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Beauty Mobile Applications and Website

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ABSTRACT

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The combination of business with information technology has existed for a long time. Nowadays, we hear the word "digitalization" in every business because digitizing data helps to improve business efficiency, reduce costs, and improve employee productivity in the business. This has long been no longer a controversial issue but has been proven by countless businesses.

In the past, to new companies, building platforms, good tools, and infrastructure to enable digitalization of data was not an easy task due to human resource and costs constraints. However, with developing of current technology, this has been simplified, and every business can do it easily.

Therefore, in the thesis, we would like to introduce benefits of technologies in business and how technologies bring the result on business. The combination will bring convenient to customers, help company are easier in managing and keeping loyalty customer. We also introduce cutting-edge, typical, and easy-to-use technologies when building web-based software, as well as phone applications, for digitizing data in businesses.

Keywords:

Mobile Application, Website, React Native, Vue, Laravel, GraphQL

CONTENTS

1. INTRODUCTION.....	5
1.1. Purpose of the thesis	5
1.2. Oasis Nails and Beauty company	6
1.3. Plan of our thesis	6
2. ANALYSIS THE ISSUES OF COMPANY	7
3. INTRODUCTION OF MOBILE APPLICATIONS AND WEBSITE	9
3.1. Mind map and introduce about features	9
3.2. The differences between IT project course and the thesis	13
4. OASSY SYSTEM	17
5. TECHNOLOGIES.....	18
5.1. Introduce and compare technologies.....	18
5.2. SKETCH	28
5.3. REACT NATIVE.....	31
5.4. Vue.js.....	32
5.5. Laravel	34
5.6. API	37
5.7. Insomnia REST Client	38
5.8. FileZila Clie	39
5.9. Visual Studio	40
5.10. Atom	43
5.11. IOS Simulator	44
5.12. GitHub.....	47
6. DATABASE	49
7. FINAL PRODUCTS.....	52
7.1. Mobile Application for customers.....	52
7.2. Mobile Application for staff.....	52
7.3. Website.....	53
8. TESTING.....	54
9. CONCLUSION	56
10.DISCUSSION.....	58
REFERENCES.....	59
APPENDICES	61

1. INTRODUCTION

1.1. Purpose of the thesis

According to Nielsen Vietnam's 2017 Smartphone User Behavior Report, the proportion of smartphone users compared to the number of regular phone users accounts for 84% in 2017, a 6% increase compared to a year ago (78%). In secondary cities, 71% people use smartphones in 93% of mobile phone users. More notably, in rural areas, while 89% of the population uses mobile phones, 68% of them own a smartphone (Vietnam News 2017, cited 29 November 2017).

Earlier this year, Nielsen also conducted another study in collaboration with Younet Media to clarify the development trend of rural consumers. The results show that social media have emerged as one of the main platforms for gathering information, entertainment and keeping in touch with relatives, friends and children with 22.5 million countryside Facebook users compared to 23.5 million from urban areas (Vietnam News 2017, cited 29 November 2017).

Based on these researches, it is highly likely that most Vietnamese people have smartphone and the time they spend on using smartphones is more than computers or laptops. Therefore, OASIS nails and beauty company would like to offer the utmost convenience to their customer in smartphone era. We are developing mobile applications with absolute support towards bookings, buying products, purchase history, and checking schedule. Besides, we are also developing website to support managing revenue, all important information of the company. Moreover, we would like to introduce the tools which we have been using in this development work and we will make some comparisons to show the reasons why we use those tools with advantages and disadvantages of each tool.

1.2. Oasis Nails and Beauty company

OASIS Nails and Beauty which is a brand chain from Singapore with five-year experience, opening its branch in Vietnam for the first time. OASIS's services include Nails, Eyebrow semi-permanent tattoo and Eyelash extension.

Therefore, OASIS would like to improve their services by introducing collective courses with teachers from Singapore and America. Besides, they also have plan to open hundreds of branches in three big cities: Ho Chi Minh, Ha Noi and Da Nang.

1.3. Plan of our thesis

Firstly, we would like to explain our plan for the thesis. We share tasks for each person, such as: Truc will take care of design, database and code front-end and Nam will take care of MySQL, API and code back-end.

We start to work on Mobile Application and Database simultaneously first. After we finish both of them, we will start to work on Website. For example, one person starts to design UX UI for Mobile Application first, while another builds database. After that, one person will work visual design for Mobile Application while another creates database on server. Then we start to work on front-end and back-end in the same time together.

2. ANALYSIS THE ISSUES OF COMPANY

The process of developing website and mobile application for Oasis comes from the core values of business planning and revenue generation. Besides, the company also would like to increase management efficiency and operation process. Because they have a lot of issues in bringing shopping experience and using services for their customers, managing between managers and other staff and protecting important information, for example:

To company, management system which the company is using is based on cloud service. Although cloud services can help to save money, backup automatically, bring benefits of flexibility and many other benefits. However, cloud services still have many potential dangers, for example, every action leaves a trail, nothing we do is private, we all have a data profile, future is uncertain and important thing is we are not just giving away our own data.

To customers of Oasis, all booking services and buying products are done through Facebook and phone call. Therefore, customers of Oasis have restrictions on convenience when are using Oasis's services. For instance, when customers would like to change their bookings, they need to call and chat via Facebook. They can check their used services or bought products, but it will take a long time to find old messages and other inconveniences (figure 1).

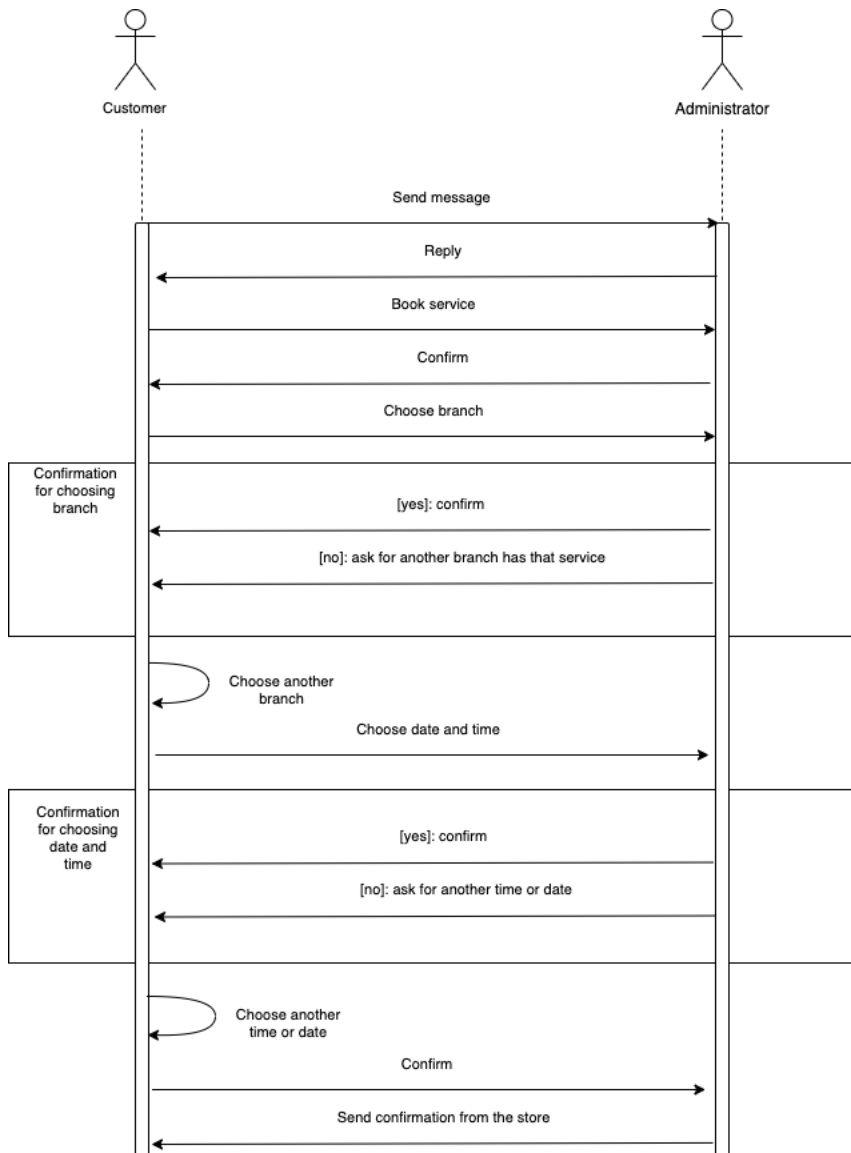


FIGURE 1. Sequence Diagram of booking services

To staff, they do not have any place to check their working schedule and also private information. Hearing announcement from managers is their only option to get information. They also cannot check their waiting bookings until they come to the working story and check it on paper. Furthermore, they also have to find new stylish nail trends by themselves and of course it does not have uniformity in the trend of the store.

Therefore, we offered Oasis to create website application and two mobile applications for customers and staff.

3. INTRODUCTION OF MOBILE APPLICATIONS AND WEBSITE

3.1. Mind map and introduce about features

We would like to introduce our mind map for User's mobile application (figure 2), Staff's mobile application (figure 3) and managing website (figure 4).

In user's mobile application, users can register account by Phone number first.

After they submit their phone number, they will receive OTP code to verify.

User's mobile application has four main pages (figure 2), such as: Home Page, Booking Page, Product Pages and Profile Page. In each page, it contains different contents, such as:

- Home Page has Hot Deals part for Promotion Campaign (Appendix 2-2).
- Booking Page has Choosing Service, Branch, Time, Date and Stylist for booking reservation with company. Besides, users also can check, change or cancel their reservations based on their needs (Appendix 2-3).
- Price List page has four main services, such as: Nails, Permanent Make-up, Eyelash Extension and Courses. Customers can check the price of service which they would like to use (Appendix 2-4)
- Product Page has four main products to sell, for example: Nails Polish, Liquid, Accessories and Equipment brushes. Users can choose what kind of products they would like to buy. After user add products on their cart, the next step will be confirmation about information of user (Name, Address, Phone Number) and payment methods (Mastercard, Visa Card, PayPal) (Appendix 2-5).
- Profile Page has two main information, such as: basic information of user (Avatar, Name, Address, Phone number and Email) and Service or Product Usage Histories of user (Date and Time, Bill Code, Photos after using service, Used Service(s), Bought Product(s), Chosen Stylist) (Appendix 2-6).

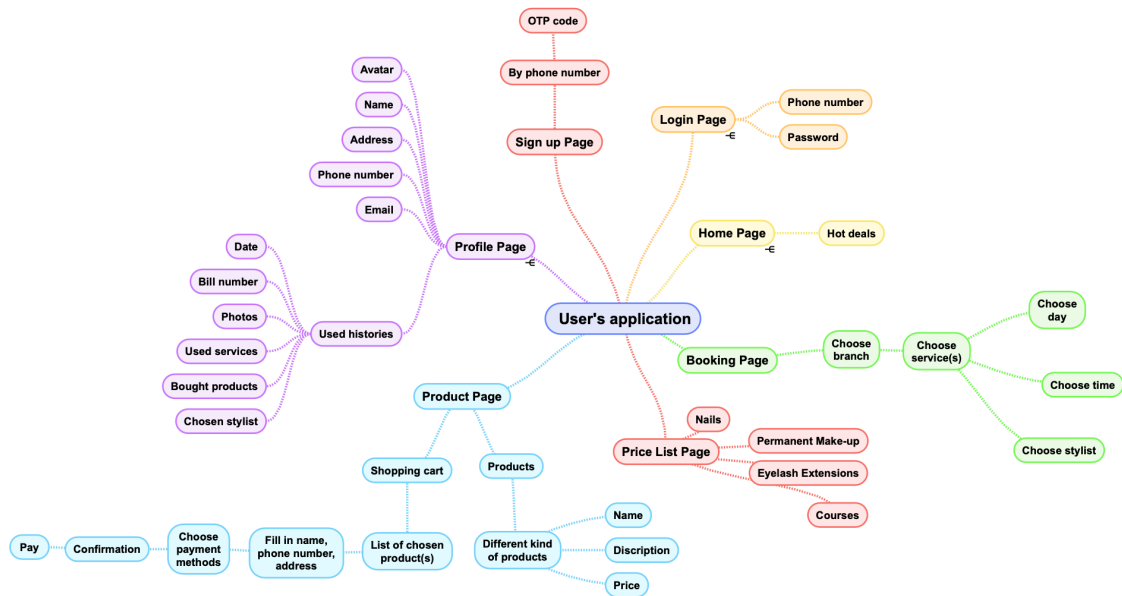


FIGURE 1. Mind map of user's mobile application

Staff's mobile application has four main pages (figure 3) which help staff are easier to follow and managing their schedule and profile, such as:

- News Page has information about parties of company, announcement from company to staff and so on (Appendix 3-1).
- Collections Page has many collections about Nails which is follow the trend, staff can take a look and update their knowledge. Besides, it helps all staff have uniformity in the trend of the store (Appendix 3-2).
- Schedule Page has choosing branch, date and it will show waiting bookings or finished bookings on date when staff chosen (Appendix 3-3).
- Booking Page has two main functions, one function is to check waiting bookings and another function is to create new booking which staff uses to create for new customer or customer comes without reservation (Appendix 3-4).
- Profile Page has basic information of own account, for example: avatar, name, address, phone number, email, points, and rank (from one to five stars) and pay slips (Appendix 3-5).

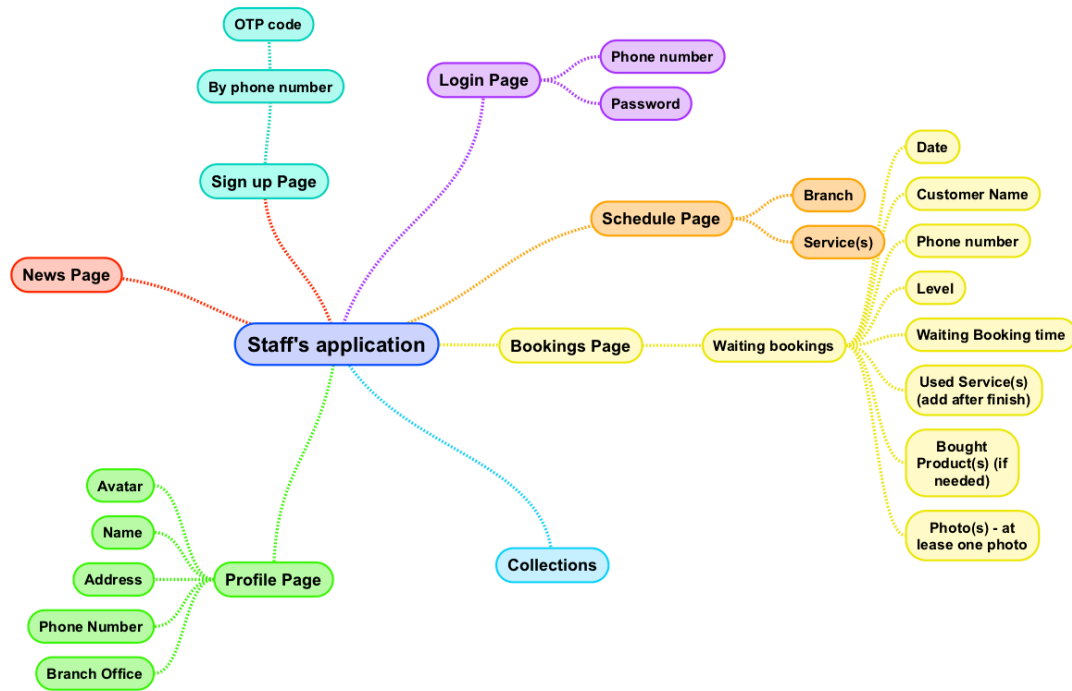


FIGURE 3. Mind map of staff's mobile application

In managing website, we would like to build a system which can help to improve managing process, the website has ten pages, such as:

- Revenue Page has four main functions, for example: total revenue of service which help managers can check that their revenue increase or decrease in each month and from that they can analyze reasons and improve their services, campaigns, total revenue of products also has the same goals and specially managers can analyze behavior of customer in purchasing. Moreover, we also have total revenue for each branch and each service, from that we can analyze and figure out reason why in some branches have lower revenue than other branches and which service(s) customers are interested more (Appendix 4-1).
- Information Page help to manage information of all branches, products, services, staff and working times which Oasis have and managers also can create new branch, product, service, staff and working time with all basic information like the photo below (Appendix 4-2).

