2020

GUIDED TECHNOLOGY PROJECT
WEB DEVELOPMENT

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Abstract

The emergence of the Digital Age enables companies to expand their business to reach their target audience.

The present study proposes the development of a system for a beauty salon, which the public can check all type of services the salon provides, register themselves on the site to make appointments online or check an appointment made previously.

Keywords: system, salon, beauty

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To my family, that always encourage me and believe that I would be able to overcome the obstacles that life presented me. To my late father Laercio, thank you for supporting my decisions even though it was halfway across the world.

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1. Introduction

1.1 Overview

The unisex salon is a commodious dwelling, offering a comfortable stay for all. There's an extensive menu to peruse, ranging from; blow drying, haircuts and colouring, manicures, pedicures, acrylics, waxing and plenty more. Each treatment is achieved through knowledgeable and talented professionals.

Customers need to be able to select a DATE for their service. The website should limit the number of bookings allowed per day. If there is no available space for a day, then the customer should not be able to book a service on that day.

The saloon is closed on Sundays and Mondays for service bookings. DO not allow customers to select a Sunday neither a Monday.

Minimum requirements needed:

Types of Booking services:

Customers can register in the website and book a service. There must be at least 4 types of booking:

Hair

Nails

Hair Removal

Face

Login:

Registered customers should be able to login on future occasions and the system should remember their details. This would include details of type of service they LAST booked on the website.

Personal information:

Customers can register on the website and book for a service; therefore, customers will need to be able to provide some basic information about themselves.

Customer name and contact number;

Booking required (type of service that customer would like to book);

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Comments (to allow customers to add any notes they want to add, such as review about the service);

Additional information (if the customer has any type of allergy);

Administration:

The saloon needs to have an admin access to the site to view bookings for any particular day OR week, so that it can plan its work & staff rostering. You can assume the saloon has at least 5 staffs available on any one particular day. The saloon needs to be able to provide a staff to each customer. You can assume that all of its staff are able to carry out any type of service and that each professional could carry out AT MOST 4 services in one day. If the booking is a Hair Colouring/ Highlights, then this would count double. The saloon needs to be able to print the schedule for any particular date.

The salon needs to be able to allocate costs to each booking. You can assume a basic fixed cost (e.g. a Haircut cost €30 minimum). It needs to be able to add to this the cost of any product that were needed to the service. For example, if the customer book a haircut and then decide to do a treatment, then the cost of this treatment would be added, or an extra charge will be charged for extra-long or thick hair. You can decide the cost of each service and what types of service you include, for example a haircut can include a cleansing wash and a nourishing conditioner, then execute the precise haircut and finalize with a blow dry. You do not have to provide an exhaustive list of service, but the more you provide the more realistic your final product will be. AT A MINIMUM you should provide 15 different types of service for the salon.

Booking statuses:

Booked: this is the default status when a booking is made in a certain day and time;

In Service: When the customer arrives in the salon;

Completed: When the service is ready and completed;

Unfinished: When there is any problem that the staff are not able to complete the service (for example for a Highlights: if the hair is extremely damaged making it impossible to perform the procedure).

Invoice

The salon needs to be able to print an "invoice" or bill for each customer when the service/repair is complete. This should provide an itemised bill for the customer. For example:

CUSTOMER: Alanah McDonald

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Mob No: 085 02140201

Service required: Balayage/Ombre

Extra service: Deep Hair Conditioning Treatment

Main Service €89

Extra Service €15

TOTAL DUE €104

Payment due on collection.

 You can assume that the actual payment is handled by salon at the checkout / on another system. You do not need to process payments or issue a receipt.

1.2 Purpose

The first step was the decision of the functional requirements of the site. Based on the design specification, and thinking about a salon website, a few things were initially established:

Possibility to schedule an appointment at the online salon, specifying what type of service will be performed, and possible additional services on the same schedule. Possibility to add comments.

Schedule, with a specified number of teams available at each time of day.

Need to register / login users, to identify the person who will make the appointment, in addition to preserve a history of previous visits to the establishment.

Need for an administration area for site management to be able to check schedules, modify status, besides add possible additional charges (extra for long hair, for example). Customer account printing is also done through the site administration area.

Once is established what needs the website would comply with, the next step was to design the wireframes with the main screens. At first, the scheduling and administration screens were made. The registration and login screens were not necessary, because it is something very generic, simply creating a form with the necessary information.

However, for the screens that were drawn, this kind of subsequent planning was very important for the flow of information (from the site user's point of view) to be done more appropriately and intuitively. In addition, that made it a lot easier the analysis of data requirements (by containing all requirements fields).

The third step was to perform data modelling, where it was decided what data would be needed, and how it would be organized.

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After that, site front end development has started. The front end was chosen to be developed first, as it does not depend directly on the back end to be mounted, and greatly facilitates its development when ready (if the screens are already ready, and the database connection is made, simply place the outputs where they need to be shown).

Since the wireframes were ready, they were only translated into HTML and CSS. Bootstrap was used as the main base because it greatly speeds development with ready-made styling and alignment classes. With that, it was enough to choose the colours, and to use the structures that the Bootstrap provides.

