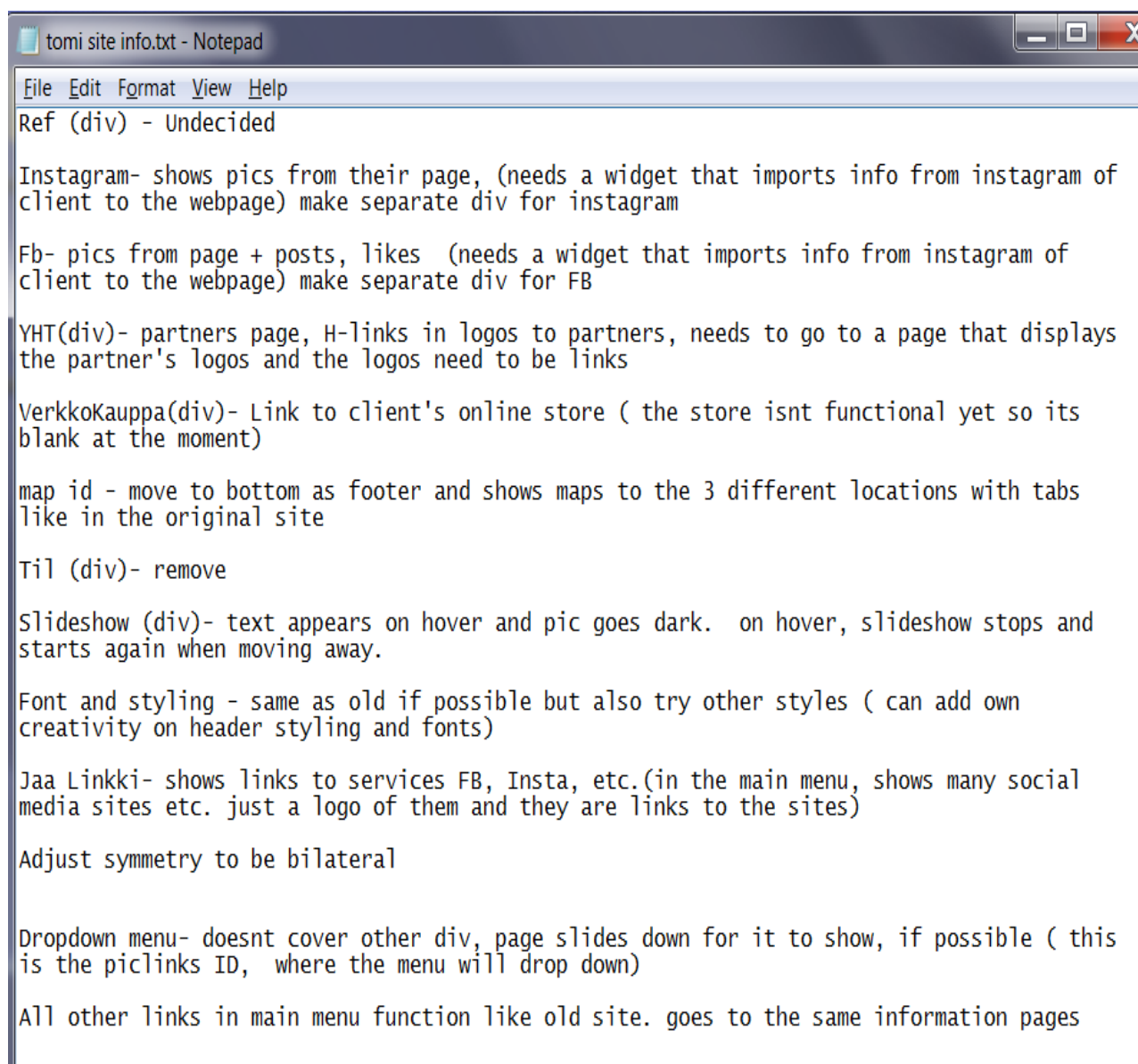


Figure 10: Info gathered from client in interview

4.2.2 Use Casing System

After interviewing the client, the system mapping came next. The system was composed of viewable content only and one booking system for making appointments. The figure below, shows the use casing of the system.