- Calendar Page help managers and staff can check their schedule on date when they would like to take a look. Besides, managers and staff can search based on branch, date and staff (Appendix 4-3).
- Content Page has two main contents for hot deals and collections which we will use to show and change content on user's mobile application (Appendix 4-4).
- Bills Page is made for cashier and managers who have responsibilities for managing bills, the page has three main functions, such as: waiting bills, create new bill and search bill number (Appendix 4-5).
- CRM (Customer relationship management) Page has main features for customer contact management, opportunity management, campaign management, customer segmentation and task management (Appendix 4-6).
- Setting Page is made for setting management rights for each person in each task by adding email, for example: who can see revenue in total, who can see revenue in each branch and so on (Appendix 4-7).



FIGURE 4. Mind map of managing website

3.2. The differences between IT project course and the thesis

In the thesis, we update more functions, redesign, change the way to connect API for user's mobile application (table 1), website (table 3) and we also develop new mobile application for staff (table 2). Moreover, we change building database to make our system are more valuable, easier manage and bring more benefits, for example:

TABLE 1. The difference between IT project course and Thesis in Mobile Application for Customers

	IT project course	Thesis
We redesign, update functions and change the way to connect API		
UX Design	Basic	Get feedbacks and update new version
UI Design	Basic colors: black, white and pink	Use radiant colors
Visual Design	Basic	Rearrange application layouts, put animations
Coding Framework	IONIC	React Native
API	REST	GraphQL

TABLE 2. The difference between IT project course and Thesis in Mobile Application for Staff

	IT project course	Thesis
We didn't have this on IT project course		
UX Design		Product Identification <ul style="list-style-type: none"> • Make interview with staff • Plan jobs that are highly effective • Create mockup • Organize meeting

		<p>Product research:</p> <ul style="list-style-type: none"> • Test with staff • Analyze competitors <p>Product analysis</p> <ul style="list-style-type: none"> • Create fake profile • Create an experience diagram <p>Design</p> <ul style="list-style-type: none"> • Make outline • Create wireframe • Create prototypes <p>Test</p> <ul style="list-style-type: none"> • Test with managers • Test with stylists • Create users log • Analysis of measurement units • Redesign based on feedbacks
UI Design		<ul style="list-style-type: none"> • Design Graphic interface based on discussion with our customer. • Test and receive feedbacks • Change colors
Visual Design		Change a little bit to focus on the user experience and product interoperability for viewers
Pages		News, Schedule, Bookings, Profile
Functions		<p>Based on position of staff, they will see different information, for example:</p> <ul style="list-style-type: none"> • Manager can check stylist's working schedule and waiting bookings who work at branch which they manage. • Stylist only can check their working schedule, waiting

		bookings and create new bookings However, they also have the same functions about see news and announcement from company and check their profile.
Coding Framework		React Native
API		GraphQL

TABLE 3. The difference between IT project course and Thesis in Website

	IT project course	Thesis
We change everything		
UX – UI Design		New versions
Visual Design		New versions
Pages	Basic Revenue	Revenue, Information, Calendar, Content, Bills, CRM, Setting
Functions		Improve management processes in all fields of company, such as: promotion campaigns, revenue of company in each field and each branch and so on.
Coding Framework	Laravel	Vue + Laravel
API		GraphQL
CRM		Manage and profiling customers, utilize data for improving marketing and sales force. Features: <ul style="list-style-type: none"> - Customers contact management - Opportunity Management - Campaign Management - Customer Segmentation Task Management
Sales system		Manage sales activities.

		<p>Provide strict management and data for CRM and Management System.</p> <p>Features:</p> <ul style="list-style-type: none"> - Inventory Database and Counting - Manage cashflow - Order History - Stock Transfers Between Stores <p>Detailed Product Reports</p>
<p>Management System</p>		<p>Manage employee performance:</p> <ul style="list-style-type: none"> - Revenue per employee - Compare employee with revenue, points, review. - Employee work schedule <p>Manage marketing activities:</p> <ul style="list-style-type: none"> - Compare different campaigns, promotions (hot deals), product/service's price by tracking number of visits, conversion rate, traffic. <p>Manage products and services:</p> <ul style="list-style-type: none"> - Revenue each product or service on each employee. <p>Predict consumption rate in near future for automation of inventory refilling.</p>

4. OASSY SYSTEM

Management is crucial for every business's success. There are four main aspects of the company that need strict management, for instance: First aspect is customers, markets, competitions. Second aspect is internal operations. Third aspect is products and services. Final aspect is Employee

Oassy is a data-driven management system, or a data-driven ecosystem to be more precise, which consist of Customer Relations Management (CRM) system, Point of Sale (POS) Management system, and Overall Management system. Each system automatically provides large amount of useful information which benefit the other. For example, POS management system provides information about purchases of every transactions, this information then pass to the CRM system to calculate the amount of point earned based on the invoice's value, profiling the customer based on their spending, interests, personal preferences and customer segmentation.

This information then pass to Overall Management system to manage employee performance, like reviews, ratings, compare performance to other employee who serve the same customer in the past or the same segmentation and adjust different marketing campaign and promotions according to different segmentations.

All features will be mentioned and explained later on the thesis.

5. TECHNOLOGIES

5.1. Introduce and compare technologies

We use a lot of technologies and platform for mobile application and website, such as:

- Sketch is for design wireframe.
- React Native is for code mobile phone.
- Vue is for code website.
- Laravel is used for backend development.
- GraphQL is used for building API and connecting website, mobile applications to server.
- Insomnia REST Client is for testing the API.
- FileZilla is for pushing the code to the server.
- GitHub is for version control and sharing code to team members.

5.1.1. Comparisons between Sketch and Adobe Photoshop

TABLE 4. The comparisons between Sketch and Adobe Photoshop

	Sketch	Adobe Photoshop
Render image	High quality	Low quality
Create shortcut	Can not	Can
Storage capacity	Low	High
Archive library	No	Yes
Grid system	Available	Not available
Color management system	Poor	Excellent
Size	Sketch symbols have the same size	Smart objects have different size
Artboard	Use many in the same time	Only one
Measurement system	Professional	Average
Adjusting	Free	Interupt
Installation capacity	Light	Heavy

In our opinion, Sketch is application which is suitable for designing website, mobile application and UI but it can't replace Adobe Photoshop. Besides, Adobe Photoshop is excellent application for design and edit but it is not suitable with design website and moile application (table 4). It is the reason why we chose Sketch for our designing.

5.1.2. Comparisons between Ionic and React-Native

TABLE 5. The comparisons between Ionic and React-Native

	Ionic	React-Native
Performance	Slower	Faster
Testing	in any browser	Only emulator
Features	Programming documentation is clearer, Many pre-designed models available	Hot Reload allows debugging and updating running applications without completely rebuilding.
Speed of development	steady	Not really steady

Advantages and disadvantages of Ionic (table 6).

TABLE 6. Advantages and disadvantages of Ionic

Advantages	Disadvantages
<p>We can use skills from web programming, helping to reduce the time and cost of training in particular and time and cost for the project in general.</p> <p>Only one set of code can be used on many different operating systems.</p> <p>Access to device and operating system features.</p> <p>Ability to use in offline mode.</p> <p>The design of interfaces for different sized devices becomes easy with the responsive design of the web.</p> <p>Using AngularJS as a core also brings great advantages compared to other frameworks for hybrid applications.</p> <p>Ionic provides a full range of user interface elements such as Pull-to-Refresh, Infinite-loader, tabs and so on.</p> <p>Another advantage of using Ionic is that it has a strong user community, making it easier to learn and support.</p>	<p>Performance will decrease significantly if calling too many native code</p> <p>If the application needs to interact with the hardware of the device such as Camera, Sensor and so on will be relatively difficult</p>

Advantages and disadvantages of React-Native (table 7)

TABLE 7. Advantages and disadvantages of React-Native

Advantages	Disadvantages
<p>It is possible to reuse the existing project code without having to re-code from the beginning when deciding to use React Native programming.</p>	<p>Android components are a bit lacking, Therefore, we need to put some effort into editing</p>

<p>The development community is big, so we will not be afraid of any challenges. Everyone is ready to help when we need it</p> <p>Because the code is platform independent (iOS or Android), It can be used on both platforms.</p> <p>Debugging capabilities in React Native are very good with many support tools</p>	<p>"Complex" applications, it requires more resources and the budget will of course be higher.</p>
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In our opinion, both of platform are good and support enough for develop mobile application (table 5). Therefore, choosing use Ionic or React-Native is based on project complexity, delivery deadlines, and even programmers' skills. Based on our project, we chose to use React Native to develop our mobile applications because React Native is one of the most popular frameworks on GitHub, it is updated and developed constantly, and we also can access a large number of libraries of third party.

5.1.3. Comparisons between Vue, Angular and React

Ease of Learning

The AngularJS framework is the most difficult to learn for new people, because even if we already have a basic JavaScript platform, when working with AngularJS (version 2+) we will have to get familiar with a language that is almost entirely just TypeScript (figure 5).

ReactJS ranks second in terms of difficulty because we will have to get used to ES6 and JSX syntax (figure 5).

VueJS is rated as the most accessible because we can use both ES5 and ES6, even VueJS supports TypeScript if we are familiar with the language (figure 5).

(Possible) Learning Curve

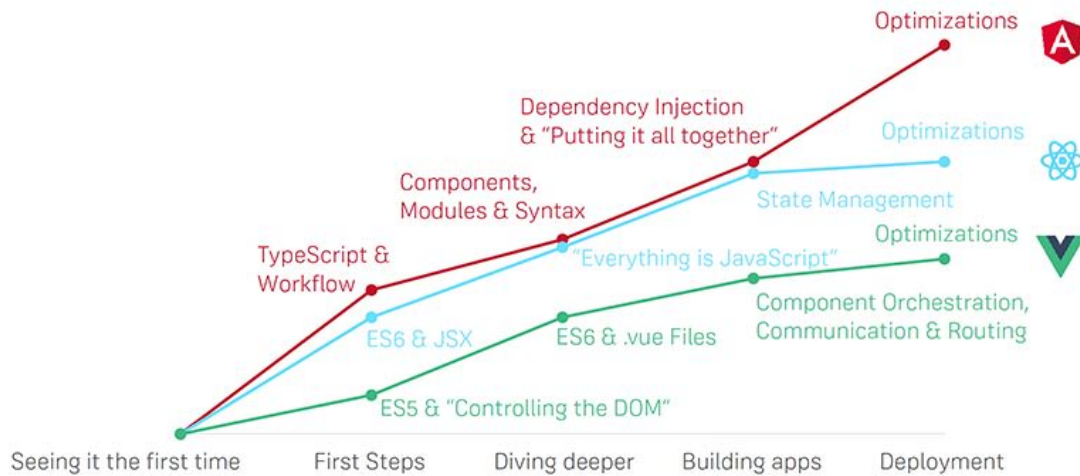


FIGURE 5. Complex diagram when approaching frameworks with new people (Maximilian Schwarzmüller, Cited 15 May 2017).

Performance

Angular is a fast framework but it also has a rather big bundle size (figure 6).

React.js is a bit faster than Angular 4 and it also has a significantly smaller bundle size (figure 6).

Vue.js offers a great performance as the table below clearly shows. It has an extremely small bundle size, too (figure 6).

	angular v1.6.3- keyed	angular v2.4.9- keyed	angular v4.1.2- keyed	react v15.5.4- keyed	react v15.5.4- redux- v3.6.0	vue v2.2.6- keyed
create rows Duration for creating 1000 rows after the page loaded.	256.22 ± 8.28 (1.88)	195.99 ± 12.00 (1.44)	198.32 ± 8.09 (1.46)	188.84 ± 14.25 (1.39)	211.38 ± 16.04 (1.55)	160.27 ± 9.23 (1.18)
replace all rows Duration for updating all 1000 rows of the table (with 5 warmup iterations).	258.58 ± 13.08 (1.75)	190.46 ± 6.39 (1.29)	199.71 ± 4.36 (1.35)	201.30 ± 6.00 (1.36)	211.23 ± 5.40 (1.43)	167.73 ± 3.48 (1.14)
partial update Time to update the text of every 10th row (with 5 warmup iterations).	12.66 ± 1.89 (1.00)	11.76 ± 2.01 (1.00)	13.80 ± 6.05 (1.00)	16.88 ± 1.14 (1.06)	18.77 ± 1.03 (1.17)	16.10 ± 0.92 (1.01)
select row Duration to highlight a row in response to a click on the row. (with 5 warmup iterations).	10.02 ± 4.18 (1.00)	5.62 ± 3.52 (1.00)	4.24 ± 3.05 (1.00)	10.22 ± 4.18 (1.00)	8.28 ± 3.18 (1.00)	10.51 ± 2.30 (1.00)
swap rows Time to swap 2 rows on a 1K table. (with 5 warmup iterations).	13.70 ± 0.59 (1.00)	12.94 ± 0.73 (1.00)	12.81 ± 0.64 (1.00)	15.19 ± 1.24 (1.00)	16.37 ± 1.24 (1.02)	17.98 ± 1.01 (1.12)
remove row Duration to remove a row. (with 5 warmup iterations).	47.87 ± 2.87 (1.11)	48.70 ± 3.32 (1.13)	46.52 ± 2.25 (1.08)	49.65 ± 1.56 (1.15)	52.76 ± 3.35 (1.22)	51.43 ± 3.78 (1.19)
create many rows Duration to create 10,000 rows	4460.96 ± 3178.93 (3.27)	1889.79 ± 68.02 (1.39)	1979.27 ± 59.43 (1.45)	1880.90 ± 67.70 (1.38)	1961.51 ± 53.46 (1.44)	1573.49 ± 30.88 (1.15)
append rows to large table Duration for adding 1000 rows on a table of 10,000 rows.	440.01 ± 8.80 (1.52)	365.08 ± 57.92 (1.26)	328.38 ± 8.94 (1.14)	344.64 ± 9.36 (1.19)	373.80 ± 24.06 (1.29)	396.48 ± 12.65 (1.37)
clear rows Duration to clear the table filled with 10,000 rows.	809.50 ± 32.95 (4.67)	386.15 ± 42.85 (2.23)	400.10 ± 10.32 (2.31)	408.33 ± 10.48 (2.36)	406.80 ± 6.95 (2.35)	258.27 ± 4.98 (1.49)
startup time Time for loading, parsing and starting up	121.49 ± 3.72 (3.22)	102.21 ± 2.41 (2.71)	84.60 ± 3.22 (2.24)	66.96 ± 1.10 (1.78)	88.93 ± 3.12 (2.36)	51.81 ± 2.41 (1.37)
slowdown geometric mean	1.75	1.36	1.34	1.32	1.42	1.19

FIGURE 6. Compare performance between JavaScript framework. (Maximilian Schwarzmüller, Cited 15 May 2017)

In our opinion, we chose to use Vue for our website, because of many benefits and strengths of Vue, such as: short template syntax, single component file, vue is like a new JQuery, easy to expand, virtual DOM, Vue CLI, help to optimize rendering.