In addition to Bootstrap, jQuery is also being used (although this is a prerequisite for Bootstrap to work, it is worth mentioning for speeding up JavaScript code writing) and Font Aweasome (for small icons).

The project will put together all types of skills needed to build an enterprise grade system. All components will be written using open source and well-known components, such as, PHP, MySQL, JavaScript, HTML and CSS.

One complete CRUD (Create, Read, Update, Delete) environment will be created and could be used for future reference or even as a template for future projects.

The register and login functionality are the most important part of this project since security on any website is very critical

In particular, this project will help me to improve all the skills learned in this course to cover a real-world problem. Since I have worked both with development and business analysis in the past, I particularly think after this Project I will feel more comfortable searching for this kind of job and this will be a benefit for me.

2. Literature Review

2.1 Development

Follow bellow some of the reasons for choosing some softwares such as PHP and MySQL. Also considering the agility in development.

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Diferences between each software			
Front end	Angular/React/Vue	HTML/CSS/JS/Bootstrap	
own server needed?	Yes	No	
open source	Yes	Yes	
other considerations	made for big and scalable applications	JavaScript plugins easily integrated	
Back-end	PHP	ASP	NodeJS
open source?	Yes	No	Yes
Supports Apache?	Yes	No	Yes
other considerations	can use both structured and object-oriented language	only works on Windows server	Hosting is more expensive
Database	MySQL	SQLite	PostgreSQL
which modern applications it supports?	only JSON		modern application like JSON, XML
open source	Yes	Yes	Yes
Other considerations	relational database management system	no user management (reads and writes directly to an ordinary disk file)	object-relational database management system

2.2 Calendar

A problem faced was the creation of the calendar imagined in the wireframes. It is used on two screens to choose the date of visit to the salon. It was used the plugin JS FullCalendar, which is very complete and has many features. However, because it is very complex, it took a while for everything to be configured the way you want, with schedules the right way; as well as setting parameters such as colours, procedures for clicking on events, calendar display, etc. [12]

2.3 Database

The MySQL database, besides having an excellent performance, has compatibility and easy integration with the PHP programming language, one of the reasons for choosing this kit, PHP + MySQL, for the development of this work.

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2.4 Web-design

Regarding "colours", they were taken from the "Color Hunt" site, which already has colour palettes ready.[6]

Initially, I had thought of using black and yellow colour for the main page because it just looked "cool" to me. But after considering some advices, I have chosen Purple colour which is associated with beauty and, according to website Fast Company, there is an explanation behind the colours such as emotion and psychology. Most people mention the colours as the primary reason to buy a particular thing.[8]
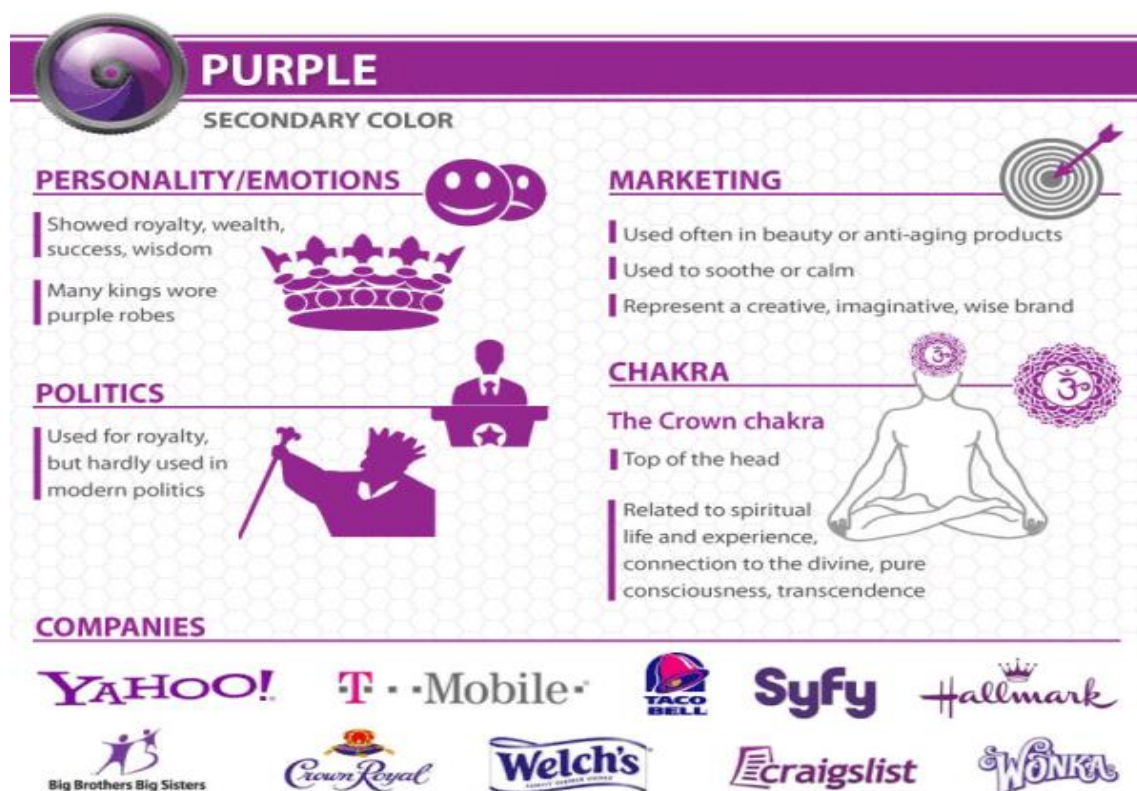