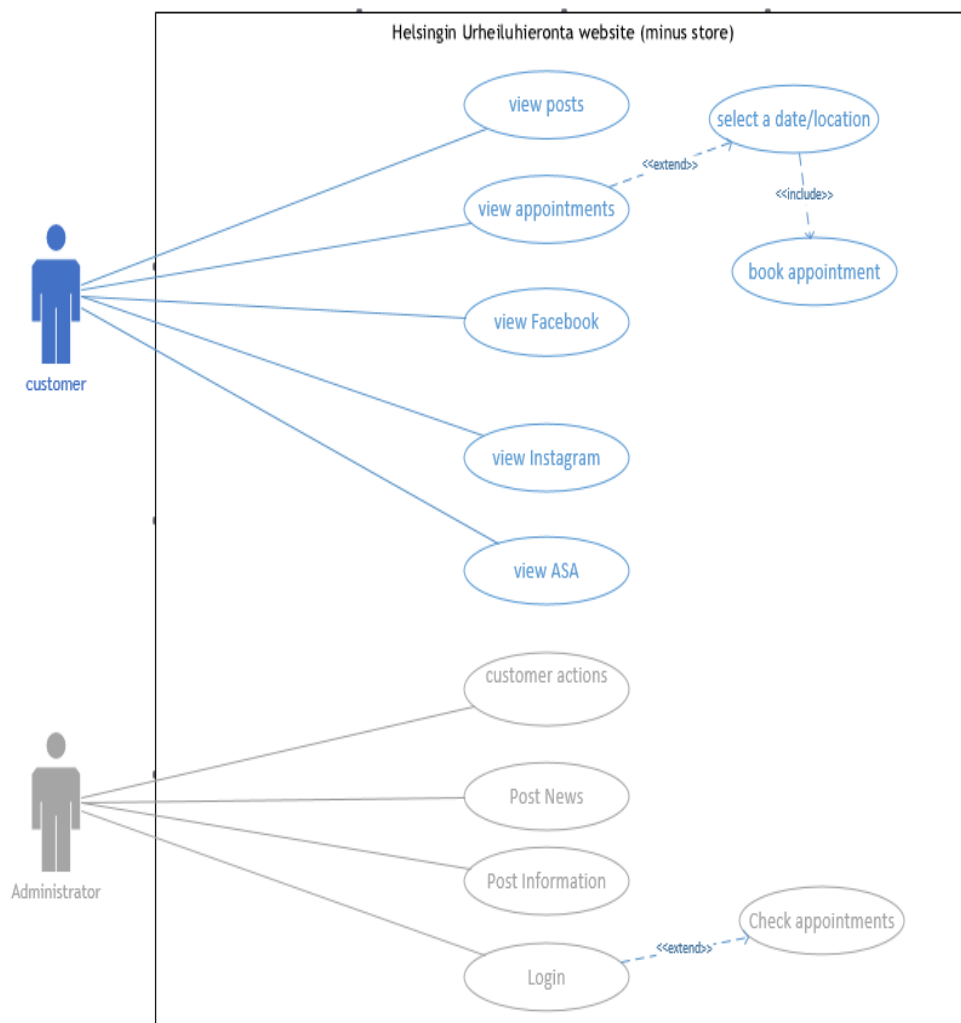


Figure 11: HUH system use case diagram

This shows the initial mapping of the first prototype. The people like figures on the outside are called the actors and they are the ones that are interacting with the system. The lines to the bubbles indicate what actions the actors can perform within the system. The bubbles are the actions that can be performed by the connected actor. Some actions are interlocked within other actions and they are called extensions of an action. It means that that particular action cannot happen unless the connecting action happens first. The system functions are very basic and easy to understand and implement.

4.2.3 Layout Design

The layout of the HUH system was drawn on paper by the client. The client only wanted a specific layout for the homepage so it was designed to the client's strict description. Figure 12 below can be referred to for a visual of part of the layout.

