

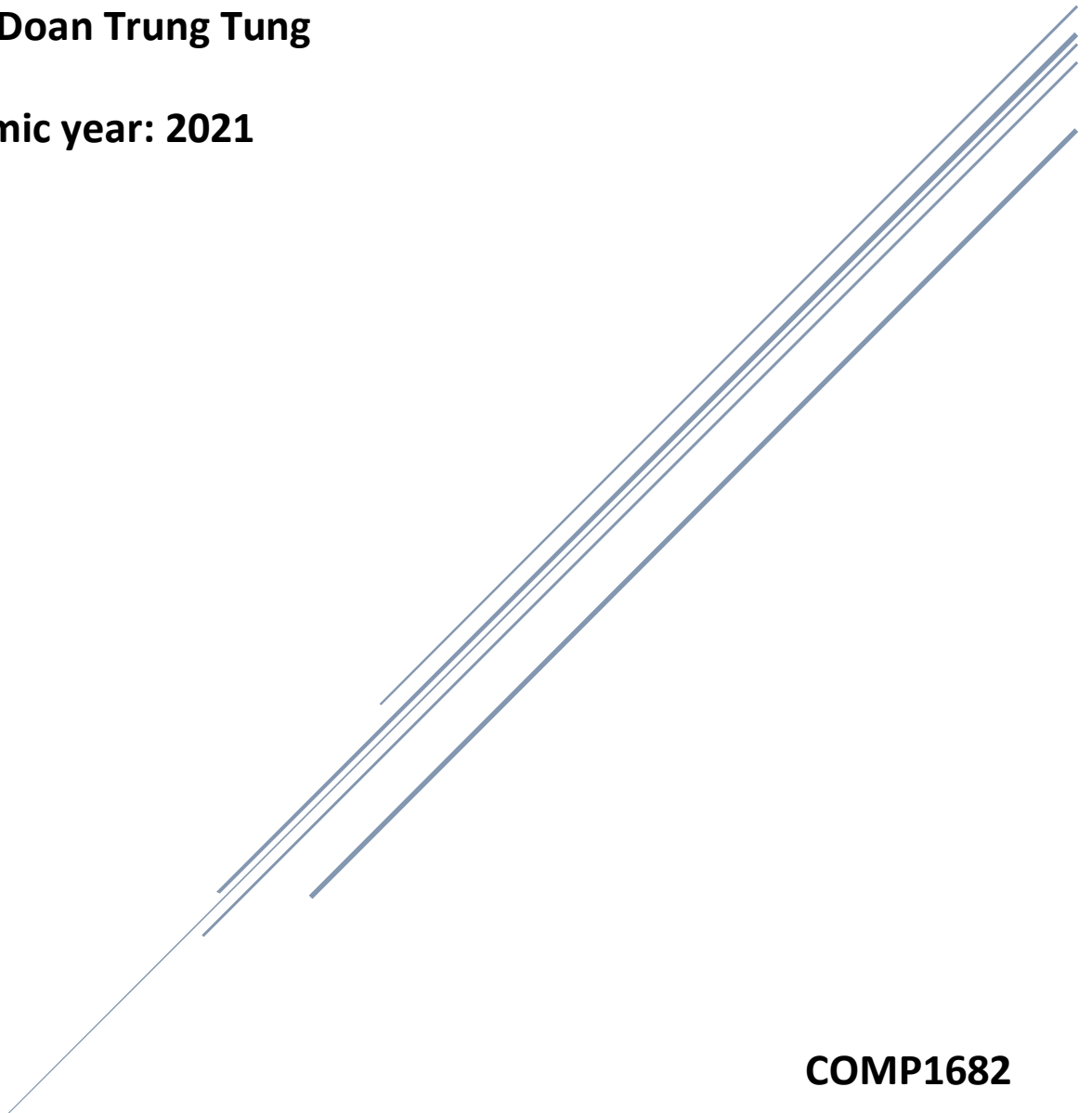
PROJECT DECOR ONLINE

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Abstraction

The website selling furniture products CiLi Decor is built with and developed using Agilw Scrum software development method, PHP language, JQuery, and Bootstrap framework allowing users to buy furniture products, and also design symbolic design and refer to documents and knowledge from CiLi Decor's Blog. Project implementation and all requirements documentation, design, build, development, evaluation and lessons learned are shown in the sections below.

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I. Introduction

In the current 4.0 technology era, everything can be solved by applying science and technology and in the world of e-commerce too, where customers buy products but cannot experience them. actual product. Everything customers can learn about the product is only trust to the website, images, introduction and especially the product feedback of customers who have purchased that product. Today, the demand for online purchases through e-commerce websites is enhanced and tends to increase more and more due to the impact of the global COVID-19 (corona virus) epidemic. So using e-commerce websites for shopping becomes a very fast and efficient way to satisfy people's needs.

Currently, all goods and products can be purchased online, such as food, fashion, department stores, etc. In which, furniture also develops due to the needs of everyone. increasing but being restricted from going out due to the epidemic and unable to hire people to design directly. Therefore, this project is the project to develop an e-commerce website "CILI DECOR" about furniture to meet all the needs of customers for home furniture.

The process of building and developing e-commerce website "CILI DECOR" includes the presentation stage, assessment of customers' needs and trends in using e-commerce websites, presentation and evaluation of customers' e-commerce websites. the most used software development technologies and methods today and their suitability for the project and then select and make a decision to use or not to use. Then details the process of building, completing and developing the project. Finally, the presentation and analysis of the results and evaluation of the furniture e-commerce website construction project are presented and analyzed.

II. Literature review

1. Review of web and ecommerce – web

Before implementing and developing a web software project, every software developer must learn and understand the history of the birth and development of the web, the general structure of the website, the development trends of the web. current website and related issues

surrounding the website construction and development process. In this e-commerce web development and implementation project, in addition to learning and analyzing the above factors about the website, the developer needs to learn and understand the e-commerce web, the history of The life and development of e-commerce web, structure, trends and issues related to e-commerce web to implement and develop the best project. In the project of building an e-commerce website "CILI DECOR" too, the programmer needs to understand the structure of a basic e-commerce website along with trends and issues related to furniture to Website building and development.

1.1. History of web

According to Niels Bruggen - editor of the book "Web History", the Web or World Wide Web (WWW) was invented by Tim Berners-Lee - a British scientist. In 1989, while he was working at CERN. CERN consists of scientists in academia and universities around the world, they need an automated forum to exchange and share information with each other, so the Web was invented and shaped by Tim Berners-Lee. to meet that need. An easy-to-use and robust global information system is the most basic idea of the World Wide Web (WWW). This idea is realized by combining the current thriving technologies of computers, hypertext and data networks,... (Bruggen, 2010)

The proposal for the World Wide Web was first written by Tim Berners-Lee in March 1989 and second in May 1990. In November 1990, three basic technologies that still underlie the web today were developed. Tim Berners-Lee writes HTML, URI, HTTP. In which, HTML is the hypertext markup language, the language format for the web page, the URI (URL) defines the address for the web page, HTTP allows the retrieval of linked resources everywhere on the web page (Hypertext Transfer Protocol). In 1991, the World Wide Web was released by Tim Berners-Lee and included a library for programmers, browsers, and web server software. The worldwide public's interest in the World Wide Web was strong when in August 1991, Tim Berners-Lee published the WWW software on Internet newsgroups. (James M. Gillies, 2000)

1.2. History of ecommerce – web

According to Niels Bruggen - editor of the book "Web History", the World Wide Web was born in 1990 by Tim Berners-Lee and published on internet groups then developed globally. At the end of

2000, people began to know how to use the internet to exchange goods and do business, in addition to electronic payment and information security services through the event of European countries and America has business companies setting up services through the World Wide Web.

In addition, e-commerce is derived from the use of technology such as EDI and EFT - allowing businesses to use electronic invoices and send electronic contracts, in addition to banking, electricity phone, credit card, automatic teller machine (ATM).

Therefore, the definition and concept of e-commerce was born, namely:

According to the World Trade Organization (WTO), "E-commerce includes the production, advertising, sale and distribution of products that are bought, sold and paid for on the Internet, but delivered in a physical manner, both delivered products as well as digitized information through the Internet". (WTO, 2021)

The E-Commerce Committee of the Asia-Pacific Economic Cooperation (APEC) defines it as: "Electronic commerce involves commercial transactions for the exchange of goods and services between groups (individuals) of an electronic nature primarily through Internet-based systems." (APEC, 2021)

1.3. Architecture of ecommerce – web

Currently, the demand for online shopping and selling online is growing strongly and becoming popular in life, especially for young people. Therefore, e-commerce websites have an increasingly huge amount of traffic, serving all services and all processes when users make online sales and purchases such as general necessary information. about products, customers, warehouses, customer care services, payments and business management,... Therefore, most e-commerce websites share a certain structure to ensure the best service to online buyers and sellers. According to the book "Encyclopedia of E-Commerce Development, Implementation, and Management" by Lee, In, The structure of an e-commerce website includes:

Interface: The first impression of customers and business managers for an e-commerce website is intuitive, suitable, beautiful colors, attracting users. In addition, the interface needs to be easy to use, easy to see and contribute to the highlight of the product.