Figura 1: The importance of colours

3. System Analysis and Design

3.1 Functional Requirements:

Priority Levels

3   Required: the system will be impaired if the function does not exist, impaired or unusable;

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4 High: high impact functionality that affects operation but does not leave the system down

5 Average: non-critical functionality (does not affect software usability), but may affect long-term usability;

6 Low: low impact functionality, which has no major problems in system quality, performance or functionality

The system was divided into two parts: administration section and user section:

Administration section:

Priority Level: Required

Functions:

- Ability to view and print schedules for any specified day / week (required)

- Create / remove items from list of services offered (medium)

- Specify the values for each of the services offered (average)

- Possibility to modify the status of a specific schedule (required)

- Ability to print the account to the specified schedule, including all services provided. (required);
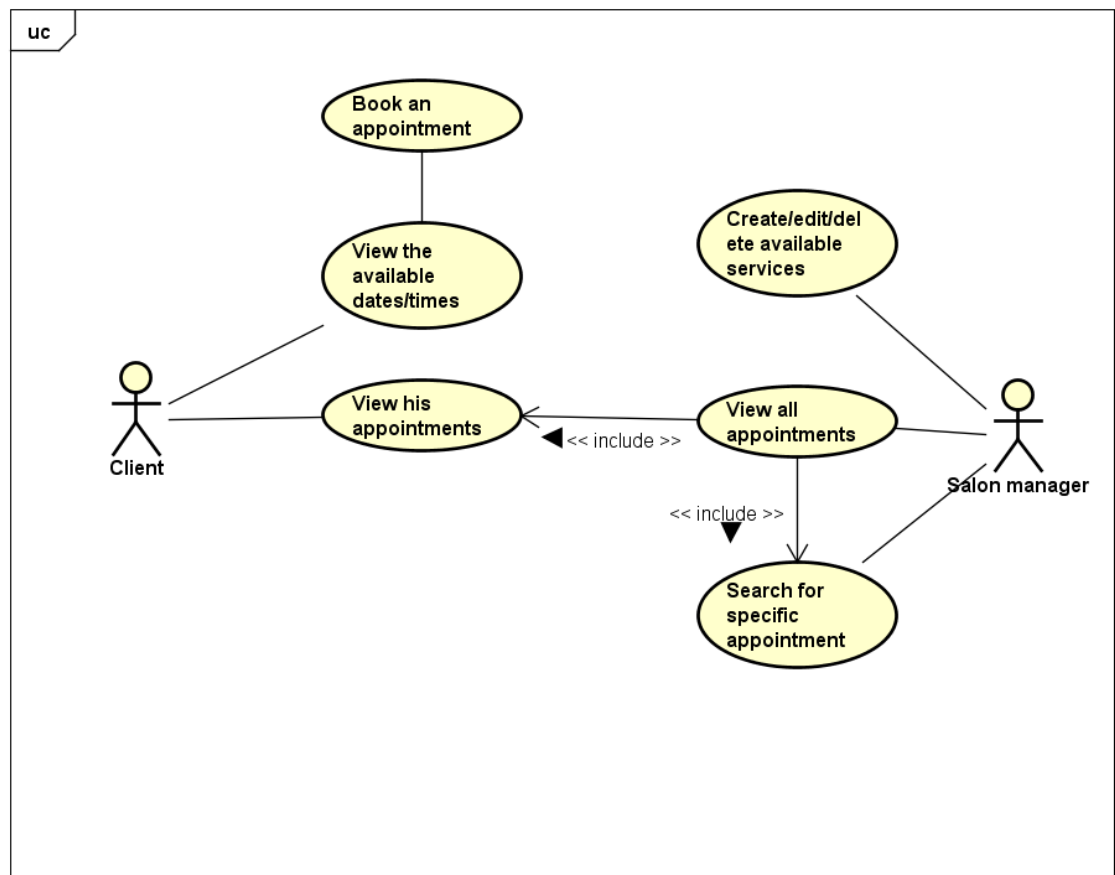
User Section:

Priority Level: Required

Functions:

- Login and user registration (required);

- Registered customers can see all services already made at the salon, at other times (low);

- Schedule a new time (required);
    - Select time, respecting the hall calendar;
    - Select Schedule Type;
    - Add additional comments / information.

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3.2 Use Case Diagrams

Figura 2: Use Case Diagram (by Juliana Garcia)

As it showed in the picture above, the website can be accessed for both:

Administrator: Which can be the manager of the salon and/or one of the staffs.

The administrator is allowed to modify any information such as price of the services, booking status, create a new service, etc.

User (customer): Once the user is registered on the website, he will be allowed to make an appointment on the website and check his previous appointment. If the user is not registered on the website, he will be able to get basics information about the salon such as what type of service the salon provides.

For the User case diagram, I have chosen Astah UML which is a software for modelling UML (Unified Modeling Language), created by a Japanese company, Change Vision.