5.1.4. Comparisons between Laravel and Codeigniter

TABLE 8. The comparisons between Laravel and Codeigniter

	Laravel	Codeigniter
Definition	Laravel is an open-source PHP framework for building web applications based on MVC structure, which is robust and easy to learn.	Codeigniter is also an open-source powerful PHP framework for building web applications with very small footprint.
Support of other DBMS	ORACLE, Microsoft SQL Server, IBM DB2, MYSQL, PostgreSQL.	MySQL, Microsoft SQL, PostgreSQL, Microsoft BI, MongoDB, DB2, and others.
Popularity & current trends	Laravel is at its peak popularity right now. With its expressive coding style favored by the seasoned developers.	It offers ease of use and therefore many web developers prefer CodeIgniter.
Support for RESTful API	The RESTful Controllers give developers the ability to develop an complete and powerful REST APIs without spending extra time.	CodeIgniter does not give much support for development of REST APIs.
Authentication	Laravel makes it easier for developers to implement authentication and authorization rules by providing Authentication Class features.	CodeIgniter, on the other hand, doesn't come with built-in authentication features. Therefore, developers need to authenticate and authorize users by writing custom CodeIgniter extensions.
GitHub Stars	45.5 K	16.5 K
Learning Curve	Laravel provides many additional features which are difficult to learn for beginners.	The beginners find it easier to learn and use CodeIgniter.

Personally, we prefer Laravel over CodeIgniter. Laravel provides many features which reduced development time amazingly, in which, some important features

are API support and Authentication which CodeIgniter neglect. Also, Laravel community is vast and provide lots of helps. Although the number of database management system that Laravel support is lesser than CodeIgniter (table 8), however, that is not important since I only use those Laravel support.

5.1.5. Comparison between REST and GraphQL

Most web-based and mobile-based applications developed today require large sets of data that typically combine related resources. The problem is that accessing all of that data using a REST-based API requires multiple round trips. This means if you wanted to retrieve data from two different endpoints, you'd have to send two separate requests to the REST API.

Another common problem which developers encounter with REST is over- and under-fetching. This is because clients can only request data by calling endpoints that return fixed data structures. Over-fetching is when the client downloads more information than what the application actually needs, and under-fetching is when the endpoint doesn't provide all of the required information, so the client has to make multiple requests to get everything it needs.

On the other hand, GraphQL does not deal with dedicated resources. Instead, everything is regarded as a graph implying it's connected. What this means is that you can tailor your request to match your exact requirements. In addition, it lets you combine different entities into a single query.

5.1.6. Comparison between Visual Studio, Atom and Sublime.

TABLE 9. The comparisons between Visual Studio, Atom and Sublime

	Visual Studio Code	Atom	Sublime
Price	Free	Free	70 dollars
Platform	OSX, Windows, Linux	OSX, Windows, Linux	OSX, Windows, Linux
Manage packages	<p>Managing packages extensions is easy. User-friendly interface. Warehouse packages with thousands of useful applications. Moreover, it is just like Atom, some are installed by default.</p> <p>It is also a bit difficult to choose from thousands of applications that suit you. Visual Studio Code also has a debugger mode for chrome that allows we to set breakpoints and debug JS from the Visual Studio Code.</p>	<p>Adding packages is quite easy.</p> <p>All packages are stored on Github .</p> <p>We can also change the available Atom theme. Currently, Atom has more than 6 thousand themes from the repository so you can choose. However, there are a few themes to be installed by default.</p>	<p>Sublime Text packages management is relatively difficult. And the first thing you need to do to manage the packages is to install the Sublime Package Control plugin. It does not have an intuitive interface, which is quite confusing for users to find and install packages.</p> <p>Sublime also has a lot of packages and themes</p> <p>Sublime's weaknesses are it Does not support renaming, moving, dragging and dropping files in the sidebar on the left</p>
During working process	<p>Visual Studio Code is built in a way that uses Electron, Node and HTML / CSS, but it's really fast and we</p>	<p>In general, everything in Atom is quite smooth. The biggest issues is finding out which additional packages need to be installed</p>	<p>Using a lot of projects in a directory is very necessary, so it is easy and fast to find files and files.</p>

	<p>haven't seen any delays.</p> <p>The ability to prompt commands as well as notify errors is excellent.</p> <p>Specially, one thing unique about Visual Studio Code is Git integration, it's very convenient. For commit commands, diff is almost perfect and execution time is very fast. This is the point we like best in Visual Studio Code.</p>	<p>when starting from scratch.</p> <p>The next feature that supports a lot of code faster is autocomplete. Automatically prompt the next command or variables available in the file.</p> <p>Another interesting feature of Atom is support for file / folder drag / drop in the tree view on the left. This function is not available in Sublime Text.</p> <p>And finally, this git integration is very supportive for programmers.</p>	<p>Installing external packages is crucial, which helps us a lot in the code process.</p> <p>One drawback is that on Sublime Text in linux it is difficult to type accented of some languages, such as: Vietnamese.</p>
Customizable ability	<p>Visual Studio Code has all necessary requirements from basic to advanced so that users can choose such as the font itself, font size, alignment, tab and so on. It can be completely easily.</p>	<p>Users can customize a lot with Atom. For example, automatically deleting extra spaces, adding empty lines at the end of the file, ... these can be set up quite easily.</p>	<p>Sublime is quite similar to Atom. Settings to remove extra white space and more are available. Users just need to add the configuration file to JSON.</p>
Performance	<p>Visual Studio Code is built on Node.js, Electron, HTML and CSS make this fast. We have not encountered any</p>	<p>Talking about the problem, perhaps performance is an omission for Atom. Sometimes it feels quite slow. Sometimes opening a file or</p>	<p>This is the Sublime aspect that surpasses Atom - opening, closino searching and so on very smooth and fast. There are a few cases where you will</p>

	problems when accessing the file. The search function is also fast.	switching between tabs has enough latency to be felt	encounter poorly animated plugins - but even then, you'll get a warning message when a plugin seems to take too much time. In general, Sublime Text works very well.
--	--	--	---

Basically, Visual Studio, Atom and Sublime are the same about functions (table 9), we chose to use Visual Studio and Atom because we are familiar with them more than Sublime. Besides, Sublime costs money for using.

5.2. SKETCH

Sketch is a graphic design tool developed by a team from Europe on the MacOS platform with the aim of bringing power, convenience, best for designers (Dom Carter. cited 16 October 2017) (figure 7).

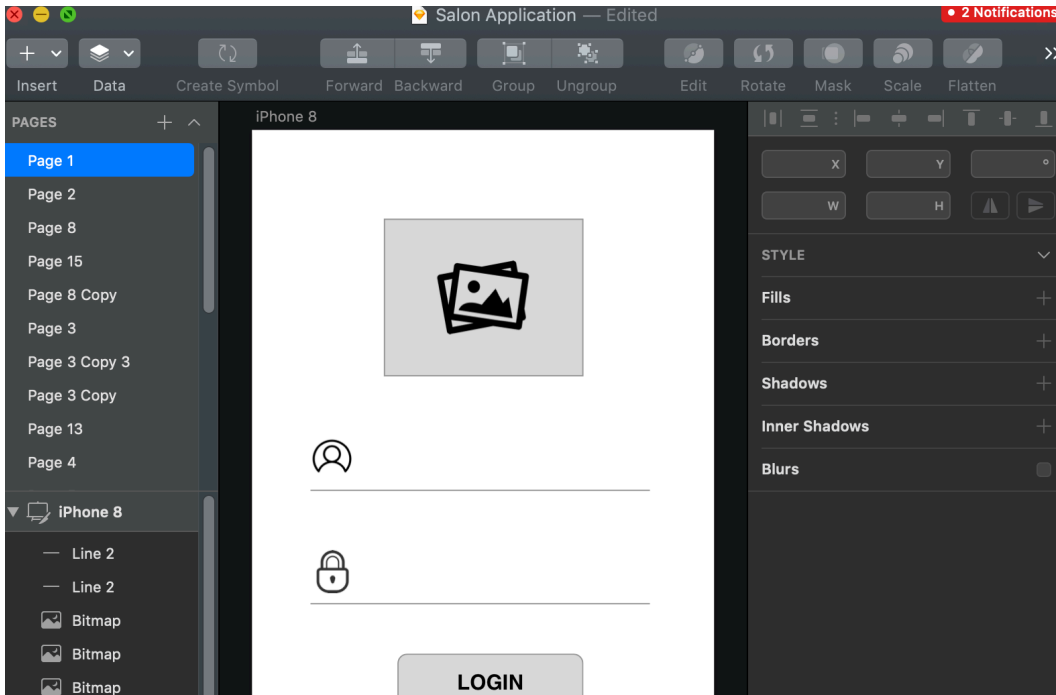


FIGURE 7. Sketch is for design wireframe

Link to download: <https://www.sketch.com/updates/>

Some features of Sketch

Vector

Sketch brings simplicity and convenience in allowing all designs in Sketch to be designed and output in vector format. It is helped to zoom infinitely and arrange the layout or circle in the simplest way.

Export function

The second impressive feature in Sketch is that the export capability is great. Using the word so cool that there are several reasons:

- Export speed is too fast. If using Photoshop or AI to export a PNG file of ten mb range, it take about five minutes (depending on computer's configuration) but in Sketch exporting speed is instant.
- Can export multiple types of formats and multiple resolutions (1x, 2x, 3x). Compared to Photoshop or AI, repeating this operation 3 or 4 times depending on the usage. Using the 3rd plugin to make this export better but it is required to pay extra and spend more time for it.
- Ability of export different components or elements quickly. This is very convenient in Sketch. Selecting the layer to export then export it to the format users need and can share it through different channels like facebook, mail and so on. Actually this feature is in the latest available PTS (Quick Export) but not everyone uses the Photoshop version.

However, the Export feature in Sketch is limited. The number of formats that Sketch can output is quite limited (stop at six formats), but downloading more plugins to supplement with the Sketch toolbox tool is possible and easy.

Friendly with “Coder”

Following one path is the most important for front end developers. Besides, the communication between the front end and designer is always a long-term problem. In Photoshop or AI there are a lot of plugins that support this but because basically Photoshop or AI is a multi-functional specialized tool, not all plugins support well. In the sketch, this problem is simpler because the sketch only stops at specialized features like shadows, borders and so on.

GRID

With the current Responsive trend, using GRID in UI design is paramount. If in Photoshop we have to find template grid for different purposes, then in Sketch this problem is solved by us can customize arbitrarily according to different purposes. Too convenient.

Ability to work multi-artboard

A great feature in Sketch helps UX / UI designer to be enchanted. If it is difficult to design each Photoshop artboard, it is easy in that Sketch. With open workspace support we can create multiple artboards at once and design them in the most convenient way.

Optimal measurement ability between Objects, Layer

If in previous versions in Photoshop, the measurement between the shapes, the right Objects thanks to the grid created from ruler is very annoying but in Sketch it is much easier by using Alt key we can know between Object A and Object B is how many pixels are and how much is between the Object A and Artboard A. This is powerful feature from Sketch.

5.3. REACT NATIVE

React Native is a framework developed by a well-known technology company Facebook that aims to solve Hybrid performance and cost issues when writing multiple native languages for each mobile platform under common language, JavaScript (figure 8).

React Native apps work in a different way, a native application is able to locate specific JavaScript code, which is later downloaded and compiled when the application is launched on an actual device. By this, updating the application can be done instantly without needing to submit a new version to the App Store again and again (Amit Bijlani, cited 17 March 2017).

```
    } else {
      return (
        <View style={styles.containerPriceProduct}>
          { /* Search bar */ }
          <SearchBar
            placeholder="Search product..."
            onChangeText={this.updateSearch}
            value={search}
            inputStyle={styles.searchInput}
            containerStyle={styles.searchBackground}
            inputContainerStyle={styles.searchBackground}
            searchIcon={styles.searchIcon}
            cancelIcon={styles.cancelIcon}
          />
          { /* Dropdown */ }
          <View style={styles.floatRightPriceProduct}>
            <DropDownMenu
              options={this.state.categories}
              selectedOption={selectedCategory ? selectedCategory :
```

FIGURE 8. React Native is for code mobile phone

How does React Native work?

In React, the Virtual DOM acts as a middle layer describing how everything is displayed and the work done to display it on the page. To display the UI in a browser, the developer must edit the DOM (Document Object Model) of the browser. This is a performance-intensive way because rewriting the DOM

multiple times will significantly impact performance. Instead of making changes directly on the page, React calculates the necessary changes by using a memory version of the DOM or in other words a copy of the DOM and re-displaying the necessary changes (figure 9).

Instead of render DOM of browser, React Native call Object-C API to display on IOS component or Java API to display Android component (figure 9).

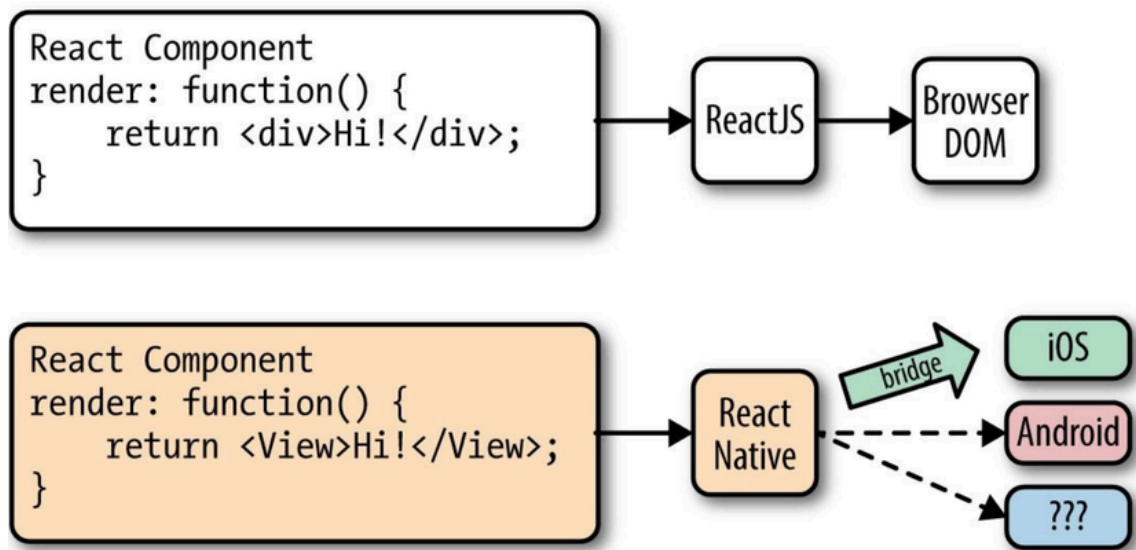


FIGURE 9. How React and React Native work

Bridge helps to connect between React Components and native UI element.

5.4. Vue.js

Vue is an advanced Javascript framework in user interface construction, unlike other frameworks, Vue is built from the most basic lines of code to optimize speed. Vue's library only focuses on the display layer, which is very simple to access and easily integrated into other systems (figure 10). Vue is also capable of providing Single Page Application single-page web applications (the whole website is only one page) that allows to combine with many modern tools, such as Laravel (Maximilian Schwarzmuller, cited 15 May 2017).