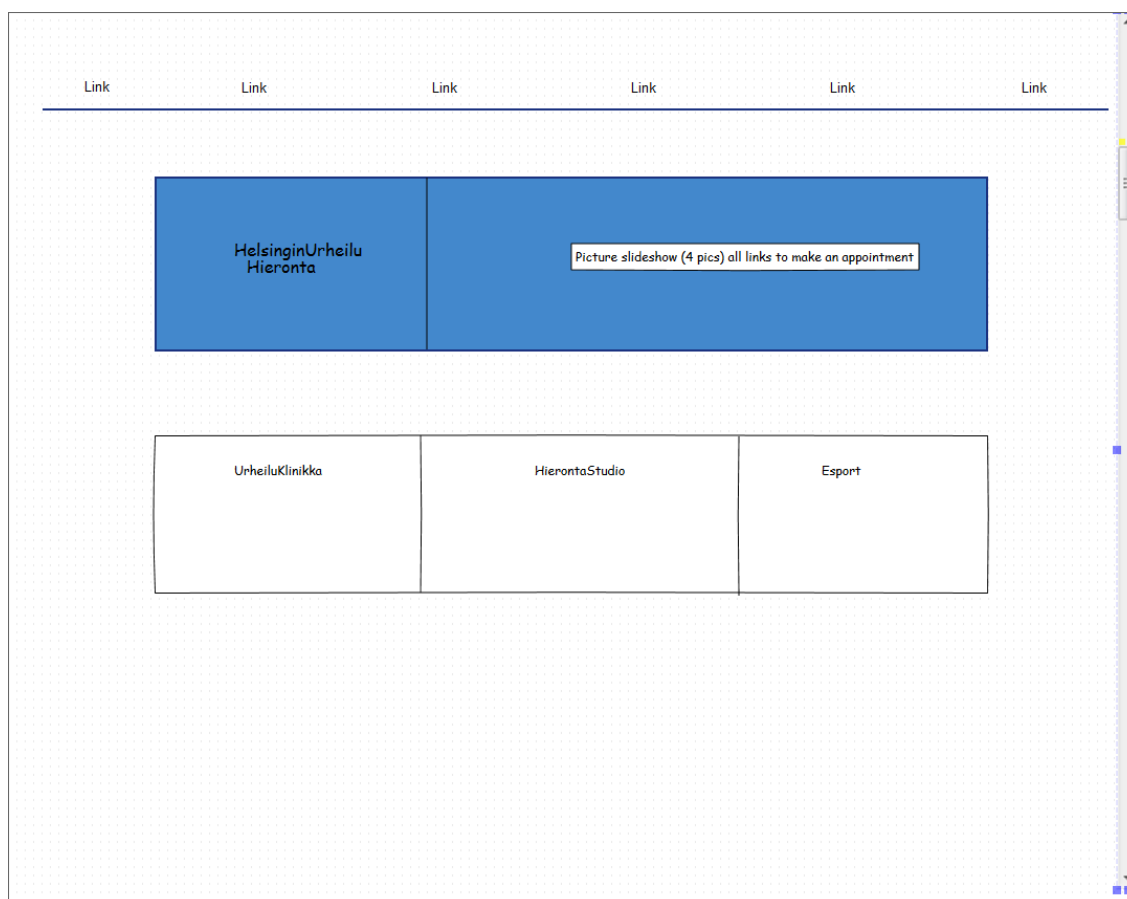


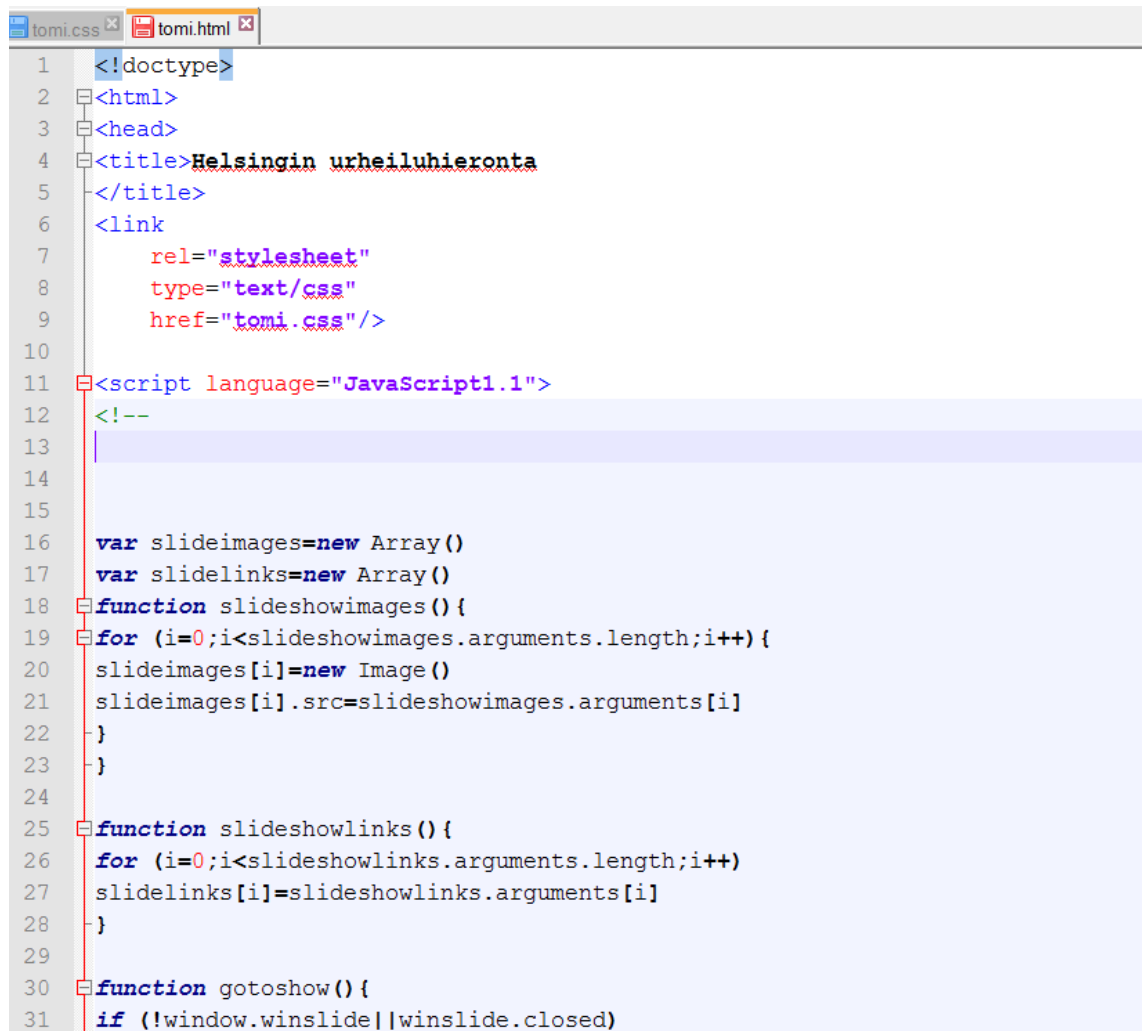
Figure 12: HUH first wireframe of homepage

The other pages in the site were free to be designed however the developer saw fit. The developer used wireframes to design the layout of the secondary pages of the website. The idea was to have a simple boxed design with centered content that would be mostly visual. The logo and menu would always be viewable, even during scrolling and the footer would be basic with pertinent information.

4.2.4 Building

As mentioned earlier, this system was constructed in WordPress, but the initial prototype was hand crafted using hypertext markup language (HTML5), CSS3, and JavaScript (js). For the first prototype, only the homepage was constructed because as time went on, the client became unsure about the final look after being assertive initially.

The developer used notepad ++ as the text editor for writing html5, css3, and JavaScript on a personal computer (pc). The developer also used industry standard web browsers such as Internet Explorer (IE), Google Chrome, and Firefox to load and view the html pages. Html files have a file ending of .html. These .html pages that contain html and js are for the content of the web page. Below in figure 13 is an example of the .html page written for the homepage of the first prototype for HUH website.