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3.3 Wireframes:

Basic design of the interface which directly demonstrates the architecture of how the final interface will be according to the reported specifications.

Initially, the Wireframes were designed on the InVision platform (invisionapp.com) using the "Freehand" tool. However, I realized I was spending a quite long time using this platform once I did not know how to manage it properly, so I decided to finish it using Paint.
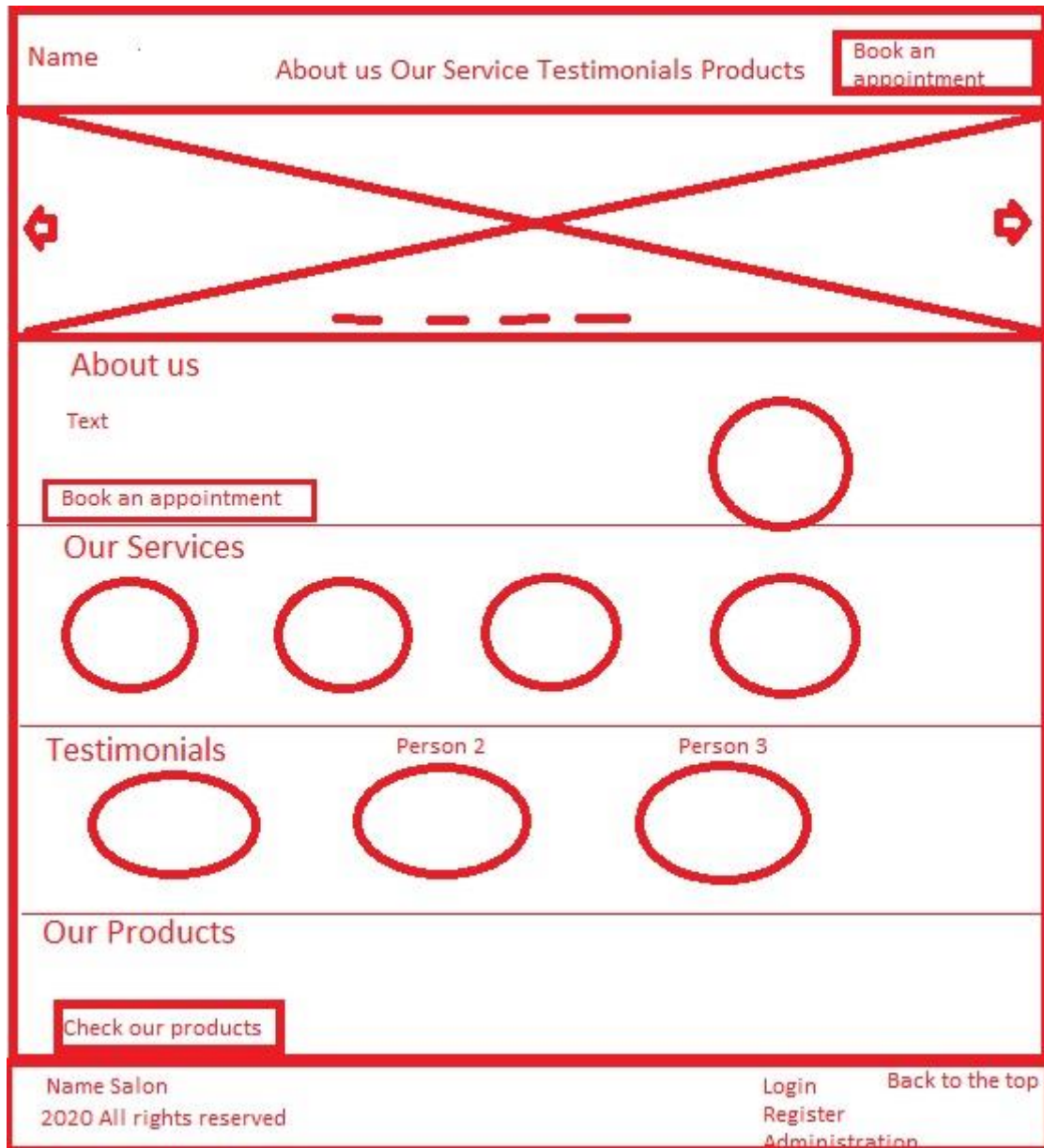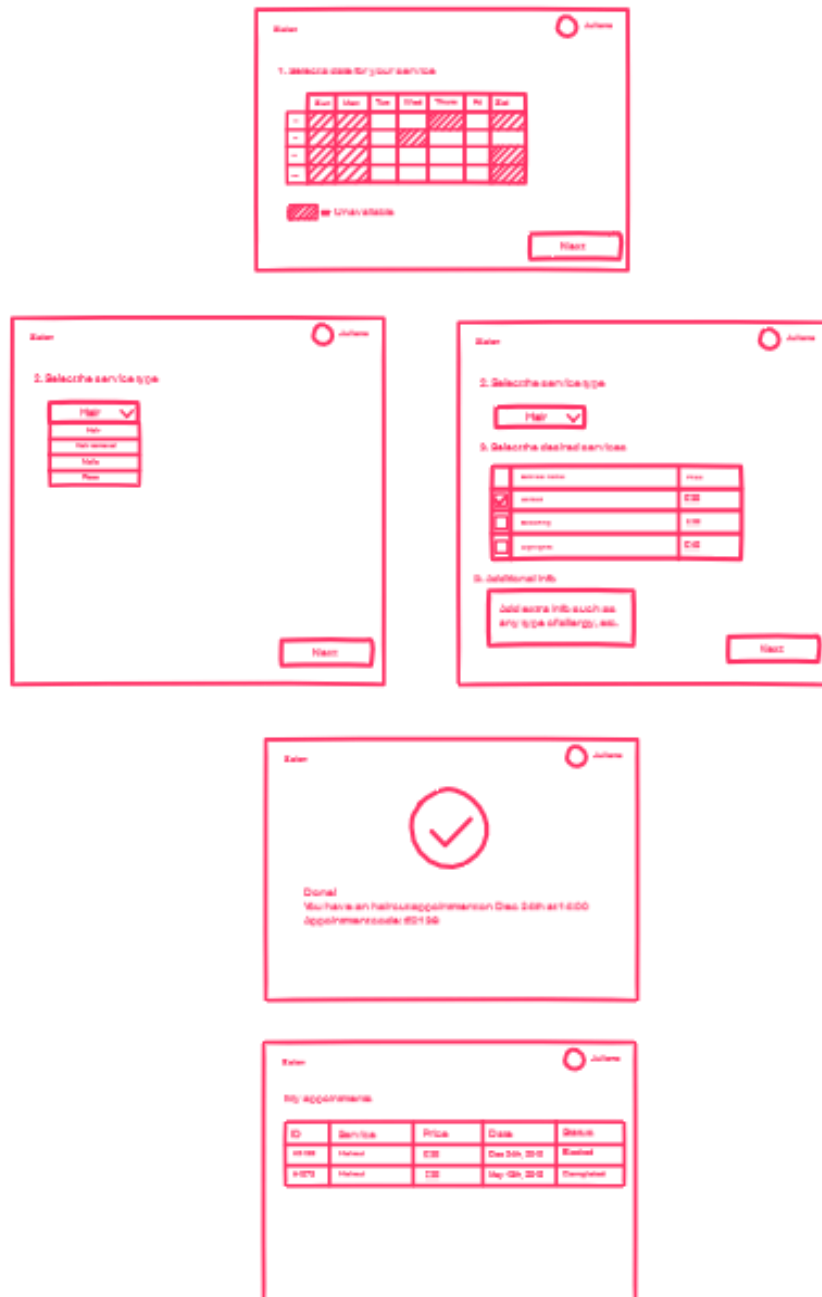