Vue.js is used to build a user interface like React, Angular, Ember and so on. However, Vue.js has a very fast rendering speed. and taking up quite a bit of memory. We can see the benchmark tables of the most popular Javascript frameworks today, Vue has a not bad ranking.

```
<template>
  <div class="container">
    <div>
      <router-link :to="{name: 'welcome'}">Welcome</router-link>
      <router-link :to="{name: 'revenue'}">Revenue</router-link>

      <transition name="fade">
        <router-view></router-view>
      </transition>
    </div>
  </div>
</template>
<script>
  export default {
  }
</script>
```

FIGURE 10. Vue js

MVVM (Model – View – View- Model) model

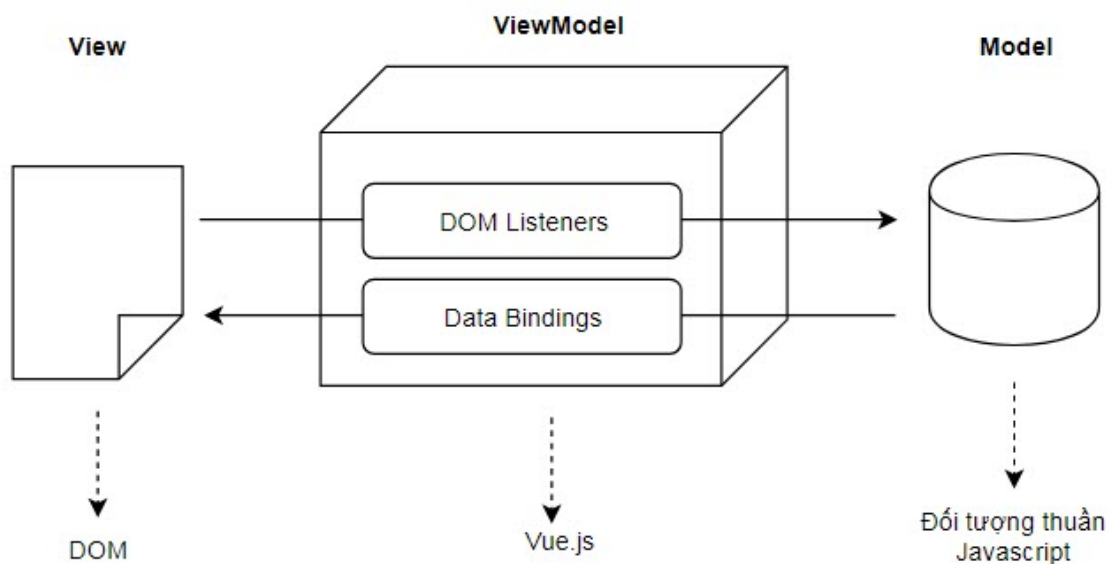


FIGURE 11. MVVM model

In this model, data when "assigned" to View or Model will be automatically attached to Vue.js for the rest. That is, when data changes in Model it will automatically be "updated" to View and when users change data on View (for example, entering data in email address box for example), the data will be automatically Update against Model (figure 11). In the Vue.js community often call this model with another term, two-way data binding (Maximilian Schwarzmuller, cited 15 May 2017).

5.5. Laravel

Before introducing Laravel, we should have a quick look at MVC model, this purpose is to have a better understanding of Laravel. The MVC is an architectural pattern that separates an application into three main logical components: Model - View – Controller.

The logic of the MVC model is rather simple. First, the user interacts with a View, which could be a web page or application. The Controller then make actions to change the model depend on that event. After that, the Model alert that some changes have happened, and update the View.

About Laravel, it is an MVC model web application framework with expressive, elegant syntax. Laravel attempts to take the pain out of development by easing common tasks used in the majority of web projects, such as authentication, routing, sessions, and caching (figure 12).

Laravel is accessible, yet powerful, providing powerful tools needed for large, robust applications. A superb inversion of control container, expressive migration system, and tightly integrated unit testing support (Laravel, cited 19 March 2019).

More on how to install and use Laravel: <https://laravel.com/>

```

Route::middleware('auth:api')->get('/user', function (Request
$request) {
    return $request->user();
});
Route::group(['middleware' => 'cors'], function(){
    //Products
    Route::get('/products', function(){
        return App\Products::all();
    });
    Route::get('/product/{id}', function($id){
        return App\Products::find($id);
    });
    Route::get('/product/booking/{id}', function($id){
        $product_id = DB::table('booking_products')->where
        ('booking_id', $id)->value('products_id');
        $product = App\Products::find($product_id);
        return $product;
    });
});

```

FIGURE 12. Laravel is for building the website and API system.

Some features of Laravel

PHP

PHP, being one of the oldest and most trusted programming languages used by the majority of programmers out there, empower more than 37 million websites. Laravel is one of the popular and best PHP frameworks which is a feature-rich platform offering high performing websites and applications.

Effective ORM (Object Relational Mapping)

This framework is equipped with the most intelligent ORM with easy PHP Active Record implementation. It give developers the ability to raise the database issues or queries using simple PHP syntax, and avoiding writing in SQL code. It offers an easy interaction for the developers with the said database table by offering a corresponding model to each of the tables. This makes this ORM

much faster than all other PHP frameworks (World Web Technology, cited 19 March 2019).

Libraries & Modular

The pre-installed object-oriented libraries and many other libraries also add value to this framework. The most popular one is an authentication library with loads of updated and useful feature like password reset, monitoring active users, Bcrypt hashing and CSRF protection (World Web Technology, cited 19 March 2019).

Artisan

It is also coupled with a built-in device for command which is also termed as Artisan. This command enables the developers to perform several repetitive and tedious tasks that they often avoid to do manually. It also helps the developer to develop a skeleton code, database structure and their migration (World Web Technology, cited 19 March 2019).

Secure Migration System

The migration process of Laravel is also very secure that allows enlarging the database of the web app without allowing developers to make much effort every time they make changes. It also helps build database tables and incorporates columns and indices easily without much fuss (World Web Technology, cited 19 March 2019).

Intact Security

This framework is well equipped with the security system within its own framework. It is packed with hashed and salted password which means no password can ever be saved as normal text in the database. It generates an encrypted representation of the password using “Bcrypt Hashing Algorithm”

which is a safe secure way to generate password (World Web Technology, cited 19 March 2019).

5.6. API

API is short for Application Programming Interface. It is a way of communication between a client and a server. API could be described as a “contract” between client and server, when the client delivers a request in a specific format, the server will always provide a response in a specific format or a defined action. This answer or action will be delivered to the client by the API. This simplify the developments across various areas of a project, making it possible to take place independently.

REST API

REST (Representational State Transfer) is a design architecture, it is the traditional way of building APIs and it has gained a very high adoption rate in many applications both web-based and mobile-based (figure 13). REST can be used over nearly any protocol, when building web-based applications, APIs typically takes advantage of HTTP protocol. This means that developers have no need to install additional software or libraries when creating a REST API.

```
Route::get('/profile/{id}', function ($id) {
    return App\Profile::find($id);
});

Route::get('/booking/customer/{id}', function ($id) {
    $bookings = DB::table('bookings')->where('cus_id', $id)->get();
    return $bookings;
});

Route::get('/booking-confirm/customer/{id}', function ($id) {
    $bookings = DB::table('bookings')->where('cus_id', $id)->where('progress', '1')->get();
    return $bookings;
});

Route::get('/booking/{id}', function ($id) {
    return App\Booking::find($id);
});

Route::get('/booking-products/{id}', function ($id) {
    return App\Booking::find($id)->products;
});
```

FIGURE 13. REST API example

GraphQL

GraphQL is a Graph Query Language designed for API (figure 14). GraphQL is used when dealing with high-complexity dataset, and nested layers of data in modern application. GraphQL is able to overcome major shortcomings of REST. It is often presented as a revolutionary new way to think about APIs.

```
type Mutation {  
  
  # Permission  
  createPermission(input: PermissionInput! @spread): Permission @create  
  deletePermission(id: ID!): Permission @delete  
  
  # Product  
  createProduct(input: ProductInput! @spread): Products @create  
  updateProduct(id: ID! input: ProductInput! @spread): Products @update  
  deleteProduct(id: ID!): Products @delete  
  
  # Category  
  createCategory(input: CategoryInput! @spread): Category @create  
  updateCategory(id: ID! input: CategoryInput! @spread): Category @update  
  deleteCategory(id: ID!): Category @delete  
  
  # Branch  
  createBranch(input: BranchInput! @spread): Branch @create  
  updateBranch(id: ID! input: BranchInput! @spread): Branch @update  
  deleteBranch(id: ID!): Branch @delete  
}
```

FIGURE 14. GraphQL example

5.7. Insomnia REST Client

Insomnia is an API testing tool (figure 15). It allows us to test that when we pass a specific set of data to our application it will return the response we expect.

Link to download: <https://insomnia.rest/download/>

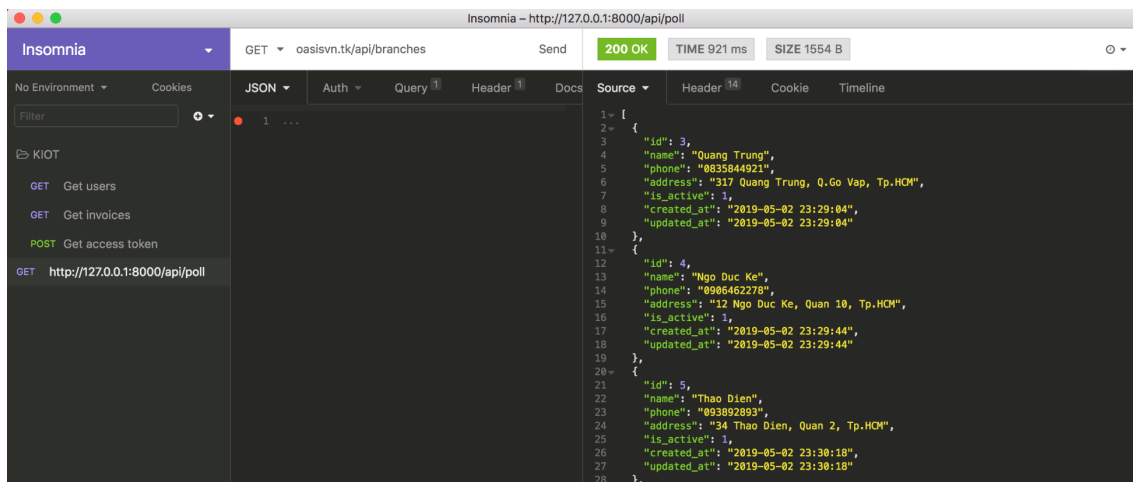


FIGURE 15. Insomnia REST Client is for testing the API.

Some features if Insomnia

Personally, the most special about Insomnia is “light as a feather” compare to other tools. Besides that, it also has code snippet generation in 12 different languages. Insomnia also help developers to viewing API response beyond JSON and XML (with Insomnia you can see HTML pages, images, SVGs, audio files and even PDF Documents). It is a very simple to use and fast to launch API testing tool (Insomnia, cited 19 March 2019).

5.8. FileZila Clie

When building an API system, an important element is a server. In order for the user to be able to use the application, the API system need to be running continuously. For that to happen, a server needs to host the API system, and for that to happen, the source-code need to be transfer to the server.

FileZilla is a free software, cross platform application that let developers to push source-code to server effortlessly. FileZilla supports FTP and FTPS (FTP over SSL/TLS). Basically, FTP and FTPS are protocols that transfer source code file to server (FileZilla, cited 19 March 2019) (figure 16).

FileZilla is light-weight and surprisingly easy to use. With drag and drop support, developers can simply drag the files that need to be transfer into the server. In

addition, FileZilla also support remote editing, which means developers can edit the source-code without the need to download them.

Link to download: <https://filezilla-project.org/>

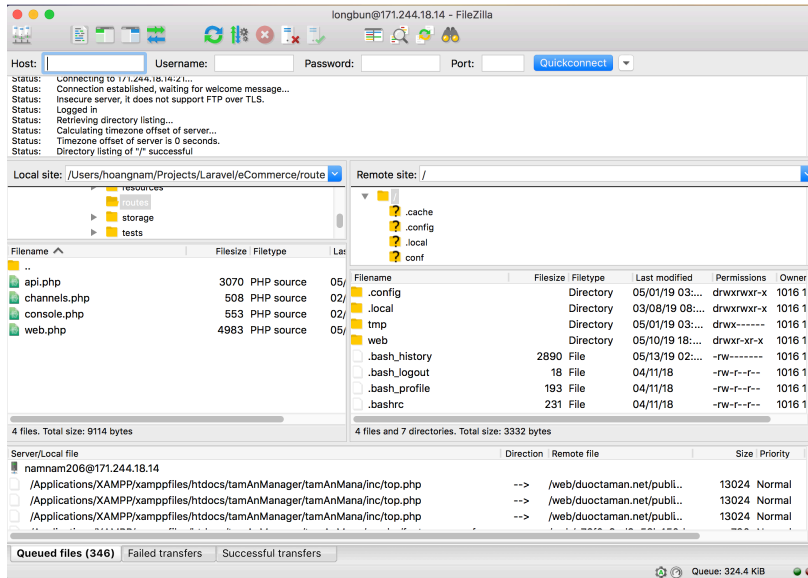


FIGURE 16. FileZilla is for pushing the code to the server.

5.9. Visual Studio

Visual studio is one of the most popular programming support tools of Microsoft and no software can replace it. Visual Studio is written in 2 languages which are C # and VB + (figure 17). These are two programming languages to help users program the system easily and quickly through Visual Studio (Terry G. Lee and Genevieve Warren, cited 19 March 2019).

Link to download: <https://visualstudio.microsoft.com/downloads/>

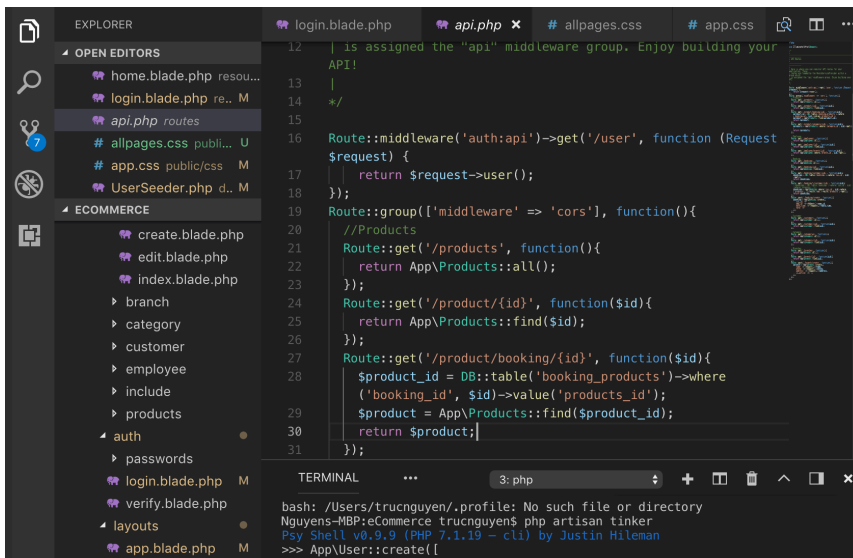


FIGURE 17. Visual Studio

Some features of Visual Studio

Editing code

Like any other IDE, Visual Studio includes a code editor that supports syntax highlighting and finishing by using IntelliSense not only for functions, variables and methods, but also for structures and language structures such as queries or control loops.