Homepage: All e-commerce websites need a general page called the homepage. This is a page that summarizes all the necessary and concise information about the user's business, products and services along with colors and a combination of eye-catching, appropriate, and outstanding content. turn on the information contained in the homepage. Therefore, the homepage is always invested and built in a meticulous and creative way so that users can easily see and remember to attract customers.

Product: This is a page that displays a complete list of general product information such as quantity, color, size, price,... specific product details.

Services: This is a page that displays all the services that the seller's business offers to users when learning about products or buying and selling products such as shopping carts, payment methods, product reviews. products and service quality of the business,...

News: This is the place to provide all information about products and businesses such as discounts, birthdays, customer gratitude, experience sharing...

In addition, the structure of an e-commerce website may include other features such as search, contact, help, ... depending on the needs of the business and the customer.

(Lee, 2016)

1.4. Trending for building e-commerce website

Sales websites are more and more popular with everyone in the current 4.0 era. The same goes for the design project of the CiLi Decor sales website for furniture, but to help the website have its own special features, there are specific features to attract website users who have applied the current new trends. Now to be closer to people, easy to use, integrate many functions in the sales system, take the user as the center, help the user experience in the best way.

1.4.1. Chat box

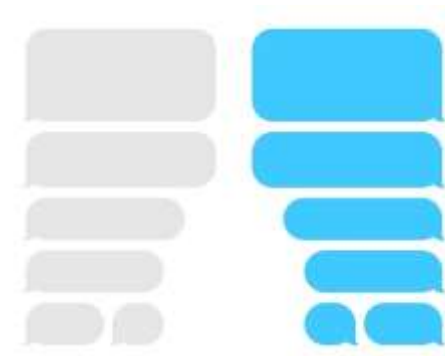


Figure 1. Chat box

Currently, web developers often use two typical chatbox types: Simple Chatbox and Smart Chatbox. Simple Chatbox is a type of chatbox that uses pre-programmed simple text lines to respond to users when there is an incoming message. Smart Chatbox is a type of chatbox that uses artificial intelligence, so it's like a robot that can automatically answer in many areas, with different questions that can simultaneously save and statistics the user's chat content. to do data.

In the CiLi Decor website, chatbox has been used in a simple way so that users can more easily communicate with the website and vice versa, the website administrator can also promptly respond to all customer inquiries.

1.4.2. Single-page websites



Figure 2. Example of Single-page websites

Website navigation plays an important role in attracting website users, the current trend of most users is to use a website with minimalist navigation, easy to understand and fully displayed, so One-page website design is very applicable. With the needs of use on different devices, meeting the needs of ease of use and completeness on the page, users only need to move and roll the mouse, so one-page websites are increasingly popular.

2. Review of Web Technologies

2.1. Program Language Front-end

2.1.1. HTML (Hyper Text Markup Language)

❖ Overview

According to Steven Bright's book "Hypertext Markup Language (HTML) Fundamentals: How to Master HTML with Ease" published in 2020, HTML - Hypertext Markup Language is the standard markup language for creating Web pages. HTML cannot build web animations; instead, it performs the function of building the layout and description of the format structure for the website. (Ease, 2020)

Each HTML page contains a set of tags (also called elements) that are responsible for building each block of a web page. Each tag forms a directory tree structure that includes a section, paragraph, heading, and other content block. HTML tags have two main types: block-level and inline tags. The Elements Block-level will use the entire web page space and always start a new line of the page (paragraph, heading, ...). Inline elements take up only a small portion of web space and do not start a new line on the web page. (Ease, 2020)

❖ Advantages and disadvantages of HTML

Based on the book "Multimedia and Web Technology" by author Reeta Sahoo, Gagan Sahoo on Computers and Computer Science (Reeta Sahoo, 2016) to summarize some advantages and disadvantages of HTML:

Advantages of HTML

- HTML is a very widely used language and has a large human resource, so it has a very rich resource and a large support team.
- HTML is compatible with most browsers, plus a straightforward learning and live learning process.
- HTML is a completely free and open source language
- The main HTML standard operated by the World Wide Web Consortium (W3C).
- Backend languages like PHP, Java, Node.js can be easily integrated with HTML.

Disadvantages of HTML

- If building a static website then HTML is a perfect choice and easy to use but HTML is completely passive when used for dynamic web and the solution for that is to combine with JavaScript or any language. that (e.g. PHP)
- HTML is recommended by experts to build separately such as footers or headers files
- HTML has many limitations with older browsers.

2.1.2. CSS (Cascading Style Sheet)

❖ Overview

According to the book "Cascading Style Sheets: The Definitive Guide" by Eric A. Meyer, published in 2004, CSS - Cascading Style Sheet language is the language used to create styles and format styles (for example, controls layout, color, font size, ...) for elements previously written by a markup language (e.g. HTML) to make web pages more colorful and displayed. CSS was created and developed by the W3C (World Wide Web Consortium) in 1996, to solve problems for developers about different fonts, background colors and styles for websites instead of code and code. many times. The correlation between HTML and CSS is very intimate, inseparable. HTML is the markup language (the foundation of the site) and CSS defines the style (all that makes up the website interface). (Meyer, 2004)

❖ Advantages of CSS

CSS aids programmers in the formatting of fonts, colors, background styles, borders, and the layout of items on different screens of a web page by allowing them to solve repetitive code difficulties. As a result, the Web site's source code will be more organized and well-structured. In the display format, website material will be more segregated. The process of upgrading material will be easier from there, and the code will be less confused.

Save time by storing CSS style definitions in external CSS files. This allows you to alter the entire site by changing just one file. CSS reduces the requirement for each element's description to be repeated. You can then save as much time as possible working with it by shortening the code and making it easy to control superfluous errors.

More attributes - CSS has more detailed properties for defining the look and feel of a web page than HTML. CSS allows users to apply various styles to an HTML web page, expanding the possibilities for page personalization.

2.1.3. Bootstrap (CSS Framework)

❖ Overview

According to Jake Spurlock's book "Bootstrap: Responsive Web Development," published in 2013, Bootstrap is a free collection of open source code in one collection that allows designers to create a complete website with built-in properties such as color, size, and more. This allows designers to save time, be more creative, and save time in the process of designing the website's interface. (Spurlock, 2013)

Bootstrap is a fantastic framework that will see a lot of use in the future. Bootstrap is a collection of built and compressed JavaScript, CSS, and font files that is mostly open source integrated and includes a number of unique features, such as giving programmers access to a large library of modules to construct a complete website interface. Bootstrap allows developers to alter the structure of their website before utilizing and downloading it. Simply simply declaring jQuery correctly, Bootstrap has it incorporated.

❖ Advantages and disadvantages of Bootstrap

Advantages of Bootstrap

- Easy to use: To utilize Bootstrap efficiently, programmers must have a basic understanding of HTML, CSS, and Javascript. The action of Bootstrap is built on the open source HTML, CSS, and Javascript trend.
- Developers can choose the qualities and elements that are appropriate for their website, and they can edit them before downloading.
- Bootstrap has been thoroughly investigated and tested on a variety of devices. Before being used, it was thoroughly tested.
- High compatibility: Bootstrap's major advantage is its ability to work across all browsers and systems. In the user experience, this is incredibly significant and required.

Disadvantages of Bootstrap

- Unpopularity: Few people are knowledgeable enough about bootstrap to be able to use it with a web programming platform.
- Because there are many redundant pieces of code or the programmer does not use 100%, the product is heavy and the optimal speed is low.
- Bootstrap does not have all of the required libraries. Because no proper native framework has yet been created, certain websites must still employ a mobile-specific version.
- Bootstrap limits originality by allowing developers to utilize everything in the built-in Bootstrap library, which encourages creative laziness.

2.1.4. JavaScript Framework

❖ Overview

JavaScript is a programming language that brings web pages to life, according to the content of Addy Osmani's book "Learning JavaScript Design Patterns: A JavaScript and jQuery Developer's Guide." JavaScript is a programming language that aids in the development of webpages.