Figura 3: Wireframe Home Page (by Juliana Garcia)

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Figura 4: Wireframe Calendar (by Juliana Garcia)
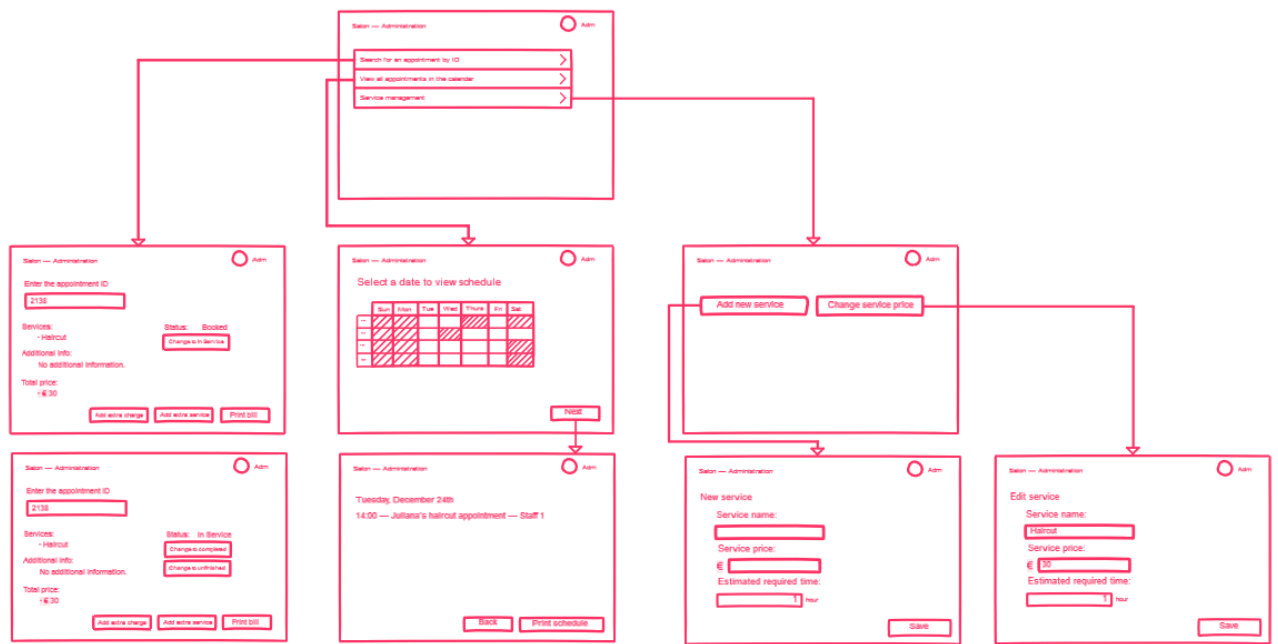
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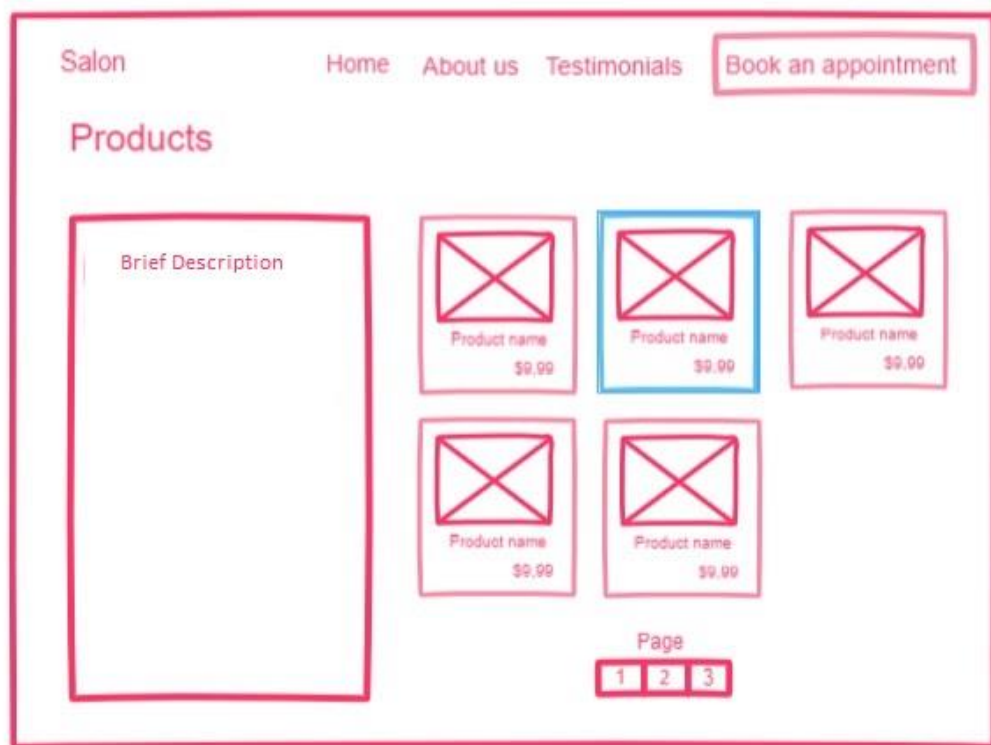*Figura 5: Wireframe Administration (by Juliana Garcia)*

Figura 6: Wireframe Products page (by Juliana Garcia)

3.4 Data Design:

An Entity-Relationship Diagram is a model of data used to represent the entity framework infrastructure. It is a data modelling that shows tables in a database and the relationship between tables within that database.

As one of the project requirements was to use a relational database, normalized in the 3rd formal normal, the division was made in 5 tables:

- Services: stores the data of each service. Columns: Name, Type, Price, Time.