Besides, Visual Studio code editors also support setting bookmarks in code to be able to navigate quickly and easily. Support for navigation such as: Narrow code blocks, incremental search and so on.

Visual Studio also has a background compilation feature, when the code is being written, the software will compile it in the background to provide syntax feedback as well as compile errors and be marked with ripple tiles and red wave.

Debugger

Visual Studio has a debugger that features both machine-level debugging and source-level debugging. This feature works with both management code like

machine language and can be used to debug applications written in languages supported by Visual Studio.

Design

- Windows Forms Designer.
- Used for the purpose of building a GUI using Windows Forms, arranged to build internal controls, or to lock them next to the template. Controls that present data can be linked to data sources such as databases or queries.
- WPF Designer.
- This feature is similar to Windows Forms Designer, which supports metaphorical drag and drop. Use interaction between people and computers targeted at Windows Presentation Foundation.
- Web designer / development.
- Visual Studio also has an editor and website design that allows websites to be designed with drag and object features.

Go to definition to class and function

When writing the source code, developers need to find classes with methods to modify continuously during development if an error occurs. Finding methods or classes is quite time consuming if the number of files in our project is quite large. Therefore, Visual Studio has supported a very great character that is Go To Definition.

Install libraries quickly through Nuget

Another utility in Visual Studio is that developers can install libraries quickly through nuget (Only applicable for projects using C # language). For example, the HttpClient library helps us download files on the internet. Developers have two ways to download this library as a .dll file and Add Reference by normal way or add via Nuget.

Advantages and Disadvantages of Visual Studio

- Visual Studio supports programming in many languages such as C / C ++, C #, F #, Visual Basic, HTML, CSS, JavaScript.
- Visual Studio is a tool to support Debug easily and strongly like: Break Point, see the value of variables in the process of running, support debug each command.
- Visual Studio interface is easy to use for beginners.
- Visual Studio supports developing applications: desktop MFC, Windows Form, Universal App, mobile application Windows Phone 8 / 8.1, Windows 10 and so on.
- Visual Studio supports building applications professionally with drag and drop tools.
- Visual Studio is used by numerous programmers around the world.

5.10. Atom

Atom is a free and open-source text and code editor with support for plug-ins written in Node.js, and embedded Git Control, developed by GitHub (figure 18). Atom is a desktop application built using web technologies. Atom is based on Electron, a framework that enables cross-platform desktop applications using Chromium and Node.js.

Link to download: <https://atom.io/>

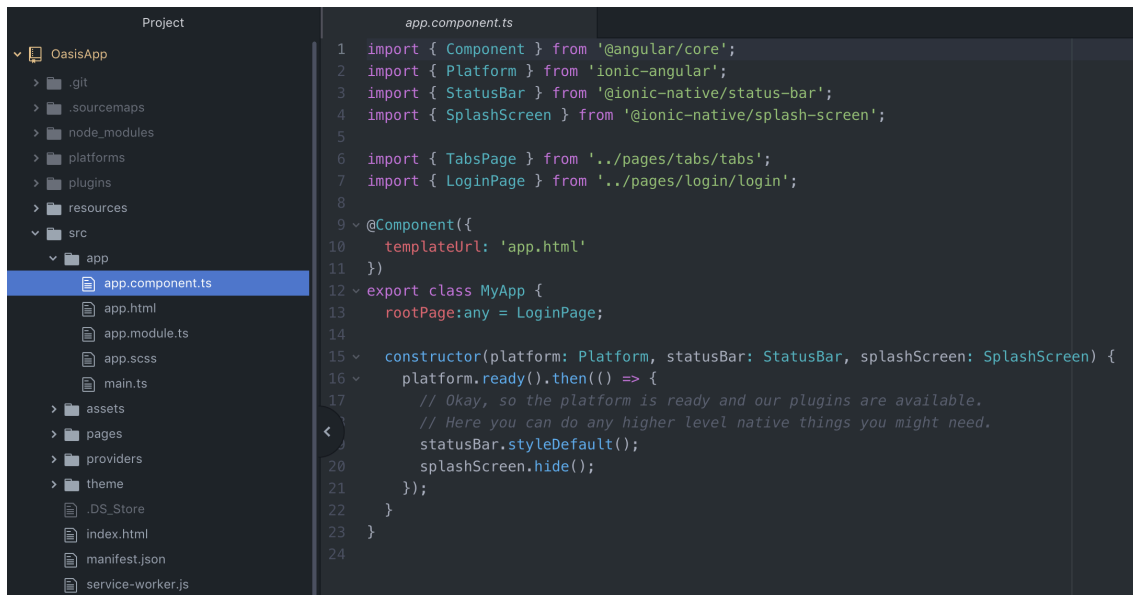


FIGURE 18. Atom

Some features of Atom

- Cross-platform editing: Atom works across operating systems. Use it on OS X, Windows, or Linux.
- Built-in package manager: Search for and install new packages or create your own right from Atom.
- Smart autocompletion: Atom helps you write code faster with a smart and flexible autocomplete.
- File system browser: Easily browse and open a single file, a whole project, or multiple projects in one window.
- Multiple panes: Split your Atom interface into multiple panes to compare and edit code across files.
- Find and replace: Find, preview, and replace text as you type in a file or across all your projects.

5.11. IOS Simulator

IOS Simulator is part of the bundled set of XCode software. IOS Simulator contains IOS SDK that allows you to run on Mac OS to simulate an iPhone

environment, iPad is for testing applications written before testing applications on the real device (figure 19).

IOS Simulator allows to install various IOS devices such as iPhone, iPhone Retina, iPad, iPad Retina and so on with many different IOS versions such as 6.0, 6.1, 7.0. Therefore, developers can easily build app for the new IOS version or for the old IOS version.

With IOS Simulator, developers can test application on interface design, application features, which can fix errors, optimize the application before they bring the real mobile.

IOS Simulator application can run with XCode software or run independently. You can interact with IOS Simulator via keyboard, mouse to enter data as well as control user events.

Link to download: <https://developer.apple.com/> . Firstly, developers need to download XCode, which come with IOS simulator or development purposes.

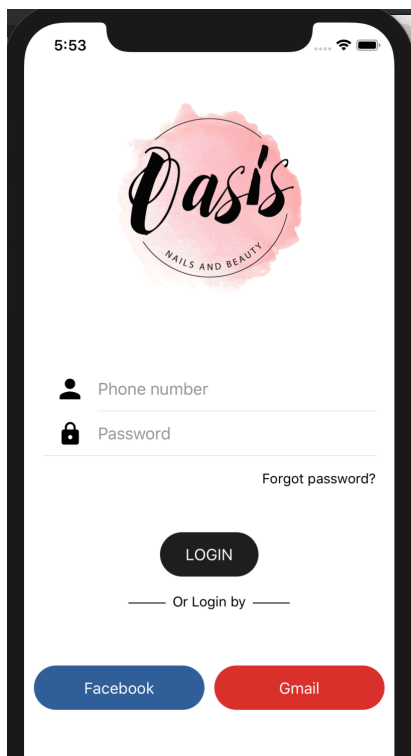


FIGURE 19. IOS Simulator is for testing application on interface design

Some features of iOS Simulator

Rotate iOS Simulator screen

In the process of running the application on iOS Simulator to test, sometimes developers need to use the screen rotation function to check the compatibility of the application with each screen type (horizontal, vertical ...) or to match fit application (such as writing applications using a horizontal screen). If it's a real device, it's easy to rotate the screen accordingly. However, with iOS Simulator, developers need to use the built-in screen rotation function to be able to rotate the screen as they like.

Hide/ Show keyboard

In the process of testing the application, many cases developers need to use the keyboard of iOS, or after the data is completed in the Text Field but application does not have the function of hiding the keyboard, then developer need to use it iOS Simulator's Keyboard feature to hide / show the keyboard.

Install and Remove the application on iOS Simulator

Applications in iOS Simulator are installed via XCode. When developers run the application in XCode, XCode will install it on iOS Simulator. How to uninstall the application is the same as on a real iOS device.

Add iOS versions and iOS devices

iOS Simulator allows you to run applications on a variety of devices such as iPhone, iPhone Retina, iPad, iPad Retina. Simultaneously, iOS Simulator also allows to use different versions of iOS like iOS 6.0, iOS 6.1, iOS 7.0.

5.12. GitHub

Version control is important when working in team, and GitHub is the most popular version control tool at the moment. GitHub is a web-based hosting service for version control using Git (figure 20). Git is an open-source version control system. When developers build project, they make constant changes to the code, releasing new versions up to and after the first official release. Version control systems keep these revisions straight, storing the modifications in a master repository. This give developers the ability to easily collaborate, as they can download a new version of the software, modify, and upload the newest version. Every developer can see these new changes, download them, and contribute (Github, cited 19 March 2019).

Link to go to Github: <https://github.com/>

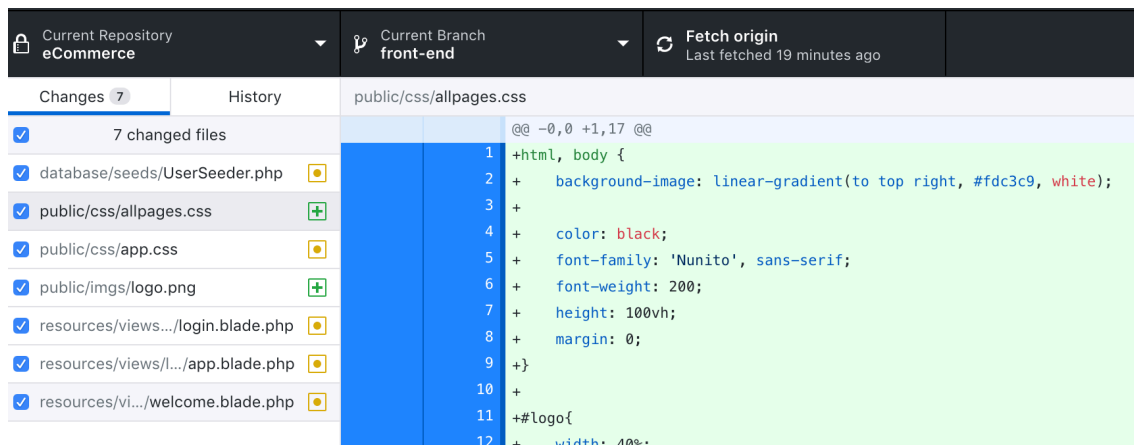


FIGURE 20. GitHub is for version control and sharing code to team members.

Some features of GitHub

While Git is strictly command-line, GitHub gives users a Web-based graphical interface and desktop. A mobile integration is also offered.

Repository

A repository is a location where all the files for a particular project are stored. Each project has its own repository and can be accessed with a unique URL.

Different tasks can be done with repository:

- Forking is the creation of a new project based on another project that already exists. This is an amazing feature that encourages the further development of programs and other projects. Any public project on GitHub can be contributed to by forking the repository, make the changes, and release the revised project as a new repository. New updates on the original repository can also be added to the current fork.
- Pull Requests: after forking and modify a project, we can make a pull request so that the authors of the original repository can see the updates, and then choose whether or not to accept it into the official project.
- Changelogs: When multiple people collaborate on a project, it's hard to keep track revisions who changed what, when, and where those files are stored. GitHub takes care of this problem by keeping track of all the changes that have been pushed to the repository.

Project Management

GitHub is not just for developers; project managers can use GitHub various tools to keep track of the project.

- Tasks: Issue, comment, and pull request descriptions support Markdown task lists, which are checklists that can be used to coordinate and track parts of a project. Reorder tasks as their priorities change and check them off when they are completed.
- Assignees and mentions: Assign up teammates to an issue or pull request to make sure the work has an owner. Mentioning other people or teams in the issue will notify them if something changes.
- Milestone: Add a milestone to track a project as part of a larger goal, such as quarterly to-do list or a big feature.
- Labels: Tagging issues and pull requests with labels allows you to quickly search for them later. Filter issues by label to find and reference all issues that are part of the project.

6. DATABASE

The database of the application contains several tables (figure 21), which are listed below:

- a. *Categories*: this table store information about product's category. Each category has ID, name and description.
- b. *Products*: this table store information about products. Each product belongs to a category. It has *category_id* to know which category it belongs to. In addition, *Products* table also stores product's ID, name, *unit_price* which is the base cost of the product, *unit_price* which is the price that customers pay to obtain the product, image, description, and type.
- c. *Branches*: this table store information about store branches. Each branch has ID, name, phone, address, and *is_active* to indicate if the branch still active.
- d. *Employees*: this table store information about employees. Similar to products, each employee belongs to a branch. It has *branch_id* to know which branch it belongs to. In addition, *Employees* table also stores employee's ID, name, gender, phone, Facebook, address, email, dob which is date of birth, image.
- e. *Customer_ranks*: this table store information about *Customer* rankings. Each rank has ID, name, description, and point to indicate how many points a specific rank requires.
- f. *Customers*: this table store information about *customers*. Each customer belongs to a rank. Point is calculated according booking information,

which will be listed below. *Customers* stores customer's ID, name, gender, phone, Facebook, address, email, dob, image, note.

- g. *Bookings*: this table store information about bookings. Each booking has IDs of customers, employees, and orders to connect to those table and store information. *Bookings* table stores note, ratings which is used to calculate point for employee, review, and time of the booking.
- h. *Booking_products*: this table store information about orders. Similar to products, each order belongs to a booking. It has *booking_id* to know which booking it belongs to. In addition, *Booking_products* table stores product's ID to connect to products table and get the required product information, and *booking_id* to connect and get information about the booking, the price of the linked products will be calculated and add to customer's point. Customer's ranking is calculated bases on this element.
- i. *Users*: this table store information about users. Each user has ID, *profile_id* to connect to profiles table, email, phone, and password for login authorization.
- j. *Profiles*: this table store details of user, such as image, address, social media address, city, postal code and other basic information.
- k. *Permissions*: this table store permission of staff for viewing revenue, managing branch and work times, and application contents.
- l. *Work_times*: this table store information about different work shifts. Each work shift has time, and ID to assigned to different staff.
- m. *Workflows*: this table store information about workflows used in CRM.
- n. *Steps*: this table store information of steps which belongs to workflow. One workflow has many steps.