JavaScript is simple to grasp and master, and it can be used for a variety of tasks, including developing web-based software, increasing functionality, and playing games.

JavaScript can be directly placed in a web page or referenced from another file.js. Because JavaScript is a client-side language, rather than the server processing it first and then sending the results to the visitor, it is processed on the visitor's system.

❖ **Advantages and disadvantages of JavaScript**

Advantages of JavaScript

- It's less difficult to pick up than other programming languages;
- Errors are easier to notice and remedy as a result.
- It can be attached to a web page element or triggered by a web page event, such as a mouse click or hover;
- JS is compatible with a variety of browsers, platforms, and...
- When accessing the database, you can use JavaScript to check the input and reduce manual checks.
- It improves the website's interaction with visitors.
- It's more lightweight and faster than other programming languages.

Disadvantages of JavaScript

- Vulnerable: JS can be used to run malicious malware on users' PCs; not all browsers support it.
- Snippets of large JS code: It's possible that it'll be done differently on each device, resulting in inconsistencies.

2.1.5. React JS

❖ **Overview**

React Js is a library used to build user interfaces (UI) written in Javascript in both Web and Mobile platforms, according to the content of the book "ReactJS by Example - Building Modern Web Applications with React" by Vipul AM author Prathamesh Sonpatki. React Js has a diverse and rich ecosystem, so it is widely used. To create a complete web interface, however, it is required to mix HTML/CSS when designing applications, Objective C when developing apps for iOS, and Server Side Language for data storage and logic processing. Hundreds of large firms throughout the world, including Netflix, Airbnb, American Express, Facebook, WhatsApp, eBay, and Instagram, use the service, demonstrating its popularity.

Virtual DOM is used by React for better page optimization, as this framework is both useable and SEO friendly, and virtual DOM also allows for component reuse. ReactJS enables organizations to construct online applications with improved user interfaces, hence improving user experience.

❖ **Advantages and disadvantages of React JS**

Advantages of React JS

- Reactjs makes creating JS code easier by allowing you to use JSX converters to blend HTML and Javascript without string concatenation.
- There are a lot of development tools in Reactjs: The Chrome plugin makes debugging Reactjs code a breeze. Programmers will be able to see the virtual DOM in the same way that they would a conventional DOM tree.
- Reactjs is a component library that can render outside of the browser using the DOM as well as render using HTML strings given by the server. As a result, Reactjs aids in the optimization of SEO and the reduction of page load time.
- Working with the interface testing problem: Because the virtual DOM is entirely implemented in JS, writing interface test cases is quite simple.
- High performance for applications that change data often, as well as ease of maintenance and troubleshooting.

Disadvantages of React JS

- Only the View layer is served by Reactjs: React won't have a Model and Controller component, therefore it'll have to work with other libraries. React will also be devoid of two-way binding and Ajax.
- Reactjs integration into typical MVC frameworks necessitates some reconfiguring.
- In comparison to other frameworks, React is quite large. In terms of size, React is comparable to Angular (About 35kb compared to 39kb of Angular). Angular, on the other hand, is a full framework.
- It's difficult for newcomers to learn how to use the Internet since it's so difficult to get to.

2.1.6. JQuery

❖ Overview

JQuery is the most popular open source JavaScript library, according to (Lum, 2019). JQuery allows programmers to perform selects, event handling, special effects, and AJAX rapidly. JQuery also has extensive and well-maintained API documentation. As a result, it aids in the rapid and smooth development of websites. Using JQuery, in my opinion, has a lot of benefits because it has built-in special effects like "animate (), fadeIn (), fadeOut(), slideDown(), and slideToggle()". As a result, the CILI ecommerce website is currently being implemented. Programmers can rapidly and efficiently set the logic of the interface.

❖ Advantages and disadvantages of JQuery

Advantages of JQuery

The most significant benefit of JQuery is its simplicity. JQuery is being used by programmers to implement domestic projects. They merely require a working knowledge of JavaScript. They can quickly understand and apply JQuery. It's also a wonderful way for programmers to conduct all of their functions on a single page, such as adding and deleting. JQuery also includes a number of libraries that aid in the development of websites. Developers can use pre-written plugins by

downloading them and embedding them in their websites. Furthermore, JQuery allows developers to employ Ajax patterns to make the web more professional; for example, Ajax allows the site to function without reloading the page. Customers purchase fish via the CILI ecommerce website. They simply click to purchase the item without reloading the website.

Disadvantages of JQuery

When it comes to bugs, JQuery might be a programmer's worst nightmare. JQuery is tough to debug since it does not display clear faults. As a result, this is a JQuery flaw to exploit. While JQuery is simple to use, its capability is limited when compared to React JS or Angular. Because JQuery has been around for a long time and does not necessarily conform to contemporary programming practices. These days, a lot of people are using React JS and Angular.

2.2. Program Language Back-end

2.2.1. PHP

❖ Overview

PHP (Personal Home) is an open source scripting language that is often used to construct server-side web applications. PHP is compatible with a variety of operating systems, including Windows, Mac OS, and Linux. PHP is a popular programming language among web developers.

According to (Luenendonk, 2019), it is a widely used language that was created in 2004 and now has over 200 million websites worldwide. According to (W3techs, 2020), "PHP is used by 79.1% of all the websites whose server-side programming language we know," and as of January 2021, 49.1% of all websites use PHP 7. According to statistics, PHP continues to play a critical role in online development technology. PHP is used by the majority of websites today. However, in comparison to other languages, PHP has gradually lost market share in recent years.

❖ Advantages and disadvantages of PHP

Advantages of PHP

PHP is a website-specific programming language. It's a common choice for online apps. As a result, it's seen to be a highly simple and lightweight solution for web developers. PHP is also simple to

learn, has a large community, and many valuable libraries. As a result, even inexperienced programmers will be able to complete PHP-based projects rapidly.

PHP is totally cross-platform compatible, which means that developers may write PHP code on any platform, including Windows, Linux, and Mac OS X. The open source and cross-platform compatibility considerably speeds up and lowers the cost of development as compared to other local languages. For instance, I created a PHP website project to sell phones, and I authorized the use of all free PHP resources, including servers, libraries, and so on. As a result, I developed the site for free.

PHP is supported by a wide community of programmers. As a result, if I run into any problems while collecting data, I can go to Stack Overflow or a Facebook group to get help from the community.

Disadvantages of PHP

PHP can only be used to create and run web applications. This is a disadvantage for developers who are learning PHP, as PHP cannot compete with other programming languages such as Java or Python. If you wish to improve and reproduce your programming skills.

PHP incorporated in HTML, for example, will cause developers to mess up the error handling procedure. When writing PHP code, the developer came upon a bug. Because they must identify PHP errors in HTML, this error time is longer than for other languages.

2.2.2. JAVA

❖ Overview

In 1995, Java was released as a high-level programming language. Java is also known as Java coffee since it is named after an Indonesian island that was the first to grow coffee. Java can operate on a variety of platforms, including Windows, Mac OS X, and various UNIX versions. Java SE 8v is the most recent version of Java Standard Edition.

❖ Advantages and disadvantages of JAVA

Advantages of JAVA

- Object-Oriented Programming (OOP): Java is a programming language that allows you to develop modular programs and reuse code in order to maintain your system scalable and flexible.
- APIs for different activities such as database connectivity, networking, I/O, XML parsing, utilities, and more are available in Java.
- A robust open source tool that is rapidly evolving.
- The world's largest community is behind you.

Disadvantages of JAVA

- In comparison to C++, the Java compiler is not highly optimized.
- In implementation, there is no specification separation.
- With Java, memory management is fairly costly.
- Java's capacity to generate high-quality data structures may be limited due to a lack of templates.
- Some flaws can be found in the browser and sample apps.

2.3. Database

2.3.1. PostgreSQL

❖ Overview

PostgreSQL is an object-relational database management system (DBMS) in which the user defines the objects. Table techniques are also used to create more complicated data structures. It is still entirely free and open source. As a result, it's compatible with a variety of systems, including Microsoft, iOS, Android, and others.

❖ Advantages and disadvantages of PostgreSQL

Advantages of PostgreSQL

- Scalability in the vertical direction
- Custom data types are supported.
- Third-party tools that are simple to incorporate
- Community-driven and open-source

Disadvantages of PostgreSQL

- Documentation that is inconsistent
- Instruments for reporting and auditing are lacking.