- Customers: stores the information of customer data. Columns: id, name, password, email, phone.
- Appointments: stores data related to each schedule made. Columns: id, customer id, date, status, additional information, team responsible
- Appointments services: relates schedules to customers (once there is the possibility of performing more than one service per schedule). Columns: schedule id, service name
- Appointments charges: stores the possible additional charges that may be made on a particular schedule (again, by being able to add more than one additional charge). Columns: schedule id, additional price, reason.

It would be possible to create new tables for team management, but the tables would become redundant, and considerably more work, as the available teams can be implicative by considering how many schedules have already been made on the day.[9]
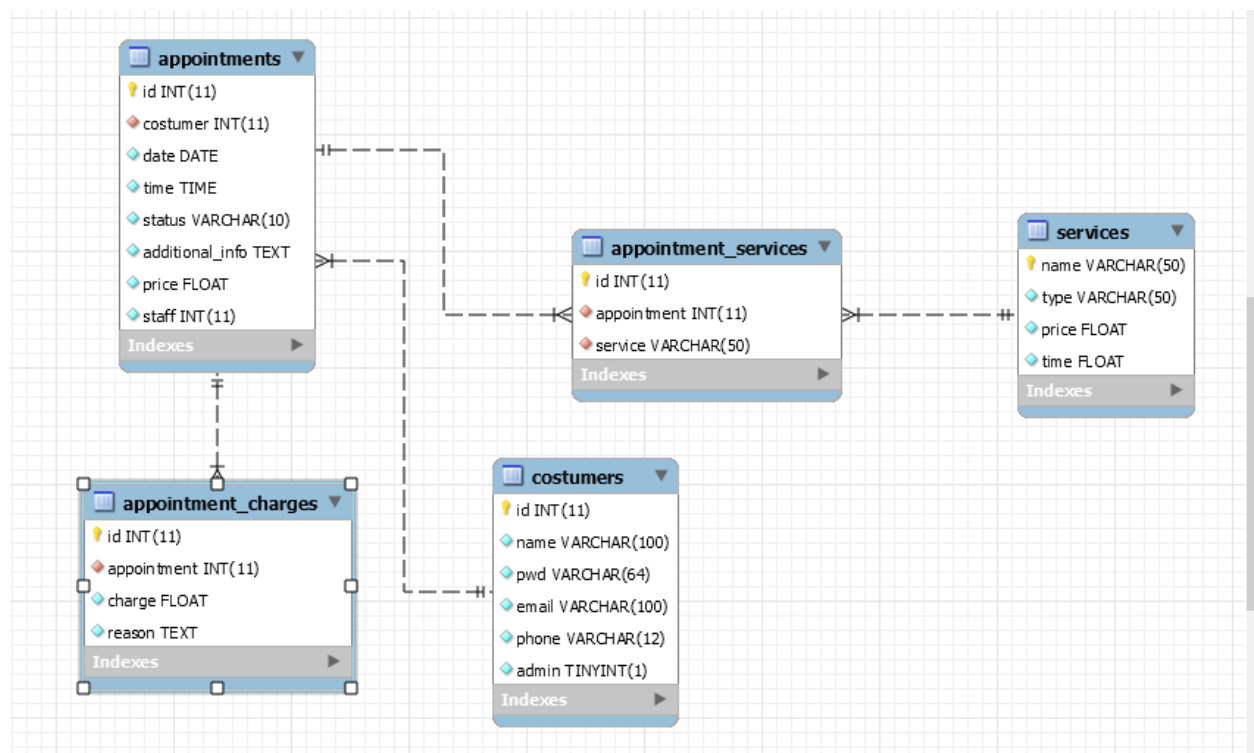