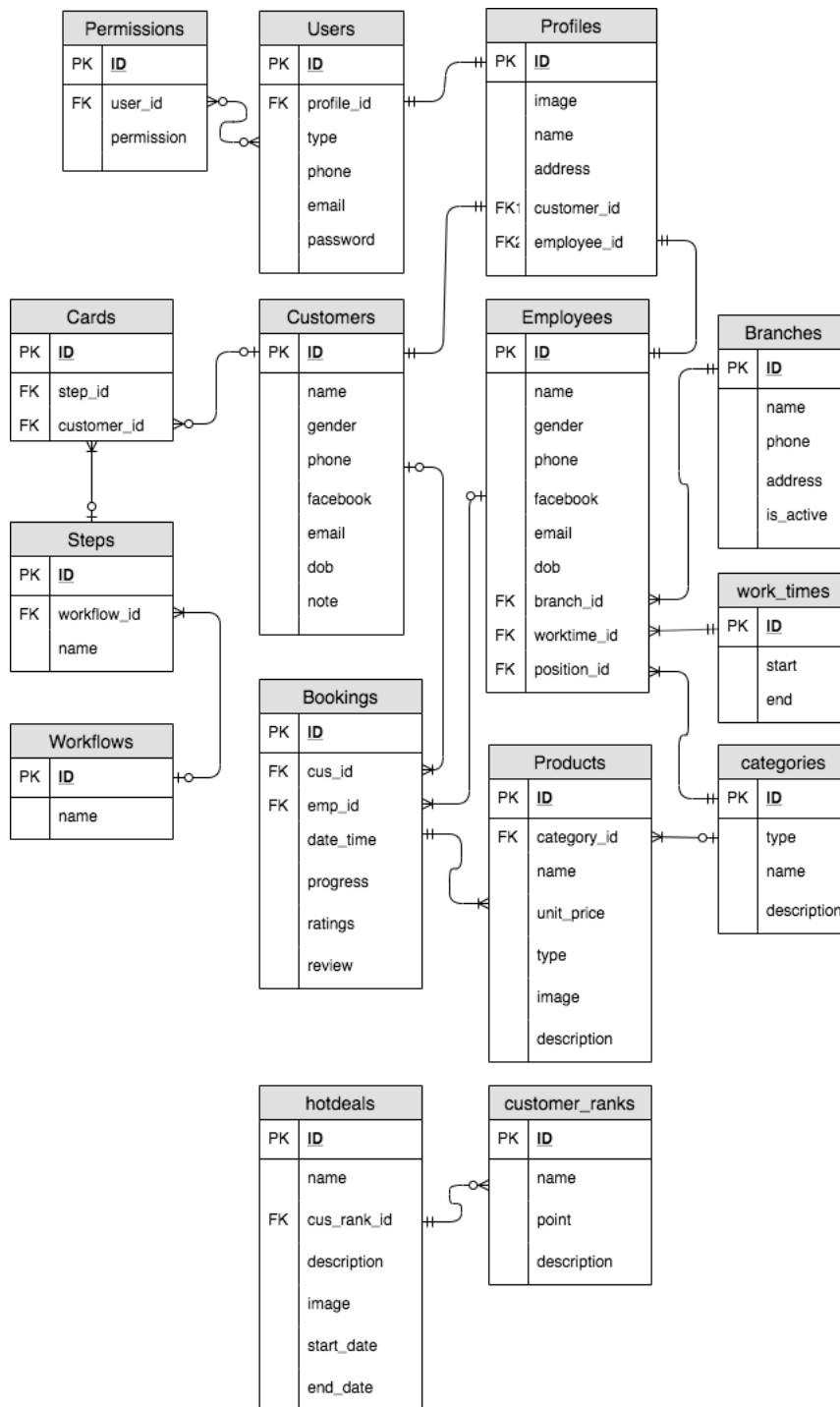


FIGURE 21. Database structure

7. FINAL PRODUCTS

In order to bring more attraction and better experience to users on a website or application interface, Visual Design considers many different principles, including consistency, properties of the Gestalt principle, space, hierarchy, balance, contrast, scale and similarity. Besides, we would like to ensure that content is still the heart of the page or function and enhance it by engaging users and helping build their trust and interest in the product.

7.1. Mobile Application for customers

In mobile application for customers, we would like to separate customers into four levels, such as: member, silver, gold, diamond. Each customer will receive different hot deals which are depended on how many moneys he spent to use service or buy products, for instance: level of customers will be member if they spent under 300€. After that if customers continue to use services and buy product until under 600€, their level will be changed to silver. Moreover, level of customers will be change to gold if they spent under 1000€, in this level customers will receive personal offers every week. Specially, in diamond level, customers will be invited to our workshop, received gifts after using services or buying products and their personal offers will be higher than other levels. To get diamond level, customers just need to spend more than 1000€. In each level, customers will receive different hot deals (appendix 2-2).

7.2. Mobile Application for staff

In mobile application for staff, staff can see new information or new announcement from the company in News page (appendix 3-1), they also can take a look and update the trends in Collection page (appendix 3-2). However, in Bookings page (appendix 3-3), Schedule Page (appendix 3-4) and Profile

Page (appendix 3-5), each staff can only see his waiting bookings, check his working schedule and edit his own private information.

7.3. Website

In website, we would like to decentralize based on which position users have in the company, for example: In revenue page (appendix 4-1), everyone can take a look on it. In information Page (appendix 4-2), only person who has admin account can change and take a look on data in branches, products, services, working hours tabs. However, managers also can take a look and change data in staff tab. In calendar Page (appendix 4-3), managers can check working schedule of all staff who are working in his branch here and staff also can check their working schedule. In content Page (appendix 4-4), people are in content team have the right to access this page. In bills Page (appendix 4-5), only cashiers can access this page. In CRM page (appendix 4-6), everyone can take a look on this page. In setting Page (appendix 4-7), only admin account can access and change data.

8. TESTING

We tested website and mobile applications by sending instruction to all Oasis's staff and Oasis's loyalty customers and then they filled in the interview form with seven questions (appendix 1).

Instruction:

Website:

Go to oasisvn.tk

Mobile Application:

1. Go to App Store/ Google Play
2. Find Expo app
3. Install
4. Go to Camera on your phone and scan
 - Customer Mobile Application (figure 40)



FIGURE 22. Barcode of Customer Mobile Application

- Staff Mobile Application (figure 41)



FIGURE 23. Barcode of Staff Mobile Application

We have the same questions for website and two mobile applications, but we send it to different user's segments via email. We created a survey form on google with the name is Oasis's Applications, for example,

- Website is sent to manager group which has about 25 people.
- Mobile application for customers is sent to loyalty customer group which has about 50 people.
- Mobile application for staff is sent to staff group which has about 60 people.

After two weeks, we received 21 answers for website, 34 answers for mobile application for customers and 49 answers for mobile application for staffs.

9. CONCLUSION

With developing of technologies, there are 64 million internet users and 143 million mobile subscription, and it is continuing to increase in the future (WeAreSocial and Hootsuite, cited January 2019).

From those statistics, showing the presence in customers' phones via the mobile applications are a way for Oasis to remind its presence. Even if they have not yet accessed or need to use Oasis's services, Oasis image will always be right in front of customers. One of the biggest benefits of mobile application for customers is that all the information Oasis wants to convey to its customers which is always present and right on their phones, which means Oasis has the shortest way to reach with its customers. Through notifications function, it reaches customers directly, and easily remind customers about its products and services when Oasis feel that is the time.

After many years, Oasis will have several thousand users who used services or bought products, but every time Oasis has a new promotion for its loyalty customer. How many of them can receive information? Instead of sticking with the old ways, for example: loyalty cards, let's turn it into a loyalty program through mobile applications. It will help to increase coming back of its customers and specially customers always receive information in a snap. Besides, it also increases accessibility to customers.

Moreover, with mobile application for staff which will help Oasis's staff are easier in managing their working schedule and information or announcements from the company.

Besides, the purpose of developing website is to bring convenient in managing. All company's information which are from revenue, customers, products, staff and so on, will be managed in a logical, easy way, and the status of the business will also be reflected in real time.

More specifically, in terms of sales, the figures were calculated which based on our testing and statistically calculated for each branch, each product, each service, and every employee which making comparison and revenue reporting are done quickly, and in real time. Moreover, after using the services, customer will give the point and evaluate staff. The grade and customer reviews are also statically counted. Combining these factors, managing the quality of products, services and staff is easier than ever.

Moreover, managing the number of branches, staff, products, services, working hours, and promotions is also flexible. Adding, removing, correcting and deleting the above-mentioned resources is done quickly so that the enterprise's session is not interrupted when there is a sudden change.

For every business, customer information is always the most valuable resource. To Oasis, customer management is focused and put on the most important. In the Customer Relation Management section, used service histories and bought products are easily accessed. The special characteristics, or preferences, requirements of each customer are recorded (in the customer notes section). This helps a lot for new staff. If they meet customers already in the system, they will always know how to serve that customer in the best way.

Another feature is Workflow, the purpose is to create uniformity in the session. An employee will always know what a customer is in the service phase, and what to do next with that customer, helping the employee build a systematic working style

Those are the reason why we choose this topic, we believe associating economics with the development of technologies, bringing not only benefits for life, but also higher profits for companies.

10. DISCUSSION

In future, we would like to improve more functions for Oasis system, especially in Customer Relation Management, for example: Firstly, Inbox is the first function which we would like to develop. In mobile application for customer, we will add chat support function. It will be Omni-channel which has all chat and email. In addition, this function will also integrate many tools to increase the processing speed of employees such as creating reminders, making notes, adding to the workflow, creating invoices, checking the status of booking and so on. Secondly, Task and Reminder will be a place to store tasks and reminders of staff. Staff can create reminders for themselves, and managers also can assign tasks to staff through this section. Finally, Automation will be the main point of Oasis system in the future. For any company, automation and repetitive tasks are essential to increase staff productivity. Automations are the place to manage them. Staff can add, remove, edit, delete tasks to be performed automatically, for example, when a customer text or sent an email, there will be a message and an email automatically sent back to the customer. Furthermore, when customer book the calendar, what action will happen? When the customer's score is just enough to reach a new level, what action will it take? Reminding customers about their booking, automatic move tasks in the workflow. From those, we can see there are a lot of tasks can be automated, and the staff will be the manager of them

After finishing those tasks, we also have the plan to develop collection function and analyze customer's information, such as: in one promotion, we will see how many people will use that promotion. What kind of content can attract attention of customers? A lot of factors can be collected and analyzed, the purpose is to understand customers better, offer more attractive promotions, and improve the quality of Oasis's services and products.

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INTERVIEW QUESTIONS AND RESULTS

To know more about what features and elements which we need to improve, or some features do not work correctly, and important reason is understanding if a feature is obsolete to our users is an obvious benefit. Therefore, we sent interview form with seven questions like below:

1. What do you like the most about our application?
2. What do you like the least about our application?
3. Are there any features that you think you need but are missing in our application? Please describe
4. With the existing features, does our application help you to achieve your goals? How?
5. On a scale of 1 to 5, rate your experience using our application
6. On a scale of 1 to 5, rate the interface of our application
7. On a scale of 1 to 5, rate the intuitiveness of the icons

After two weeks, we receive twenty-one answers for website, thirty-four answers for mobile application for customers and forty-nine answers for mobile application for staff, such as:

On survey of website, the answers are:

1. User Interface, Fast page loading speed, Easy to navigate, Mobile friendly.
2. It is a little bit hard to take a look revenue's charts by mobile.
3. It would be good if more information of staff could be shown, such as workdays in the past, revenue, and reviews.
4. 90% answers are yes.
5. Average is 4.
6. Average is 4.
7. Average is 4.4

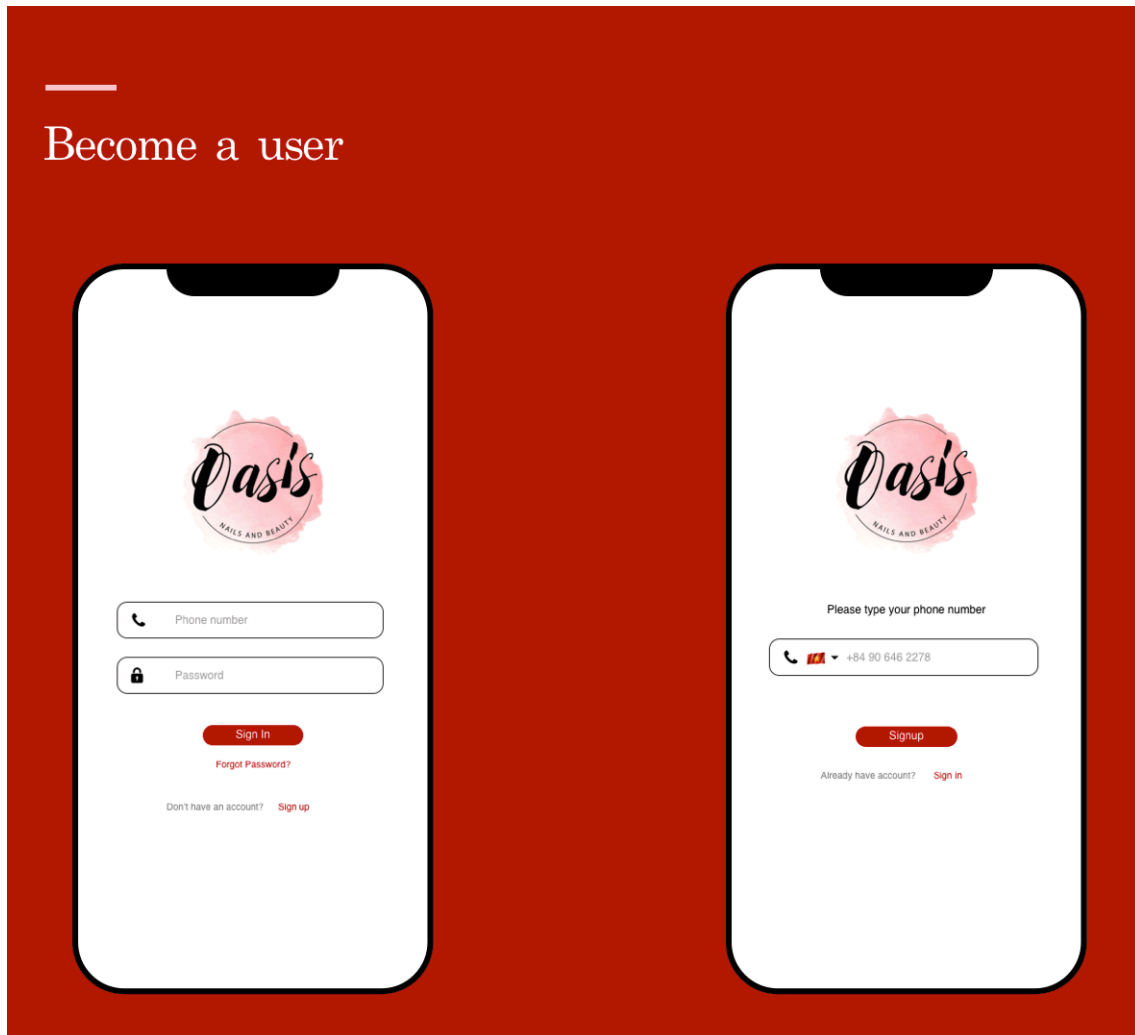
On survey of Mobile Application for customers, the answers are:

1. User Interface, easy to navigate, stable and fast, great features, ser friendly.
2. Products do not have images.
3. Missing function to check on current customer points, and to see how many more needed to rank-up.
4. 95% answers are yes.
5. Average is 4.8
6. Average is 4.3
7. Average is 5

On survey of Mobile Application for staff, the answers are:

1. UI is friendly, easy to understand and use.
2. Cannot see other staff 's performance.
3. It will be better if application can show analyzed data about customers, for example: customer favorite nails styles and so on.
4. 97% answers are yes.
5. Average is 4.9
6. Average is 4.7
7. Average is 5