2.3.2. MySQL

❖ Overview

Oracle Corporation created, distributed, and supported MySQL is a popular open source relational database management system (RDBMS). MySQL saves archive data in tables and accesses the database using SQL (structured query language). (2019, Altexsoft). MySQL is also a component of the LAMP (Linux, Apache, MySQL, and Perl / PHP) stack. That means it's ideal for PHP, Linux, and Apache programmers. Indeed, I frequently utilize MySQL when developing a PHP application. It is extremely efficient and provides excellent query performance.

❖ Advantages and disadvantages of MySQL

Advantages of MySQL

The first benefit of MySQL is that it is completely free to set up. It's one of the most beginner-friendly devices. It includes a minimal collection of tools for personal use and modest project maintenance. Users can, however, pay a price to access MySQL's more advanced features.

Second, because of its simple syntax and low complexity, MySQL makes it incredibly simple for developers to construct and query databases. A developer, for example, can complete most operations directly from the console command line. Furthermore, when MySQL is utilized in

conjunction with the PHP programming language, developers will be able to efficiently query data structures for display on web pages.

Finally, there's a lot of cloud compatibility. MySQL is supported by the most major cloud providers, including Amazon, Microsoft, and others. MySQL is very scalable and compatible as a result of this. MySQL can be used and upgraded as needed by developers to support their databases. When developing a tiny e-commerce application, for example. MySQL is available in a free version for developers. When the application matures and requires a considerable amount of database storage, the developer will move from the free to the paid version, gaining access to a plethora of additional capabilities.

Disadvantages of MySQL

Although SQL is free, it is only partially open source. Developers and enterprises using MySQL, on the other hand, must pay if they wish to use sophisticated capabilities or store significant volumes of data. When developing a tiny e-commerce application, for example. MySQL is available in a free version for developers. However, if the program grows and requires a big quantity of database storage, the developer will need to switch from the free to the commercial edition to gain access to many other capabilities.

Challenges with scalability MySQL allows developers to grow their database in many ways, but it takes a lot more effort and time than a NoSQL database. The SQL structured query language has this issue as well.

2.4. Source code

2.4.1. GitHub

❖ Overview

GitHub version 3.1 is a tool for storing and maintaining the CiLi Decor online project's source code. CiLi Decor website developers can easily communicate with Visual Studio code using GitHub. After successful integration, developers can instantly save the entire source code to GitHub's online

storage. This ensures that the project code is always up to date and saved in a secure location when in "Private" mode.

❖ **Advantages and disadvantages of GitHub**

Advantages of GitHub

- The service is free, although it also has paid services.
- Very fast search in the repos structure.
- Large community and easy to find help.
- It provides practical tools for collaboration and integrates well with Git.
- Integrates easily with other third-party services.
- It also works with TFS, HG and SVN.

Disadvantages of GitHub

It's not completely open.

It has a capacity limit, as you cannot exceed 100MB in a single file, while the capacity is limited to 1GB in the free version.

2.4.2. GitLab

❖ **Overview**

GitLab is a DevOps platform that helps businesses boost their overall return on software development by allowing them to deploy software more rapidly and efficiently while simultaneously enhancing security and compliance. Every team in your company may use GitLab to collaborate on software planning, development, security, and deployment to improve business outcomes while retaining complete transparency, consistency, and traceability.

❖ **Advantages and disadvantages of GitLab**

Advantages of GitHub

- The free plan has no limits, although it does have a paid plan.
- This is an open source license.
- Allows self-hosting on any plan.
- It is very well integrated with Git.

Disadvantages of GitHub

- Its interface may be slightly slower than the competition.
- There are several common problems with repositories.

3. Review of Software Development Methodologies

3.1. Waterfall model

❖ Overview

One of the early SDCL models is the waterfall model. It was erected and developed in stages, one after the other. The latter stage is only done after the preceding stage has completed, and it is extremely difficult to return to the prior stages if there is a change request. Requirements analysis, design, implementation, testing, deployment, and maintenance are the phases of a waterfall project.

❖ Advantages and disadvantages of Waterfall model

Advantages of Waterfall model

The benefit of waterfall development is that papers are created at each stage, allowing progress to be tracked against the development plan. This makes the process visible, making it easier for project managers to oversee their projects. (Sommerville, 2011, p49). Another benefit of the waterfall approach is that the needs are set before the program begins. By starting with the appropriate plan from the start, you can ensure the project's duration and cost, avoid bad performance, and restrict modifications to requirements as the project progresses.

Disadvantages of Waterfall model

The reaction to changing customer needs during the development process is a disadvantage of the waterfall paradigm. At the start of the procedure, commitments must be made. (Sommerville, 2011, p49). Because the test is performed afterwards, risk reduction techniques and methods are extremely difficult to plan. The disadvantage is that designing and completing the system proposal before beginning programming takes a lengthy time during the analysis phase. The waterfall model's flexibility and any time fluctuation in one phase will have a significant impact on the entire process, and it is difficult to go back to a previous stage to correct errors or mistakes. Furthermore, client deliverables are frequently a poor communication method. As a result, the project may be neglected.

3.2. Spiral model

❖ Overview

The spiral model, which supports risk management, is one of the most essential software development lifecycle models. Each phase of the software development process is represented by a loop in the spiral loop. The innermost loop outlines the system's feasibility, the following loop handles the request's definition and definition, and the loop proceeds to develop the system. Each cycle is followed by an evaluation that includes all items generated in the previous cycle as well as plans for the following cycle. (Sommerville, 2011, p66).

❖ Advantages and disadvantages of Spiral model

Advantages of Spiral model

Benefits of the spiral model: The spiral model is the optimum development model for projects that have not yet identified risks. When a project is divided down into several segments, risk management becomes easier, and the risk may be developed sooner, reducing management challenges

Disadvantages of Spiral model

Disadvantages of the spiral model: The risk analysis phase is a vital stage of the system because it determines the system's next moves. Risk analysis leads to recommended software changes and

project concerns such as over-budgeting and over-scheduling, so risk mitigation is a critical aspect of project management.

3.3. Agile model

❖ Overview

Agile is a flexible software development methodology that aims to get products into consumers' hands as soon as feasible. Scrum, crystal, extreme programming (XP), and feature-driven development are just a few examples of agile development methods (FDD).

"In a recent survey, more than 52 percent of respondents claimed that their organization employs Agile development in some form or another," according to (QA, 2016). And, according to (Google, 2020), the Agile model is one of the most popular now (with over a million views and searches). It goes well beyond classic models such as waterfall and spiral mode. According to statistics, the Agile Model is one of the approaches that many firms and organizations are progressively adopting.

❖ Advantages and disadvantages of Agile model

Advantages of Agile model

Agile development has the benefit of allowing software to be updated on a regular basis. Repeated releases increase efficiency by allowing teams to quickly identify and repair bugs, as well as change expectations. They also enable customers to reap the benefits of the software sooner, thanks to frequent updates. Furthermore, the Agile approach allows for constant engagement between clients, developers, and testers throughout the product development process, and weekly distributed work allows developers to track the speed and completion of their assigned tasks.

Disadvantages of Agile model

Because agile development is based on real-time communication, new users frequently lack the documentation they require to keep up. They necessitate a significant amount of time and effort from the user because developers must fully complete each feature in each iteration for user approval. If the client representatives are unsure of the end outcome they seek, projects might quickly go astray.

Only advanced programmers are capable of making the kind of decisions required during the development process. As a result, novice programmers are not welcome unless they are paired with experienced resources.

4. Choosing Solutions

4.1. Web Technologies

4.1.1. Program Language Front-end

Furniture sales website CiLi Decor has chosen **Bootstrap** and **JQuery** as the most popular **CSS** frameworks for implementing interface code, for a number of reasons:

About Bootstrap

- Bootstrap is a well-known CSS framework that makes it simple to create a Responsive website. As a web developer, I use Bootstrap to create websites. It can assist me in swiftly creating my interface with less effort.
- Bootstrap has always been separated into 12 adaptable, responsive columns, and the built-in design options in Bootstrap are always beneficial to website speed. Bootstrap adaptations make it simple for me to create views for various devices.
- Bootstrap allows a website to be seen on any device without compromising its quality or content, such as a smartphone, laptop, tablet, or other computer.
- Bootstrap satisfies all of the standards for responsive design.

About JQuery

- JQuery is an open source JavaScript library, so it has a very large and rich resource along with a large and abundant human resource, so during the project implementation, all errors arise. birth, hard-to-solve cases have quick help from the JQuery community.
- The CiLi Decor website's UI logic will be significantly more agile and efficient thanks to the combination of JQuery and Bootstrap.
- JQuery allows me to limit the redirect to a different page in order to complete the task. JQuery may be used to do any action on a web page.