Figura 7: ERD (by Juliana Garcia)

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4: Implementation of the System

Technologies**:**

The choice of the technologies which has been used took into consideration the following criteria:

- Technical skills needed for the operation of the website;
- Agility in development;

(Presumed) cost for the maintenance of the system;

Regarding the process of development, it has been chosen tools that optimizes the process as a whole, fulfilling the necessities, which it does not cost too much for a real customer keep it.

Front-end:

The site is basically simple, few pages and with a directly purpose: make bookings, management of this bookings. Nowadays, there are so many tools for the front-end development: Angular, React, Vue, etc. They are robust frameworks Javascript, made by big and scalable applications, which it would be too much for a small-sized application such as a hairdresser. In addition, it would be needed its own server, running the application for the operation, which it would include unnecessary costs.

Therefore, the front-end was developed in HTML/CSS/JavaScript, basis for any website, with small additions as Bootstrap and jQuery, with the aim of making the development agile and simple.

Bootstrap is an open source framework for responsive webpage building, initially developed in 2010 by a Twitter team, and is now in version 4.4. Bootstrap has several components (forms, modes, buttons, navigation bars, etc) ready for use but highly customizable; plus, CSS classes for easy alignment of elements on the page. As a result, the transition from wireframes design to the already structured HTML/CSS webpage occurred quickly and true to plan. [2]

One of the requirements for the correct functioning of Bootstrap components is jQuery, which is an open source JavaScript library designed to make it easy to manipulate HTML Document Object Model (DOM) elements. Animations and requests AJAX are also included.[3]

The downside of jQuery is that execution slows down compared to JavaScript Vanilla. However, the development process becomes considerably easier and faster using the

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versatility offered by the library, and for this reason, it has also been used to develop all JavaScript of the site.[5]

Back-end:

For the back end, it has been chosen PHP and MySQL.

PHP is a programming language made for server-side scripting and is highly used for website development (for example, the WordPress platform is made in PHP).

Its advantages are the easy-to-learn language and it can use both structured and object oriented programming; high server presence: Most servers today, such as Apache, support PHP and are relatively inexpensive; and it supports a large number of databases, such as MySQL which it was used.

Other options would be ASP, Python, Ruby, JavaScript (NodeJS), which would also comply the project aims easily, however it has higher added cost (ASP only works on Windows server, which is more expensive, and hosting that supports Python or NodeJS is hard to find and also more expensive).Moreover, familiarity with PHP has made development faster.

Regarding to Database, MySQL has been chosen because its relational (project requirement) and its integration with PHP is very fast and effective: with a few lines of code it is now possible to perform database operations. There are alternatives to MySQL, such as PostgreSQL or SQLite, nonetheless, MySQL was chosen for the convenience of packages such as XAMPP (used in development), or LAMPP, which it offers Apache+PHP+MySQL in a single configuration, making the initial setup process much simpler for both development and possible deployment to a hosting later.[4]

5. Testing and Evaluation

The architecture chosen for the development of the site, with intern API calls facilitates the creation of tests for the main points of the site.

The main objective of the tests is to verify the correct functioning of the logical part of the system, which involves the manipulation of the data created. As such, there are no tests to execute the front end (such as testing clicks on pages, for example).

Because of the short time I had to do the tests, I was not able to do tests more complex such as the scripts. If I had enough time, I would build the tests using PHPUnit library for automatization and Guzzle to accomplish the HTTP call from APIs. This way, each file

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would be called, and its output (in JSON) analysed. And if the result matched the expected

result, it would mean the API was doing its job correctly.[10][11]

For parts of the site that involve creating / editing / removing some data from the database,

I would try to preserve the original state of the database (before the tests).