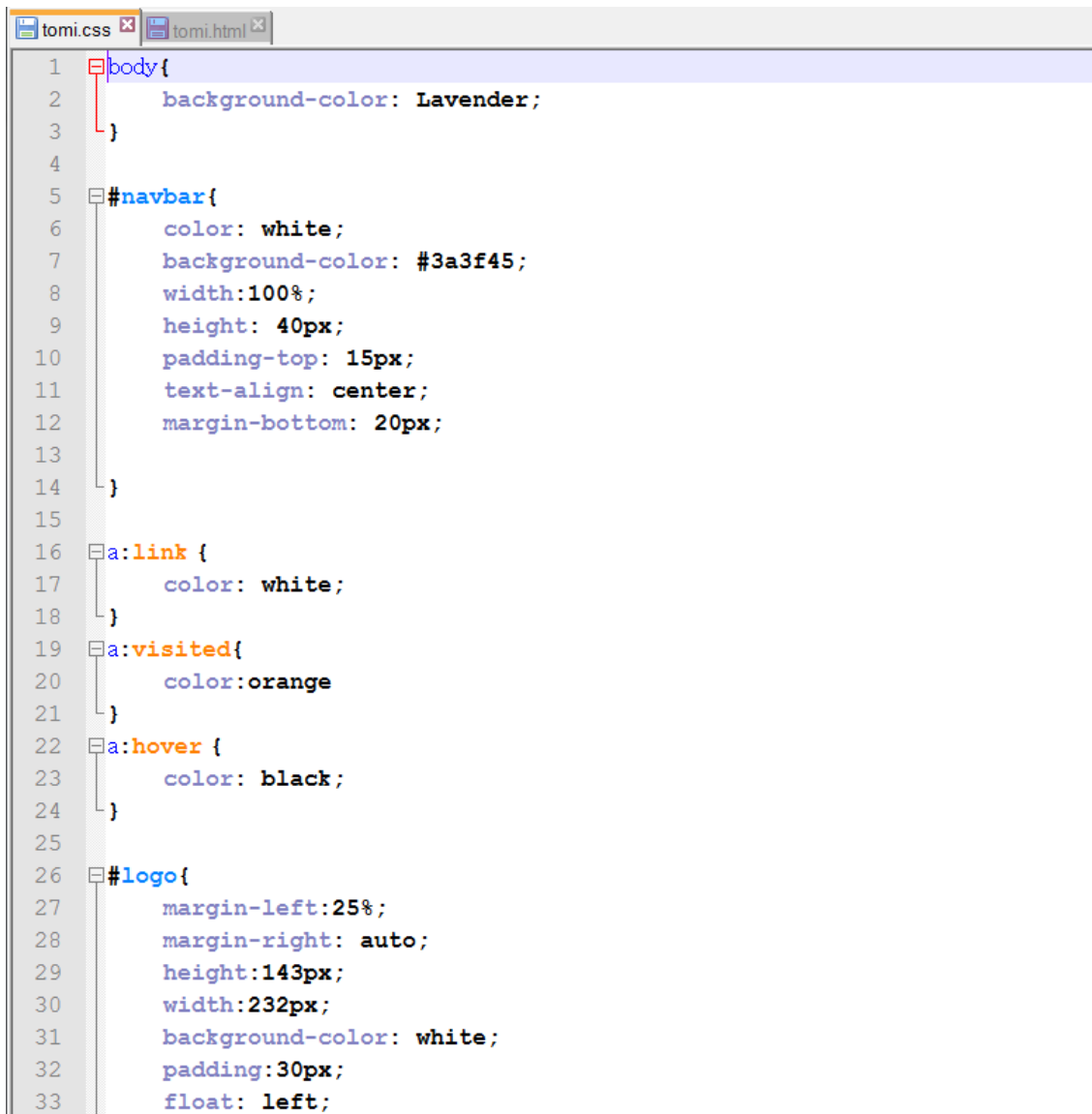
```

1  <!doctype>
2  <html>
3  <head>
4  <title>Helsingin urheiluhieronta
5  </title>
6  <link
7      rel="stylesheet"
8      type="text/css"
9      href="tomi.css"/>
10
11 <script language="JavaScript1.1">
12 <!--
13
14
15
16 var slideimages=new Array()
17 var slidelinks=new Array()
18 function slideshowimages() {
19 for (i=0;i<slideshowimages.arguments.length;i++) {
20 slideimages[i]=new Image()
21 slideimages[i].src=slideshowimages.arguments[i]
22 }
23 }
24
25 function slideshowlinks() {
26 for (i=0;i<slideshowlinks.arguments.length;i++)
27 slidelinks[i]=slideshowlinks.arguments[i]
28 }
29
30 function gotoshow() {
31 if (!window.winslide|winslide.closed)

```

Figure 13: HUH .html code sample

There is one more file type that is included with these files and it has a .css file ending. As explained in an earlier section, css stands for cascades styles sheet. The .css files are there for governing the page layout. Below in figure 14 is a sample of the .css file for the HUH homepage.



```

1  body{
2      background-color: Lavender;
3  }
4
5  #navbar{
6      color: white;
7      background-color: #3a3f45;
8      width:100%;
9      height: 40px;
10     padding-top: 15px;
11     text-align: center;
12     margin-bottom: 20px;
13 }
14 }
15
16 a:link {
17     color: white;
18 }
19 a:visited{
20     color:orange
21 }
22 a:hover {
23     color: black;
24 }
25
26 #logo{
27     margin-left:25%;
28     margin-right: auto;
29     height:143px;
30     width:232px;
31     background-color: white;
32     padding:30px;
33     float: left;

```

Figure 14: .css sample code for HUH homepage

The combination of these two files was the makeup of the first prototype.

4.2.5 Testing

To test the code, it was simply rendered in the major web browsers that were mentioned in the previous section. The test aimed to show the layout the client wanted, the embedded features and links that were requested and the responsiveness to mobile devices.

4.2.6 Prototype release

The first iteration was finished ahead of schedule on February 6, 2015. This prototype was then released to the client for viewing and feedback. Below are figures 15 and 16 of the first

prototype.