- JQuery provides a lot of assistance for animation and website layout design; the finest example is the CiLi Decor website, which is a commerce website.
- JQuery can produce gallery photos of furniture pieces using techniques like favoritebox(). To execute pagination and lookup tables that hold data, use DataTable().

About my own experience

- I have studied and worked on bootstrap projects, so I feel more confident applying this technology to my final project.
- I usually search things on the internet so when choosing such popular languages I feel very safe.
- The most popular frameworks used by most developers nowadays are Bootstrap and JQuery. As a result, I used Bootstrap and JQuery on this website project as a way to acquire more knowledge with them.

All the above reasons have helped me choose Bootstrap and JQuery to build and develop a website selling furniture CiLi Decor.

4.1.2. Program Language Back-end

Furniture sales website CiLi Decor has chosen PHP for implementing back-end code, for a number of reasons:

- PHP is a very popular language today, projects have applied this language a lot so this is also a reason why I feel safe to choose this language. PHP has many useful libraries and has a large community so I can get help anytime thanks to the PHP community.
- PHP is a programming language that facilitates creating websites faster and easier than any other language due to its unique attribute of being built exclusively for website development.
- Because PHP is totally cross-platform compatible, the project of constructing and developing a sales website must be compatible with a wide range of browsers and devices.
- PHP is a versatile programming language that programmers may use to quickly develop websites by combining it with additional frameworks such as JQuery and Bootstrap. PHP

may also be used in conjunction with MySQL. It functions as a database connection module as well as a database query in a simple and efficient manner.

- During my time studying subjects at school, I also did some PHP projects, so choosing PHP was the most suitable choice.

4.1.3. Database

Furniture sales website CiLi Decor has chosen MySQL as the database for the following reasons:

- MySQL makes it simple for CiLi Decor website developers to construct and develop databases.
- Because MySQL has a simple syntax and a low level of complexity, establishing and creating a database for a website is considerably easier than with other databases.
- MySQL is absolutely free, and I can use "PHP My Admin" to simply manage and install MySQL databases, so it's a great tool to have and incorporate into the CiLi Decor project.
- Developers will be able to quickly query structured data for display on web pages using MySQL and the PHP programming language.
- MySQL will have no problems as the site continues to grow.

4.1.4. Source code

Furniture sales website CiLi Decor has chosen Github to store and manage code for the following reasons:

The CiLi Decor furniture sales website project, after building and developing the code, is pushed to github and stored and managed here. Using github has many advantages for the code development of the CiLi Decor website because it integrates with Visual Studio Code as discussed above (section 1.1.1). The management on github is also highly appreciated github supports all the actions of the programmer during source code checking such as diff, merge source, check modifications, show history, ... In addition, while building Building and developing CiLi Decor website, developers can learn from other developers' experience from commit histories using social networking features like network graph, feeds and followers.

4.2. Software Development Methodologies

The project of building and developing an internal sales website saw that CiLi Decor chose the Agile software development model to implement the project. Following are the hypotheses and reasons for choosing the Agile model to implement the project.

There are two hypotheses put forward as follows:

- "Project completed in 5 months."
- "The project is made personal."

Reasons for choosing Agile software development model for project implementation:

Agile helps to complete projects faster than other software development models.

When starting to use agile, the developer will have to organize the entire requirements of the project into a list called user stories then from the user story start to break it down into sprints with different implementation times. to match the project completion time. So the programmer can identify the things to do in the most clear way. In addition, after each sprint, the programmer can always see how quickly his product is completed and always neat. Moreover, when applying Agile, programmers must apply the rules of arranging work in order of priority for important tasks and affecting other jobs to be done first. This makes all the work of a website developer organized and ready to go. Therefore, the project was completed very quickly and in a short time.

Agile brings higher efficiency than other models when applied to the CiLi Decor website building project.

When using the Agile model, all the work is done by individuals, so it makes sense to divide into sprints and tasks in sprints, after being a designer, then a programmer will move on. tester role to test and complete. Since then the work efficiency is higher than designing all the requirements and then doing it again from ddaaua and when there is a problem, come back to fix it.

Agile Scrum made it simple for me to deploy the CILI ecommerce website and increase its efficiency.

This is ensured by using Agile Scrum. A website developer can examine both the specifications and the project's execution. In actuality, there are no precise prerequisites for the seafood website project. Throughout the project's implementation, the Project Developer will understand and assess the requirements that will be applied to the project. As a result, while using the Agile Scrum approach. It will enable the project developer to divide the CILI ecommerce website requirements into sprints and update them as needed. A Spring backlog, in particular, is meant to incorporate key information such as tasks, user stories, task status, who is accountable for the work, and task length. It makes it simple for project implementers to get the work done swiftly.

All of those reasons have answered the above 2 hypotheses and are specific reasons to choose the agile model as the model for implementing the CiLi Decor sales website project.

III. Requirement Analysis

1. Similar application

According to the book "Software Requirements & Specifications: A Lexicon of Practice, Principles, and Prejudices" by author Michael Jackson, Michael James Jackson published in 1995, according to which the requirements specification is a description of the development of the system. software to make functional and non-functional requirements, in addition, there are use cases to describe the interaction between customers and users in the most clear and understandable way. (Michael Jackson, 1995)

According to the project proposal, The e-commerce website project - CiLi Decor furniture sale is built and developed with sufficient features to bring users the best experience. To do that, as a software developer, this project had a clear set of functional and non-functional requirements to ensure the best completion of the project.

The website selling furniture CiLi Decor is built and developed based on a number of current e-commerce websites.

1.1. Similar application 1 (dongsuh.vn)

Website dongsuh.vn is a popular decoration website in Vietnam. In general, in terms of interface, the website is designed to be simple in terms of colors and functions, but also makes it easy for users to use and less confusing, highlighting the product. The speed of the website is quite fast. This is a website that has a lot of users at the same time but the problem is very stable. Websites like dongsuh about furniture are trending these days.

In terms of functions, the functions in the website are all common functions of today's sales websites, meeting the basic needs of users, such as product search function, chat function. with customers, shopping cart function,...