MOBILE APPLICATION FOR CUSTOMERS



APPENDIX 2-1. Sign In and Sign Up of mobile applications



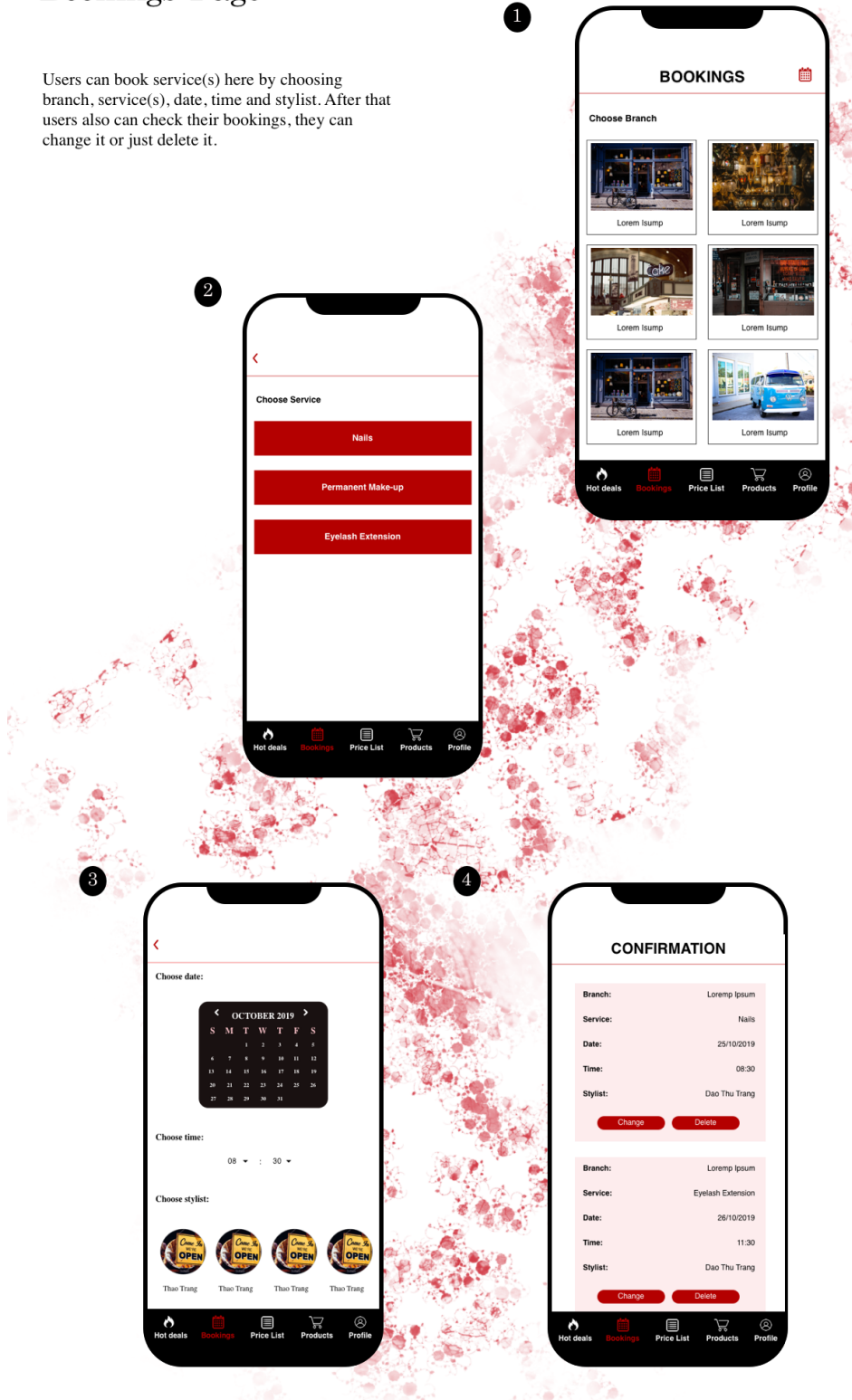
Hot Deals Page

Users can check information about Hot Deals which is offered based on their level.

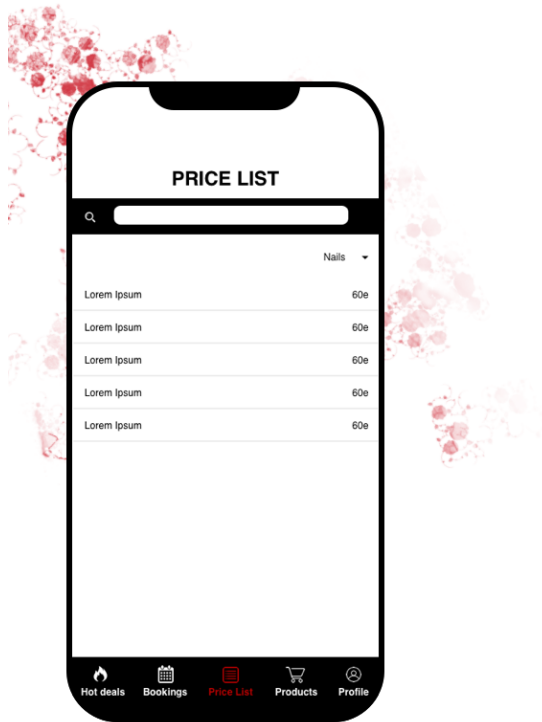
APPENDIX 2-2. Hot Deals page of mobile application for customers

Bookings Page

Users can book service(s) here by choosing branch, service(s), date, time and stylist. After that users also can check their bookings, they can change it or just delete it.



APPENDIX 2-3. Bookings page of mobile application for customers

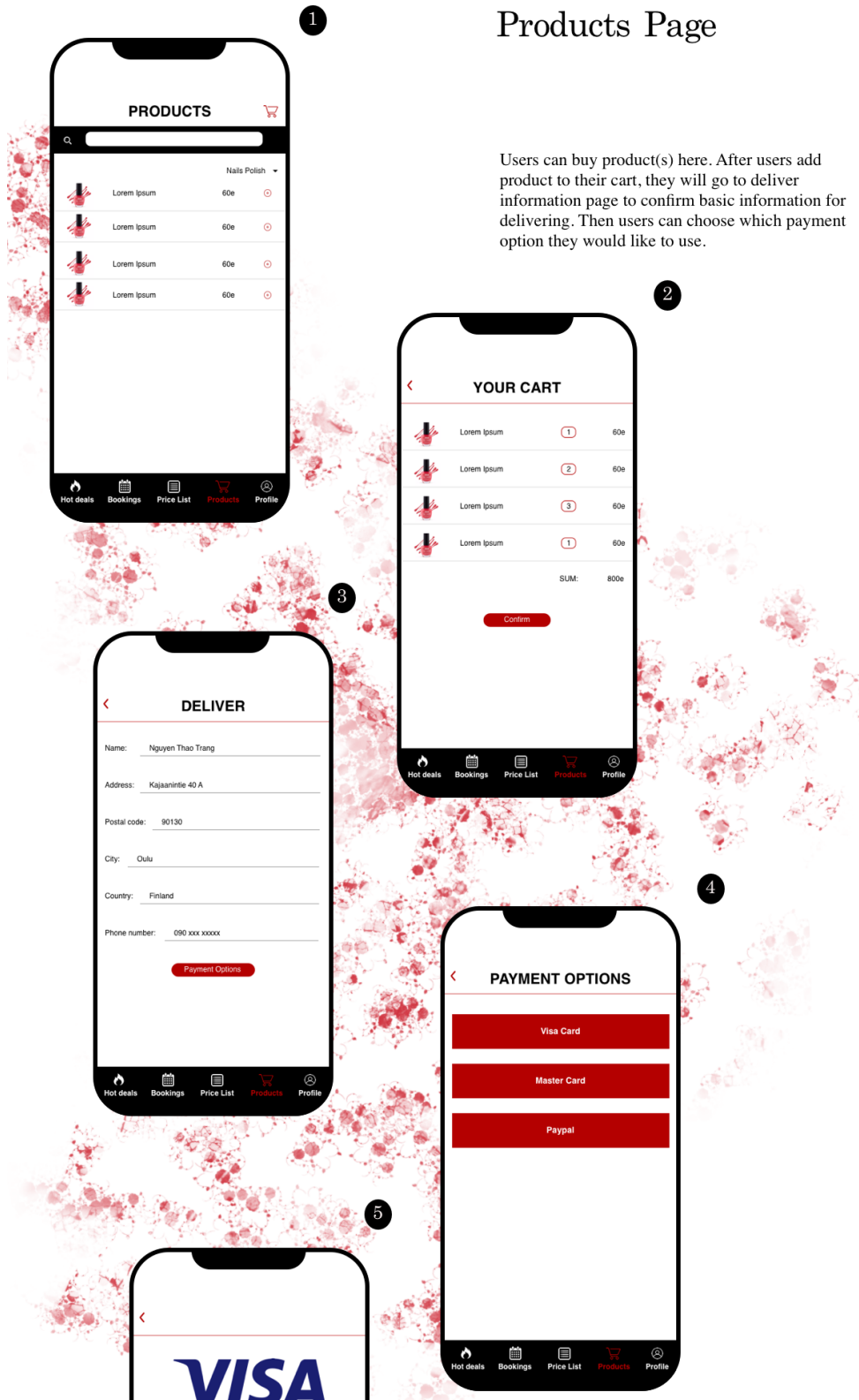


Price List Page

This page is include all price list of services, it helps user can know which service Oasis has and which they would like to take

APPENDIX 2-4. Price List page of mobile application for customers

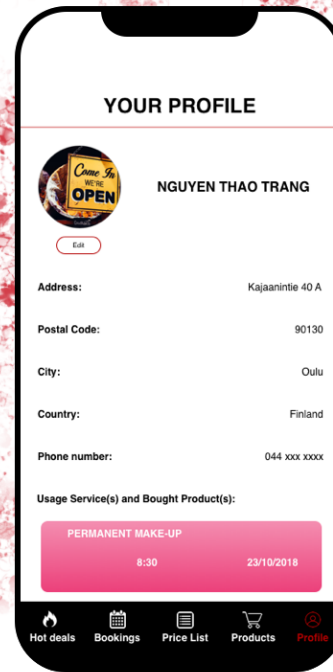
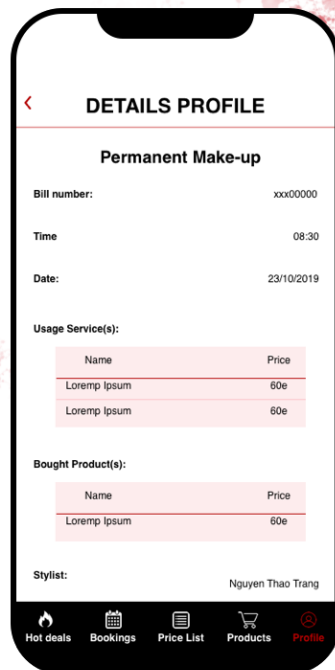
Products Page



APPENDIX 2-5. Products page of mobile application for customers

Profile Page

This page has basic information of own account



APPENDIX 2-6. Profile page of mobile application for customers

MOBILE APPLICATION FOR STAFF

News Page

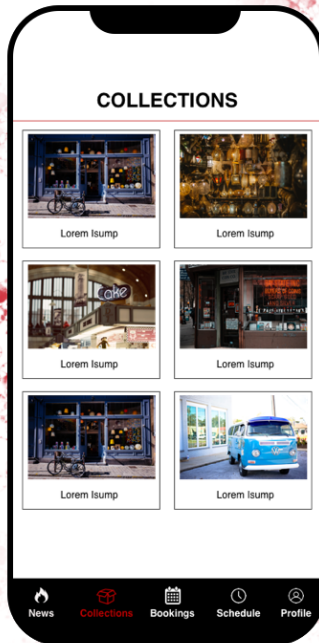
User can check information about parties and new announcement from company



APPENDIX 3-1. News page of mobile application for staff

Collections Page

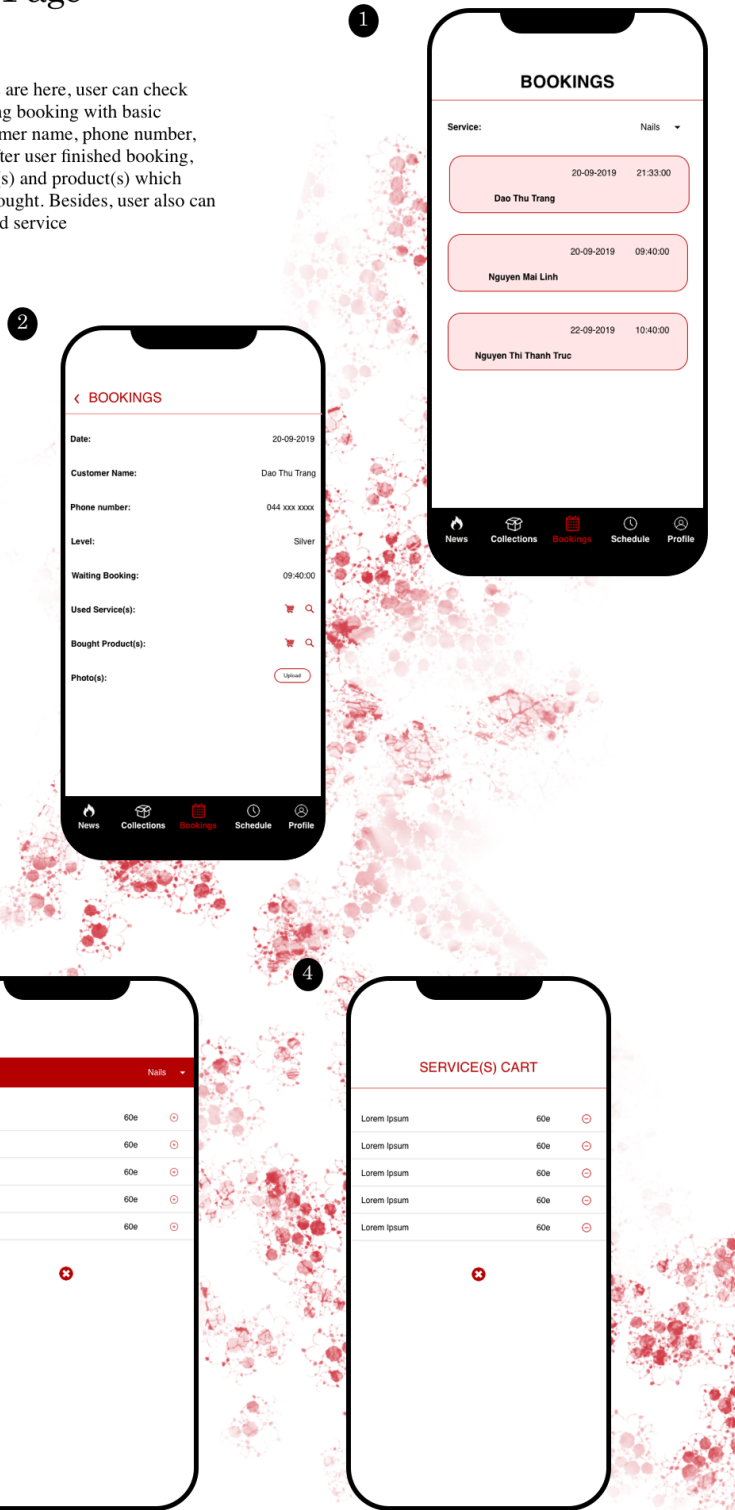
This page is include all new collections, it helps user can update new trend everyday



APPENDIX 3-2. Collections page of mobile application for staff

Bookings Page

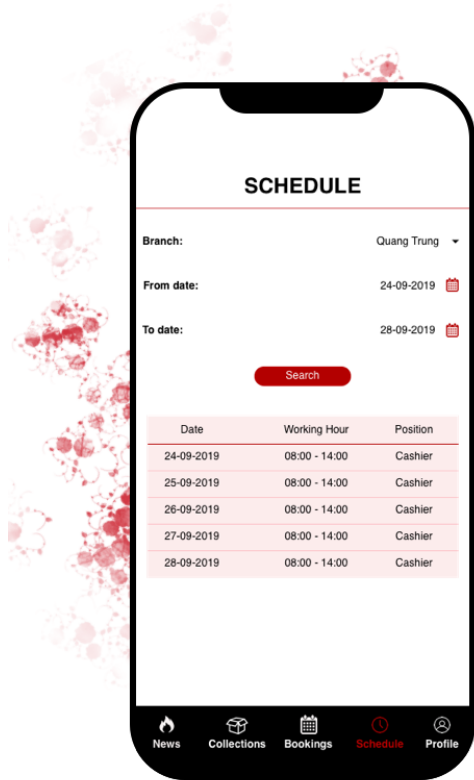
All waiting bookings are here, user can check details of each waiting booking with basic information is: customer name, phone number, level of customer. After user finished booking, they can add service(s) and product(s) which customer used and bought. Besides, user also can add photos of finished service