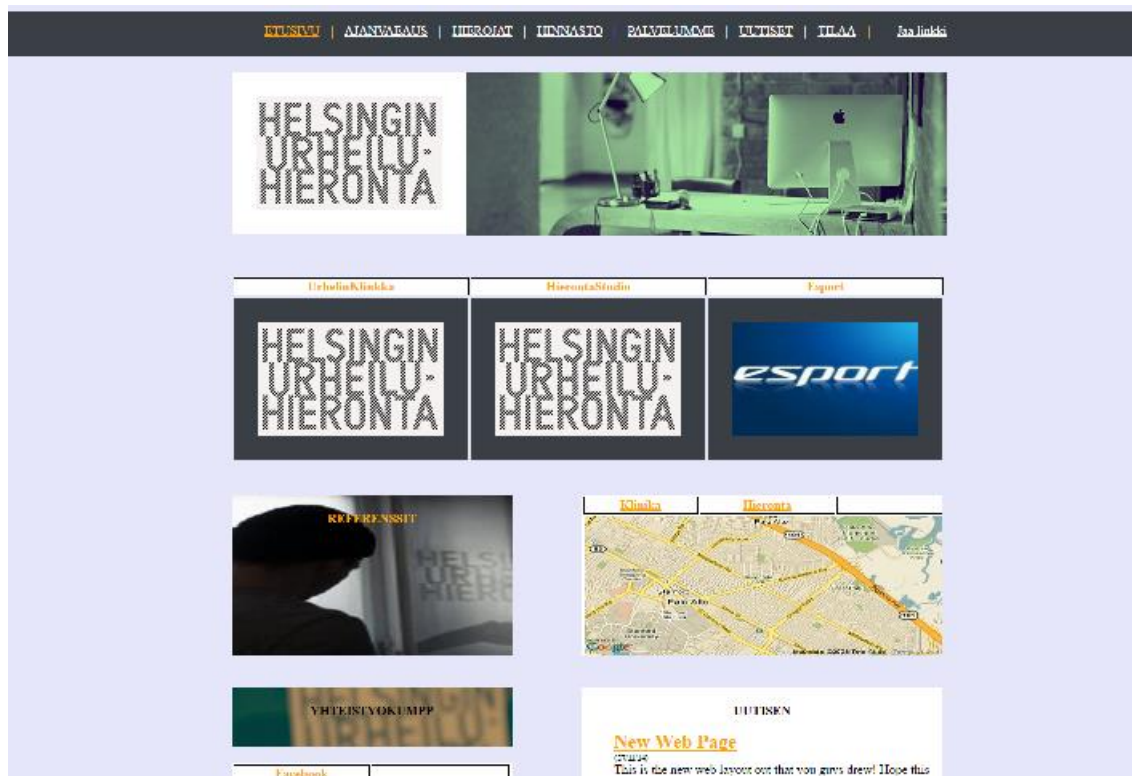


Figure 15: First prototype release



Figure 16: First prototype release continued

4.3 Second Iteration

The second iteration follows the same steps as the first iteration with the exception of a few small differences. Table 3 shown below outlines the process.

Dates	Actions	Details
February 7-10	Research	feedback from 1 st prototype
February 11-16	Planning	2 nd Use casing, 2 nd wireframe
February 17- March 25	Development	Setup development environment, Building UI, adding desired functionality and features
March 26-29	Testing	Checking prototype in web browsers and checking functionality, prototype shown to client
March 31	Release	Place final solution in client hosting environment

Table 3: Second iteration plan

4.3.1 Second Information Gathering

The second meeting with the client was for feedback and changes to the first prototype. The client desired changes to the layout, color scheme, and wished to add an ecommerce store to the website. Most of the elements from the first prototype were kept. The client also wanted to know the developers ideas for the remaining pages that needed to be constructed.

4.3.2 Second Use Casing

The first use casing of the system lacked an ecommerce store that needed to be added to the site. The second system mapping is what is referred to as a subsystem mapping. This is the process of mapping a smaller system within a bigger system. Doing this makes constructing the system much easier for the developer. Figure 17 below shows the mapping of the ecommerce section of the website. The first mapping was of the main system and that was not

changed so only the subsystem needed to be mapped.