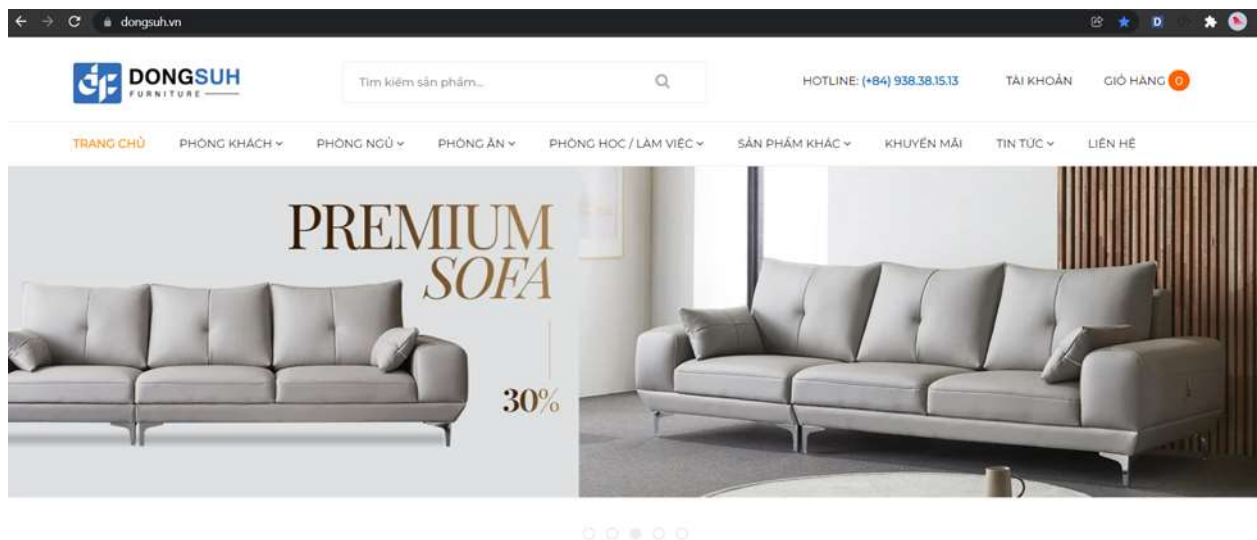


Figure 3. Dongsuh

1.2. Similar application 2 (homeoffice.com.vn)

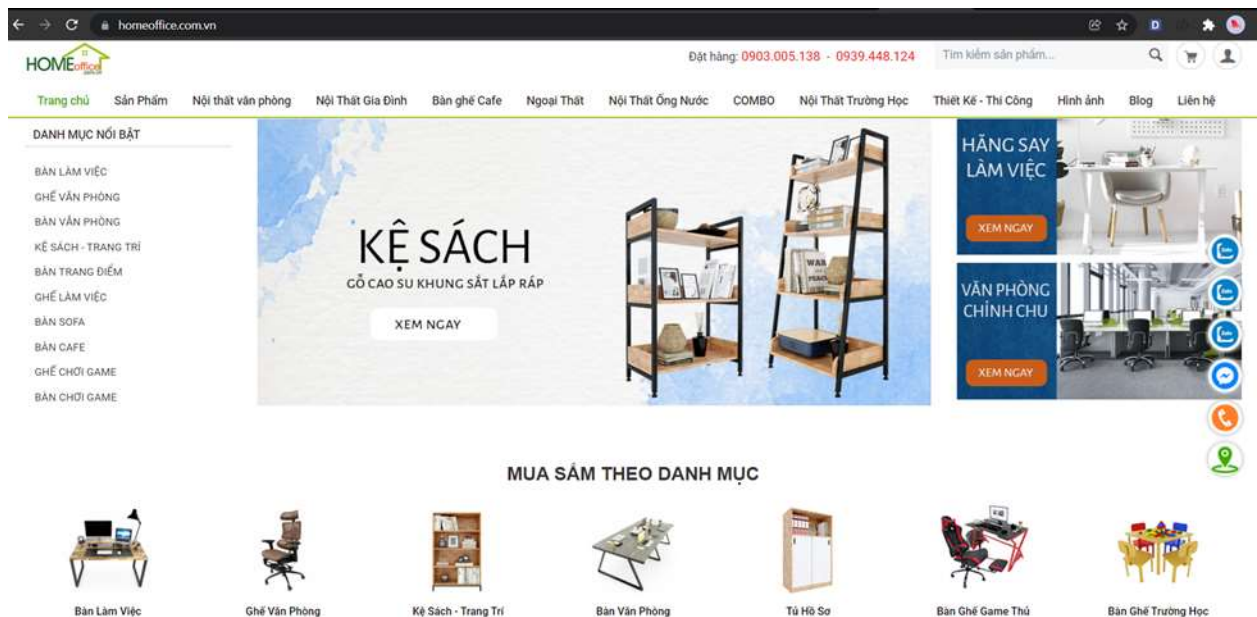


Figure 4. Homeoffice

The homeoffice.com.vn website also belongs to the same e-commerce websites that sell furniture as dongsuh, but in general, each website gives users a different experience in terms of interface, functionality as well as products. displayed on the page, however, the user interface of homeoffice.com.vn goes in a more classic direction because of the arrangement of menus quite a lot. In terms of speed and security, homeoffice is a working website with a pretty good and stable user experience.

This is also a website that modern to develop in terms of functionality and improve the interface according to a more trend with new functions that is the chatbox itself sends default messages to the user, for example, questions. .. the blogs function helps users to collect some necessary information and articles about furniture,...Other features are very familiar to users.

2. Analysis functional requirement.

From two e-commerce websites selling furniture, homeoffice and dongsuh, the CiLi Decor website project also developed from the functions and operation of the two websites above, which have certain similarities, in addition. There are also new features. This CiLi Decor project mainly focuses

on two user objects, customers and administrators, which are functional and non-functional listed below.

2.1. For customers

Good user navigation

User navigation is a very important component for a sales website so furniture selling website CiLi Decor has tried to make navigating the customers as easy as possible. For example, customers can easily see the products of the website and easily chat with the system.

Featured search bar

When entering a website to search for a product, the user's psychology often wants to find the search bar as quickly as possible to find the product they need, so the search bar should be prominently designed so that users can easily find it. interact with the sales system as easily as possible.

Shopping cart

Nowadays, all sales websites have shopping cart functionality. It helps users to select their favorite items into a folder so they can review them later to determine whether to purchase or not, or they may have a problem and have not bought the product and will return. after. This feature also contributes to increase the store's revenue.

Diversity product classification

Product classification is similar to customer classification. Customers who need to buy products with what characteristics will look for in those product categories, this is very convenient and saves customers time.

Animated pictures and videos

Customers are usually mainly attracted to websites with outstanding, professional interfaces, especially sales websites, images and videos must be paid more attention to to provide a good user experience as well as good customer service. customers' trust in their products

Diverse types of payment and shipping

Currently, many websites have applied online payment via e-wallets and banks. This is a convenient form of shopping that is popular because it is very quick and easy. The form of transportation is also simpler than before.

See the news blog and comment with everyone

This is an information page to bring users news or experiences from system administrators to help people understand more about the CiLi Decor sales website.

2.2. For administrator

Admin in the website is the person who manages and operates everything related to the website, so the admin in the website selling CiLi Decor furniture will have the following functions:

Customer management

All sales websites are required to have this feature because the admin will have to be the one to control everything from the users in the system.

Product Management

Admin will manage all the products displayed on the website to add, edit and delete them easily.

Content Management

Manage all information and content on the website, including weekly and daily blog posts to exchange with customers.

Manage message content

When a customer chats with the system, the admin is the person responsible for communicating with the customer and managing that message store.

3. Analysis non-functional requirement

All complete web pages fulfill 2 main types of requirements namely functional requirements and non-functional requirements. Both of these requirements are equally important in a website.

Non-functional requirements directly affect the user because it makes the interaction between the user and the system closer, the non-functional requirements in the website include:

Performance: This is an important factor to increase user experience. Because a website that runs quickly through each click will leave a very good impression in the eyes of users and customers will not have to spend too much time waiting.

Security: When customers register personal information to log in to access the system, the system is responsible for ensuring the security of customer information, avoiding cases where passwords and personal information are revealed.

Usability: The website always tries to be as error-free as possible when put into use.

Scalability: After a problem-free deployment, the system collects customer feedback to develop the right features, so the website needs to make sure it doesn't happen. What's the problem when updating more.

IV. Design

1. Architecture

To develop a website selling furniture CiLi Decor, the software developer used PHP, Java Script, HTML and Bootstrap to develop the website to meet the needs of the users. use.

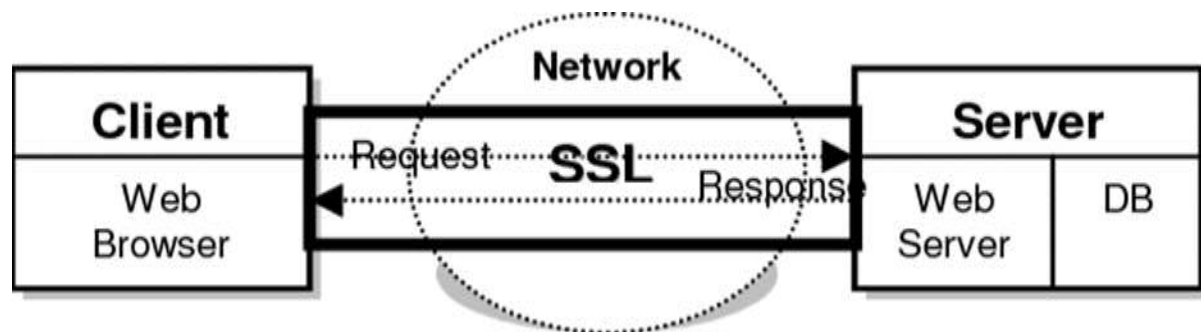


Figure 5. Architecture

Applying the project's architecture is a very important thing when developing because without applying the architecture, the project will be very difficult to control, in terms of functions, requirements and especially the code development process does not follow a certain pattern.

Which architectural process makes control very difficult. Therefore, applying the project's architecture makes it easy for developers to find all aspects of the software, the process is strict, every time a problem occurs, it is easy to check and control the problem. and quick adjustment.