Bellow, there is a brief of the smoke tests that were done:

Test scenarios	Description	Test steps	Expected result	Actual result	Status
Must login to book an appointment	Test the appointment page to ensure that only registered users may book appointments	1. Navigate to the appointment page	Redirect to login page if not logged-in	as expected	Pass
Must be logged-in as administrator to acces the admin page	Test the security of the administration section of the website	1. Navigate to the administration page	Redirect to appointment page if not logged-in as administrator; Redirect to login	as expected	Pass
Create account	Test the creation account page	1. Navigate to the login page 2. Click in the "Create an account" button 3. Enter the form data 4. Click in the "Submit" button	Redirect to the appointment page	as expected	Pass
Valid "repeat password" field	Test the creation account page, to ensure that both "Password" and "Repeat password" fields have the same value	1. Navigate to the login page 2. Click in the "Create an account" button 3. Enter the form data 4. Enter a distinct values for the "Password" and "Repeat password" fields 5. Click in the "Submit" button	Get an alert with ame	as expected	Pass

Login test:

Figura 8: Login (by Juliana)

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Password and repeat password do not match:

Figura 9: Login password (by Juliana Garcia)

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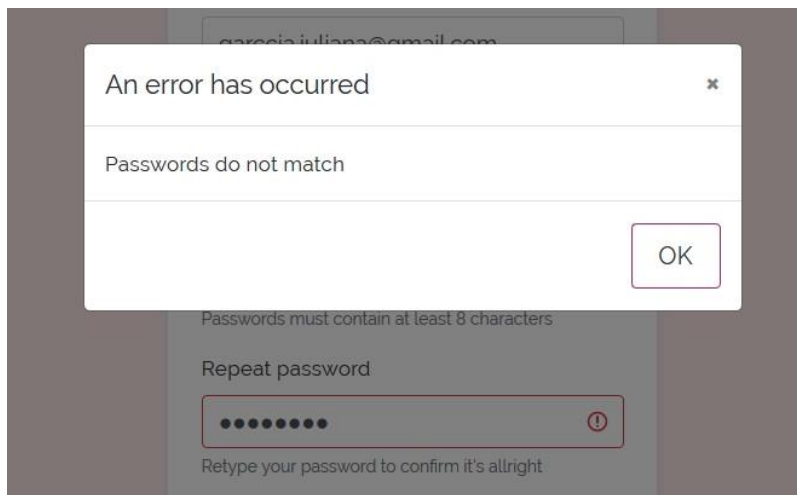
Figura 10 Error (by Juliana Garcia)

Register Successfully:

Figura 11: Successfully (by Juliana Garcia)

Choosing a type of service:

Figura 12: Service (by Juliana Garcia)

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2. Select the service type

Hair ▾

3. Select the desired services

	Service name	Service price
☐	Blow-drys	€ 15
☐	Colouring	€ 40
☑	Haircut	€ 30
☐	Highlights	€ 40
☐	Treatments	€ 20
Total		**€30**

3. Additional info

Add any extra informations such as any type of allergy, etc.

Cancel   Next

Figura 13: Service2 (by Juliana Garcia)

Done!

You have a Hair appointment on Wed Feb 05 2020 10:00:00 GMT+0000 (Greenwich Mean Time)
Appointment code: #17

Thank you!

Go to my appointments

Figura 14: Appointment ok (by Juliana Garcia)

It would be impossible to include all in screenshots from all tests done so far, however, the screenshots were included in a folder.

6. Conclusions and Further Work

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The main aim of this project was the development of a web application, developing a system for a beauty salon in order to facilitate the management of customer's bookings and also facilitating the scheduling for their own customers.

A website was then developed which, in addition to having a pleasant look, allow the public to login to the site and book an appointment online where the access to it can be done by web address.

With this project it was possible to practice much of the content learned in the classroom. It was possible to verify some characteristics in the world of systems development work, such as: how the daily routine of a beauty salon works, how is the collaborative development, among others, in addition to gaining experience in the test process. In several situations it was necessary to seek help from former co-workers who have more experience than me, dealing with problems that I had not had so far.

Future studies:

As future work, I can point out:

Confirmation of appointment via SMS: Allows customers to receive a confirmation not only as soon as the appointment is made but also a reminder one day before the schedule date.

Another suggestion would be: Make possible to buy online the products available in the physical store. At the moment, customer can only check in the website, what type of products and brands the salon offer.

Appendix A: Code Listings

This project can be found in GitHub (follow the link below).

https://github.com/GarciaJu/Guided_Technology_Project_CCT_2019051

administrator login: admin@admin.com password: abc12345

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[2] Carousel image 1:

() *Naturali, fantastici capelli per ogni occasione,* Available at: *https://pierosermasi.wixsite.com/4uextension/galleria?lightbox=i41mth* (Accessed: 06/01/2020).

[3] Carousel image 4:

Kennedy, Laura 2019 *This excellent hair removal product is expensive but how much do you spend on waxing?,* Available at: *https://www.irishtimes.com/life-and-style/fashion/beauty/this-excellent-hair-removal-product-is-expensive-but-how-much-do-you-spend-on-waxing-1.3992025* (Accessed: 06/01/2020).

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