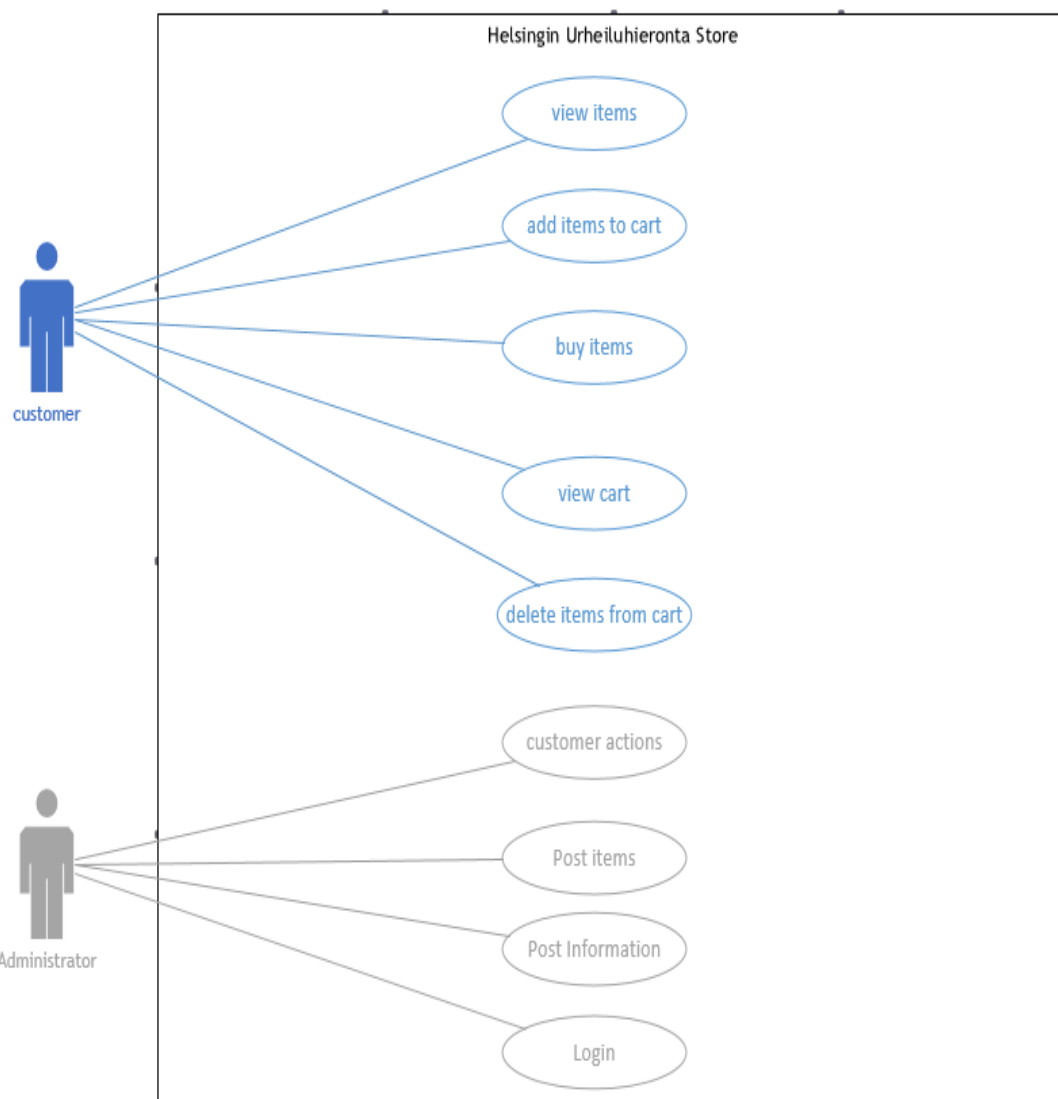


Figure 17: HUH ecommerce store

The mapping shows the capabilities of the users that will interact with the system. The figure shows this in a use case diagram.

4.3.3 Layout Redesign

As mentioned earlier, the client wanted changes to the layout of the prototype. The desire for more bilateral symmetry and drop down menus were requested. The developer shifted some elements around to create more bilateral symmetry and added drop down menus to the main content boxes on the home page. The idea for the remaining pages was left unchanged. Those pages would be built with a boxed style layout with side margins. The client also

agreed that this look would be good for the homepage layout as well. Figure 18 shows how the layout was edited on part of the front page.

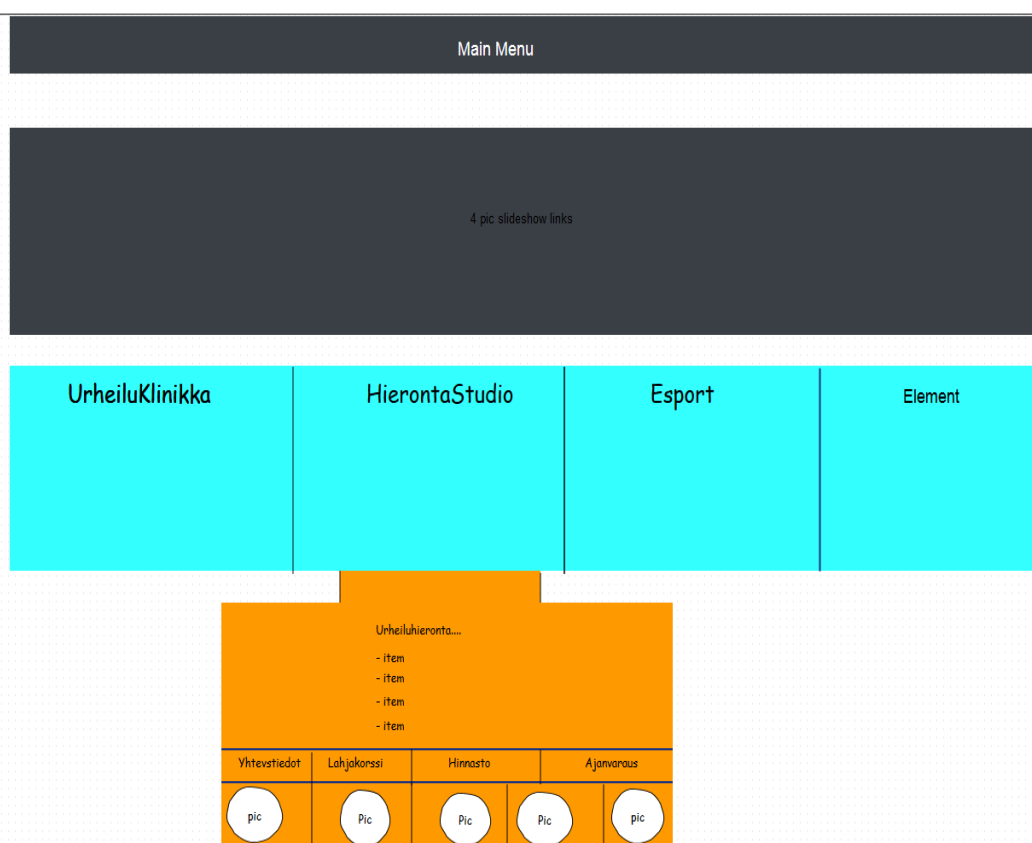


Figure 18: New layout for HUH site

The changes were applied to the second prototype. The concept of the drop menu was added to the second prototype but the look is a bit different than that of figure 18.