2. Use case

2.1. Customer

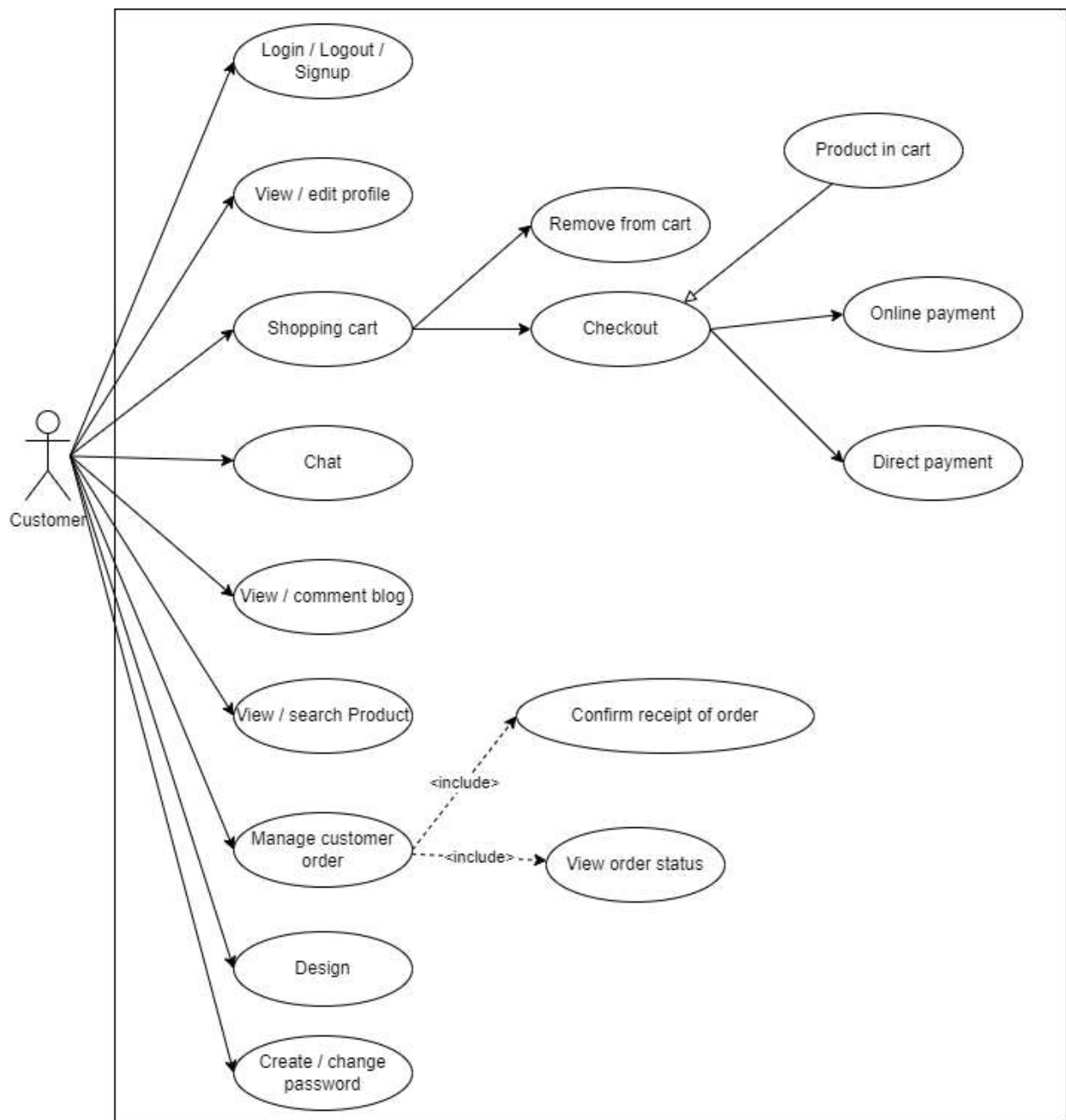


Figure 6. Use case of Customer

The customer functions are described by the use case above and are summarized and explained in the table below.

No.	Function	Description
1	Login / Logout / Signup (Login with Google)	When accessing the website, customers need to log in to make a purchase and after completing can log out, in addition, customers can log in with google which will be faster.
2	Create / change password	Change password: create new password, forget password, password will be sent to customer's email when customer forgets or reveals password
3	View / Edit profile	Customers can view their personal information details after registration and can correct it if they want to add or change certain information.
4	Shopping cart	Customers can choose their favorite products into the shopping cart, from which they can store product information, can pay to buy products and if they are not suitable, they can remove them from the cart.
5	Chat	Customers can communicate with the website system via text message to get the fastest information about the product
6	View / Comment Blog	Customers can view and read the articles that the system has uploaded to the website's Blog to understand more about the interior as well as the decoration of their space.
7	View / Search product	Customers can view and search for products according to their needs

8	Manage customer order	Customers can know what products they have purchased, how to pay, ...
9	Design	Customers can design their own space

Table 1. Description Use case

2.2. Administrator

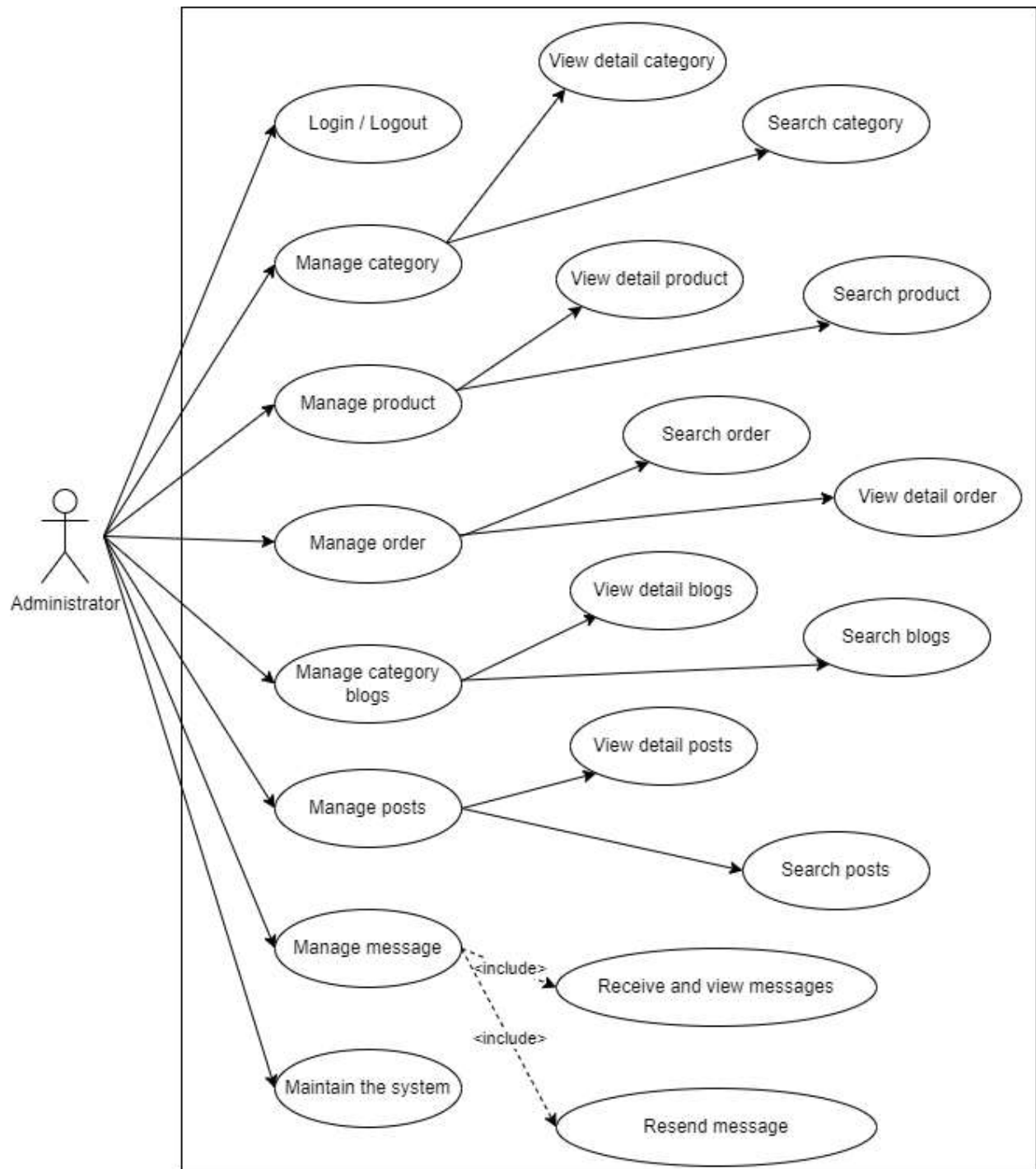


Figure 7. Use case of Administrator

The administrator functions are described by the use case above and are summarized and explained in the table below.

No.	Function	Description
1	Login / Logout	The administrator functions are by the use case above and are described and explained in the table below.
2	Manage category	Admin can login and log out to access admin rights to the system.
3	Manage products	Admin can manage furniture product categories, add, edit, delete, search, view product details.
4	Manage orders	Admin can manage all furniture products, add, edit, delete, search, view product details.
5	Manage category blogs	Admin can manage customers who have purchased furniture products, edit, delete, search, view details of purchased products and prices.
6	Manage posts	Admin can manage blog post categories, add, edit, delete, search, view details of article categories.
7	Manage messages	Admin can manage blog posts, add, edit, delete, search, view details of articles.