APPENDIX 3-3. Bookings page of mobile application for staff

Schedule Page

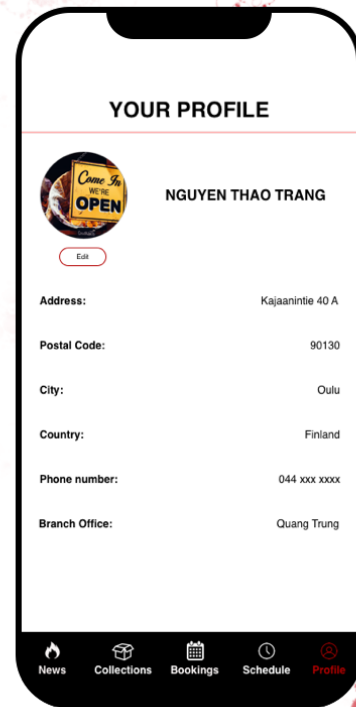
User can check working schedule here by choosing branch and date



APPENDIX 3-4. Schedule page of mobile application for staff

Profile Page

This page has basic information of own account

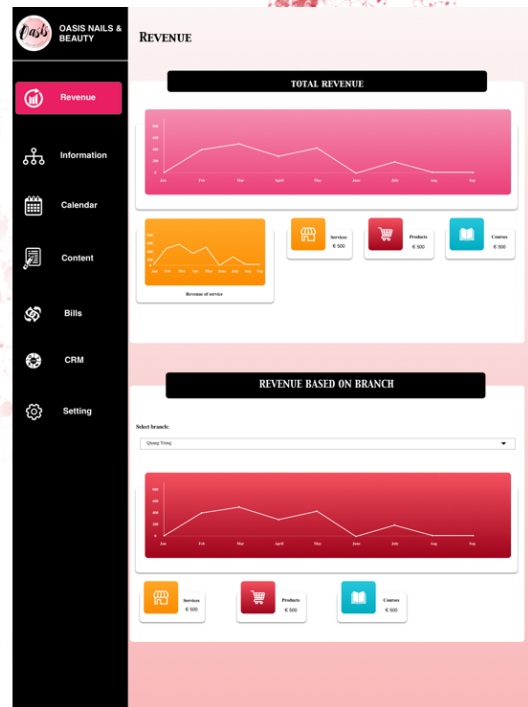


APPENDIX 3-5. Profile page of mobile application for staff

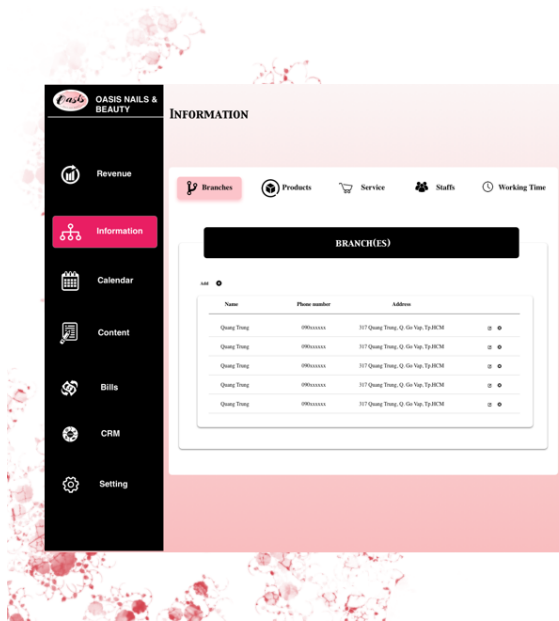
WEBSITE

Revenue Page

Managers can check that their revenue increase or decrease in each month and from that they can analyze reasons and improve their services, campaigns, total revenue of products also has the same goals and specially managers can analyze behavior of customer in purchasing. Moreover, we also have total revenue for each branch and each service, from that we can analyze and figure out reason why in some branches have lower revenue than other branches and which service(s) customers are interested more



APPENDIX 4-1. Revenue page of website



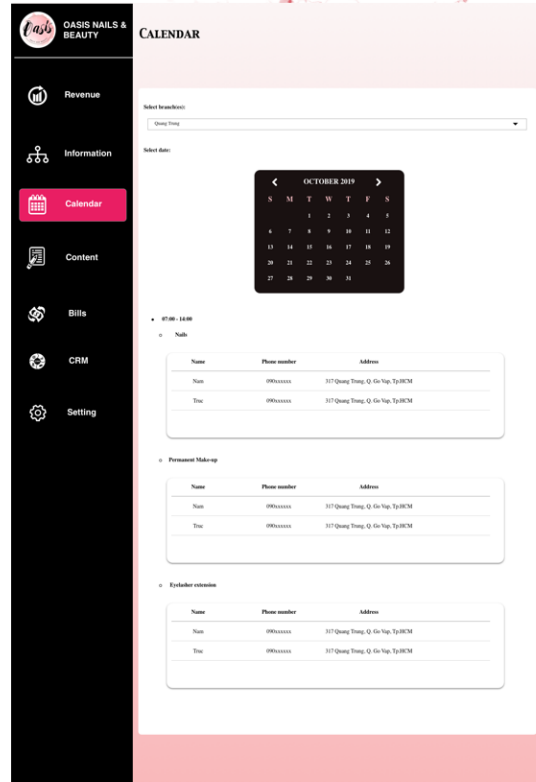
Information Page

It help to manage information of all branches, products, services, staffs and working times which Oasis have and managers also can create new branch, product, service, staff and working time with all basic information

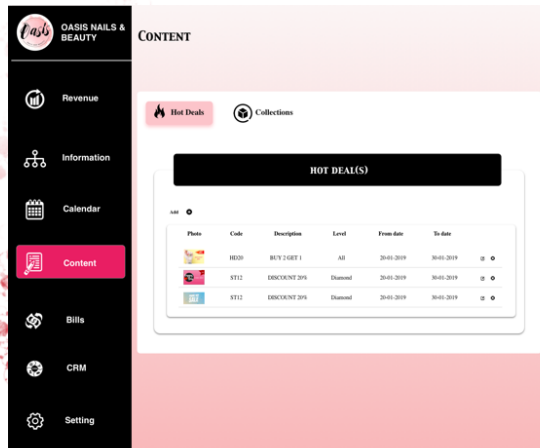
APPENDIX 4-2. Information page of website

Calendar Page

Managers and staffs can check their schedule on date when they would like to take a look. Besides, managers and staffs can search based on branch, date and staffs.



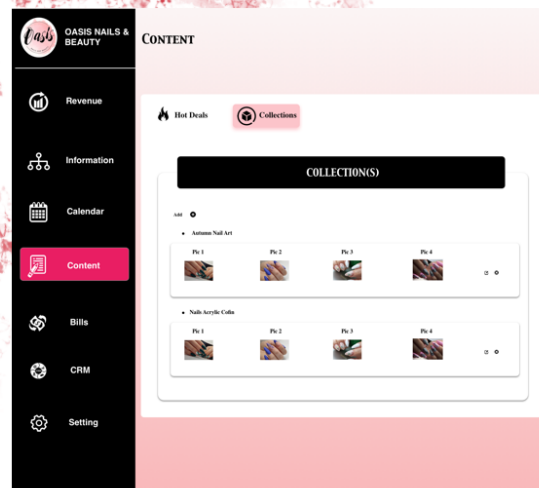
APPENDIX 4-3. Calendar page of website



1

Content Page

It has two main contents for hot deals and collections which we will use to show and change content on user's mobile application

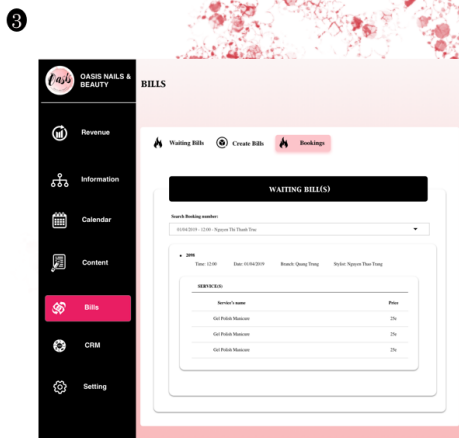
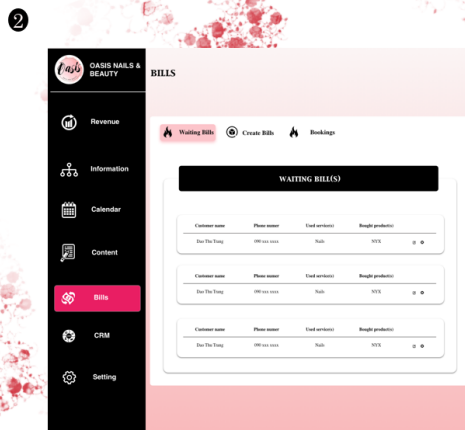
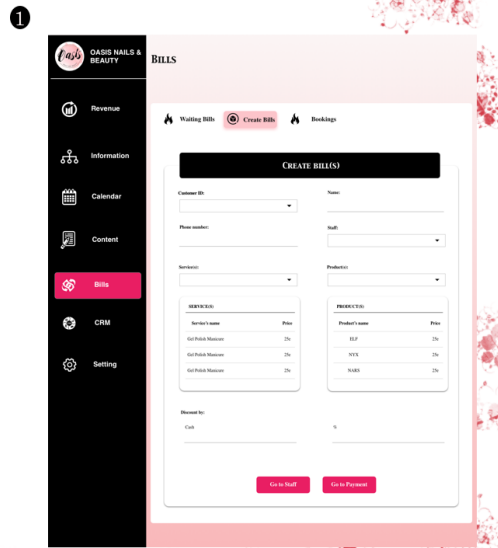


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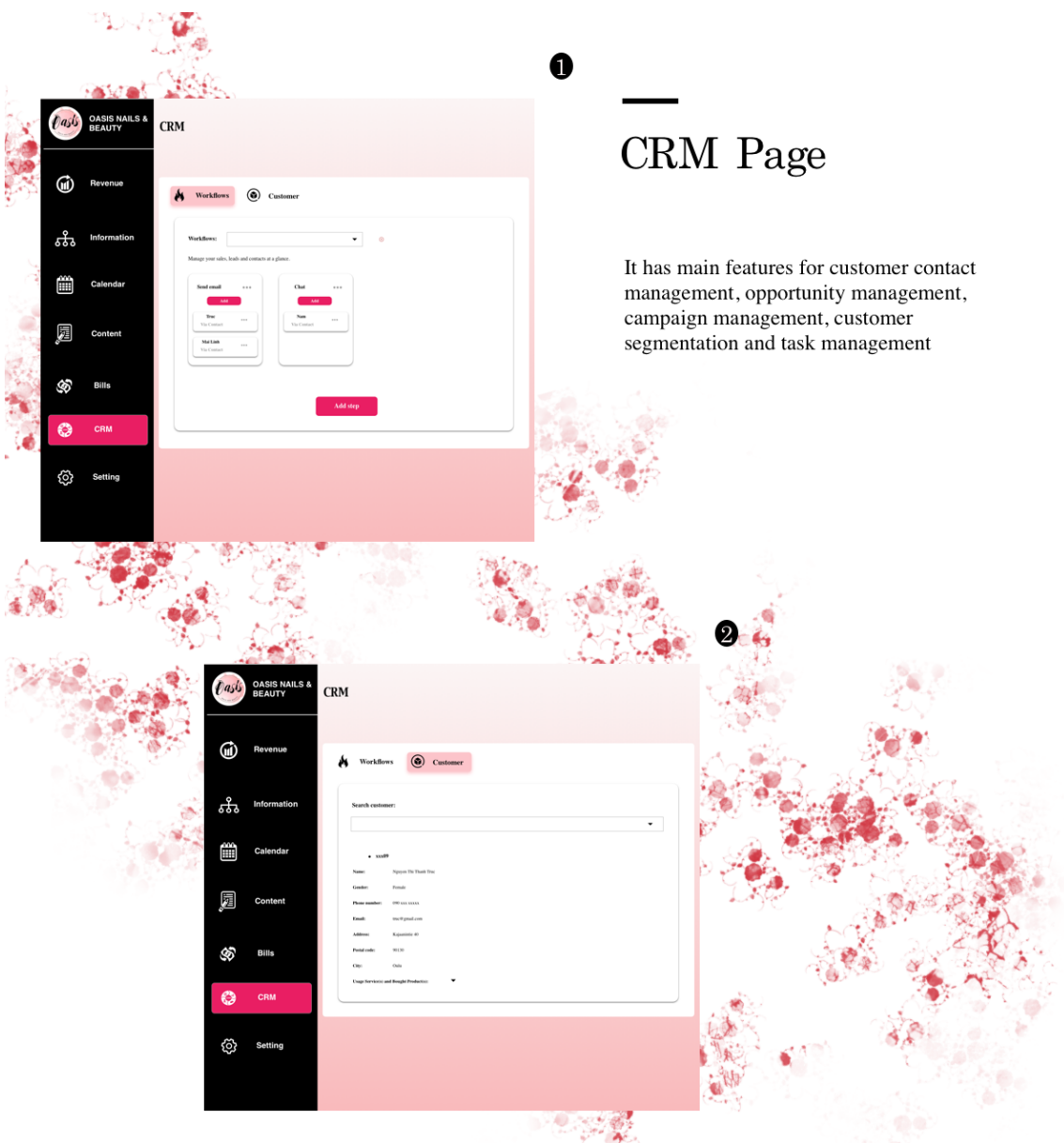
APPENDIX 4-4. Content page of website

Bills Page

It is made for cashier and managers who have responsibilities for managing bills, the page has three main functions, such as: waiting bills, create new bill and search bill number



APPENDIX 4-5. Bills page of website



1

CRM Page

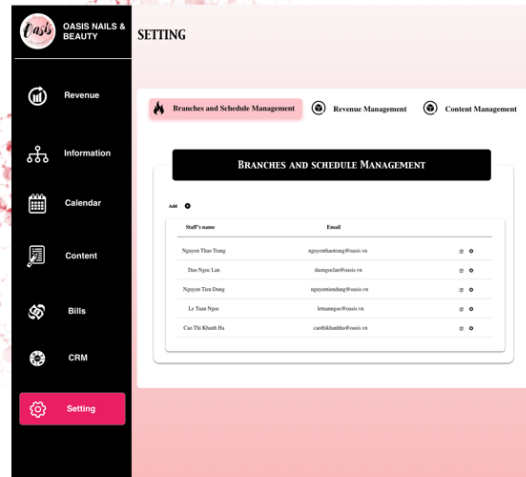
It has main features for customer contact management, opportunity management, campaign management, customer segmentation and task management

2

APPENDIX 4-6. CRM page of website

Setting Page

It is made for setting management rights for each person in each task by adding email, for example: who can see revenue in total, who can see revenue in each branch and so on.



APPENDIX 4-7. Setting page of website