4.3.4 Second Build

The second build was done completely different than the first. The second build was constructed in the CMS WordPress. The development environment was the developers own hosting environment. The developer installed WordPress into one subdirectory in the hosting and then proceeded to install the chosen WordPress theme and plugins. Refer to this link http://codex.wordpress.org/Installing_WordPress to receive more detailed instructions on the installation of WordPress.

After installation was complete, the developer began to customize the theme to create the solution that was desired by the client. First, the developer began with the main menu. The main pages of the site were linked to the main menu as well as the online store. Figure 19 shows the main menu with the desired links.



Figure 19: Main Menu for HUH website

Next the developer created the footer for the website. The footer contains information about locations such as addresses, email, phone number and links to the appointment booking page. Figure 20 shows a sample of the footer from the HUH website.

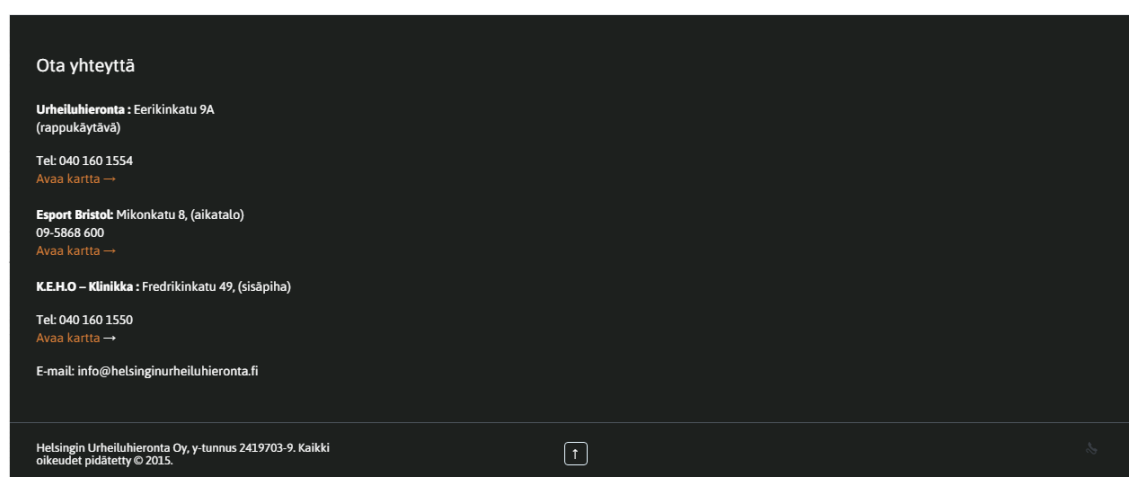


Figure 20: HUH website footer

The developer then began to construct the rest of the homepage. The theme came with a drag and drop feature that made placing elements simple. The developer was able to structure the desired layout and place the desired elements with this feature. The developer used some html short codes to get the desired look of some elements such as font and color of text. The developer brought in links to outside applications Facebook, twitter, google and Instagram. The homepage also contained links to outside affiliates. Figure 21 and 22 shows a sample of the homepage for huh website.



Figure 21: HUH homepage

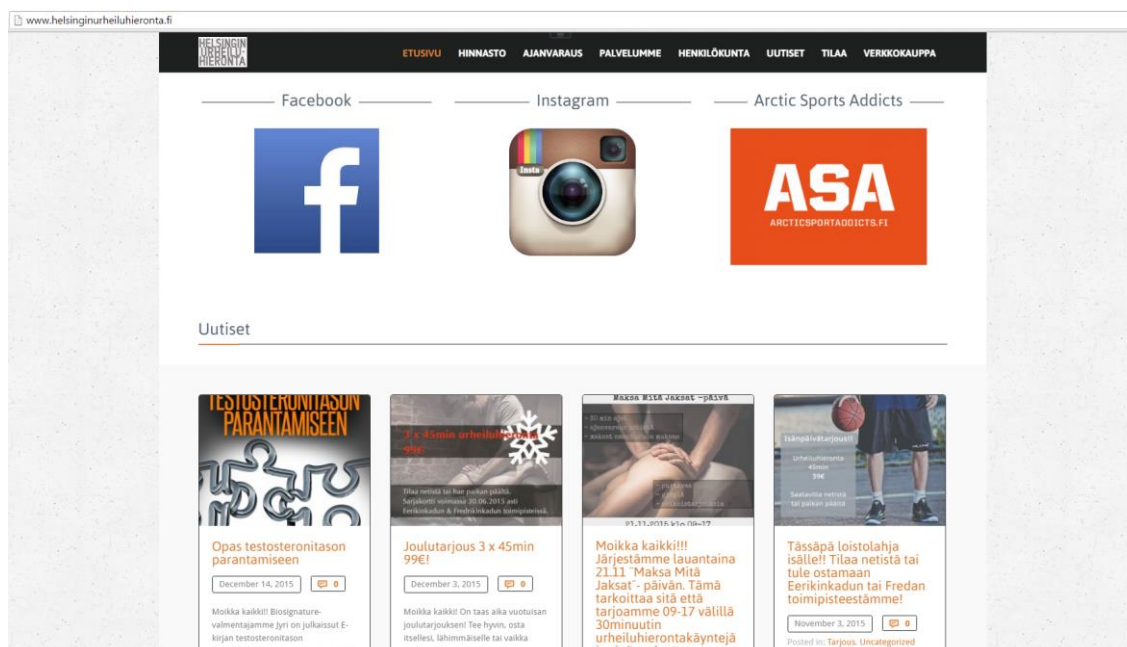


Figure 22: HUH homepage continued

The homepage is more bilaterally symmetrical with a boxed shape. The construction of the homepage created the layout mold or format for the following pages. They were the next to be constructed using the same drag and drop feature. There were a total of 7 custom pages created all of which are linked to the main menu.

The next area of construction was the online store. Wordpress has many popular plugins that can be used for adding functionality and woocommerce is one of them. This plugin was used to add the online store to HUH website. The plugin comes with 4 template pages that can be customized however the developer pleases. The pages are shop, cart, checkout, and my account. The developer customized those pages to the clients requests and added a payment gateway to receive payments online through a third party handler. Figure 23 shows the store page for HUH website.

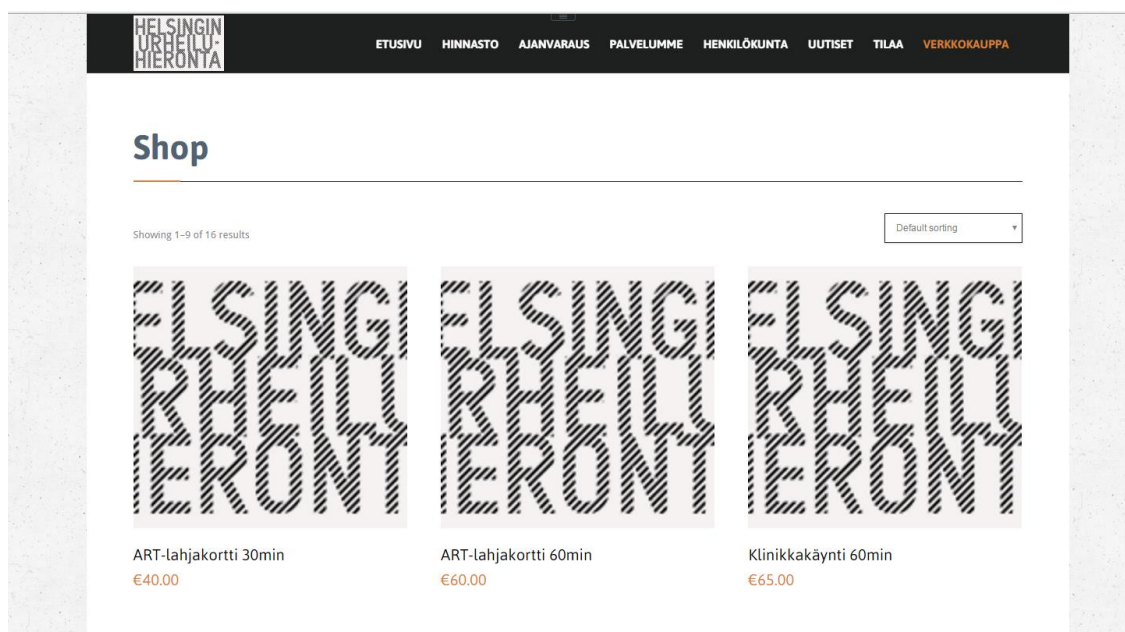


Figure 23: HUH online store

After all of those pages were created and customized, the building of HUH website was completed. The final steps for the developer was protecting the website. The developer implemented security and backup features to the website. The security features were put in place to help prevent the CIA of the website from being compromise by a blackhat hackers. The backup features are to bring the website back online quickly in the event that disaster strikes and the site is compromised.

4.3.5 Final test

The final test of the website was basically a check list for the developer to make sure everything was functioning properly. Table 3 shows the items tested before deployment.

Item	Details	Pass	Fail
Browser Compatibility	IE, Firefox, Chrome, Safari, opera	X	
Responsiveness to	Desktop, laptop,	X	

Screens	phone, tablet		
All Links	Permalinks and custom links work	X	
Images	High resolution, no distortion	X	
Text	Good clarity, same fonts	X	
Store	Process works, third party payment system works	X	
Booking System	Setup appointment, appointment received	X	
Contact	Emails received, Comments received	X	
Database	No errors	X	
Security	Password strength, failed logins, etc.	X	

Table 4: Testing checklist

The items all passed the checklist after two rounds of checking. The prototype is now ready to be shown to the client for final approval.

4.3.6 Final Solution

This prototype was accepted by the client as a final solution. The client viewed all pages and content and approved the final solution. The final step was to move the website from the developers hosting environment to the clients hosting environment. This task was performed using a WordPress plugin called Duplicator. Duplicator clones a websites files and database and saves it into a zip file. The developer has to install duplicator into a fresh WordPress install on the destination environment. Then the zip file is uploaded and deployed. If successful, the result is an exact copy of the developed website into the client's hosting environment. This step was completed and the solution was delivered to the clients hosting environment on March 31, 2015 at approximately 5am.

5 Conclusion

The project was a successful one. The client was happy with the solution. The cost, time and scope of the project were all met. The HUH website was successfully launched to help market

the clients new locations that were having a grand opening and the online business is thriving with the new convenience of an online payment system. Overall, the project was a good experience and many new things were learned by the developer technically and business wise.

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