Figure 8. Description Use case

3. Sitemap

3.1. Customer

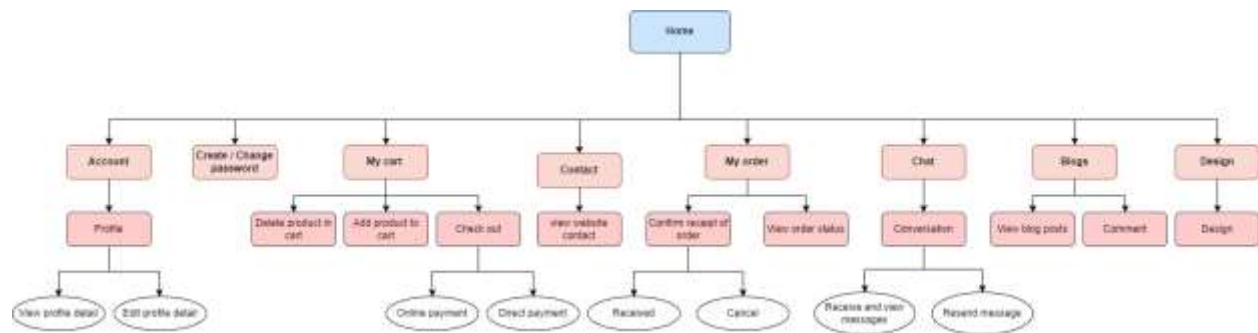


Figure 9. Sitemap of Customer

The customer sitemap showed all of the site's navigation to customer functions. The navigation includes: Customer account, shopping cart, customer orders, exchange customer contact, view website contact information, design, payment methods when purchasing, ... are clearly shown in the diagram above.

3.2. Administrator

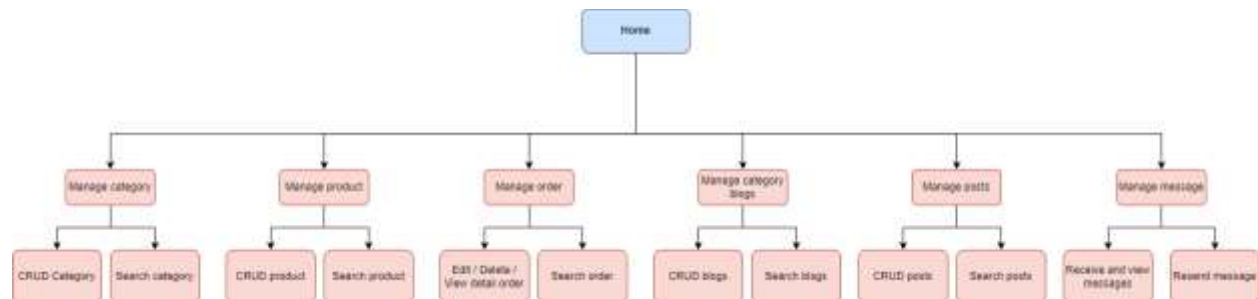


Figure 10. Sitemap of Administrator

The administrator sitemap showed all of the site's navigation to customer functions. The navigation includes: The function of managing customers who have purchased, managing product categories, managing all products, managing categories of articles, managing articles uploaded on the website, managing conversation between the user and the system.

4. Database

Database is used to store all data of CiLi Decoration website. That why, database design is one of the most important things in the process of implementing Cili Decoration website. A good and easily maintainable database makes it easy for websites and developers to develop new features.

Therefore, the Developer needs to follow the steps to follow the principles of database design. In which, the first step of the database design process is to define the database scope.

4.1. Database Scope

There are two main components defined in the scope of the CILI Decoration website database as core functionality and additional functionality. In which, the core functions are the functions that the system is required to store, the additional functions are required to help the user to improve the experience of using the CILI ecommerce website.

No	Scope	Description function
1	Core functionality	Manage User Manage products by category Shopping cart
2	Additional functionality	Chat box Blogs Reviews

Table 2. Sope of database

The above table is the information that the database needs to store. Based on the scope above. The CiLi Decoration website developer needs to define the logical design of database.

4.2. Logical design

According to (Laender, 2009) “Logical database design is the process of converting a conceptual schema into the underlying data model for a DBMS”. Based on the design principle of Top-down database design, After determining the conceptual model. The CILI Decoration website developer conducts the identification of database entities and properties as the foundation for the design of the relationship and the physical database. (Laender, 2009)

4.3. Identity entities and attributes of CILI Decoration website

The Database of the Decoration website has 16 entities, they are designed and defined in **Appendix 1**. Each entity and attribute is named according to its meaning so that it is easy for developers to use and develop the website.

4.4. Data normalization

According to (Jayaram, 2018). “Applying database normalization makes stored data cleaner, less memory intensive, and more professional”. Applying database normalization makes stored data cleaner, less memory intensive, and more professional. There are three commonly used standardizations: 1NF, 2NF and 3NF. Applying these 3 standardization makes the Cili Decoration website's database more visible and usable. The data standardization process is described in detail in **Appendix 2.** (Jayaram, 2018)

4.5. Design of Entity Relationship Diagram (ERD)

Below is the ERD image of the database. The ERD is designed based on the entities and attributes that were clearly defined from the previous step. A consistent logical data model will serve as a solid foundation for developers and physical infrastructure. The relationships between entities are explained in **Appendix 3.**

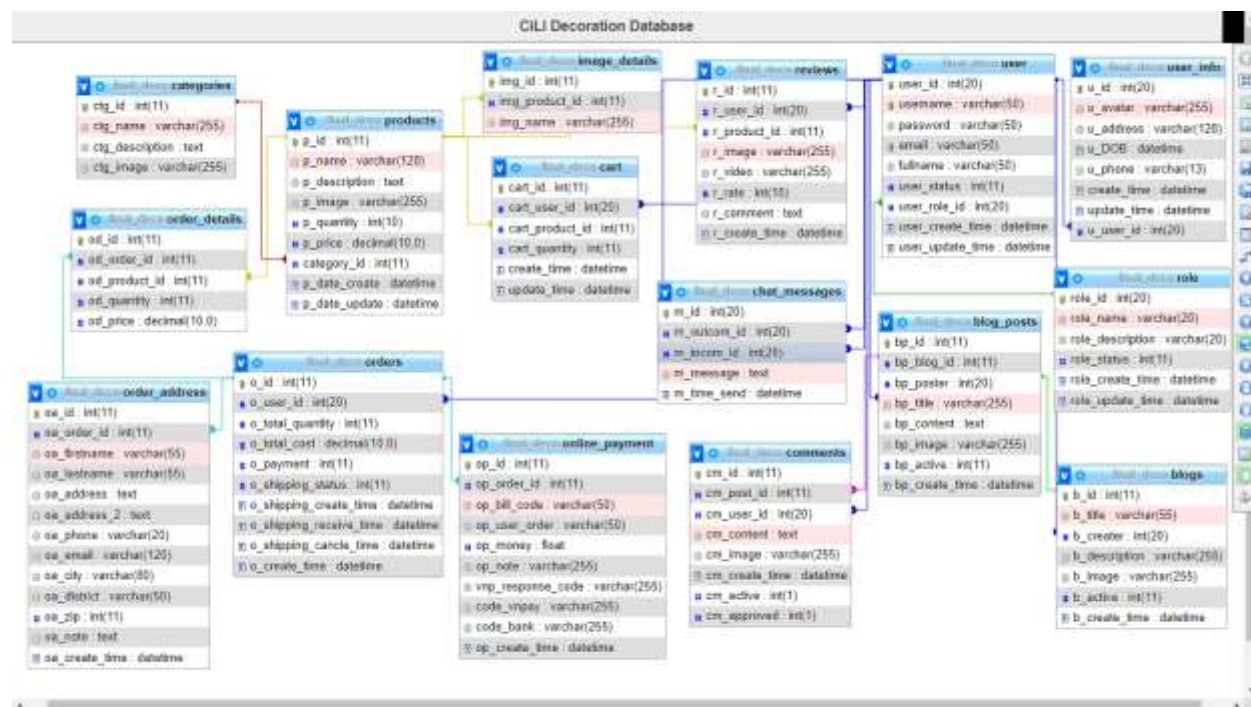


Figure 11. Design of Entity Relationship Diagram (ERD)

4.6. Physical Database

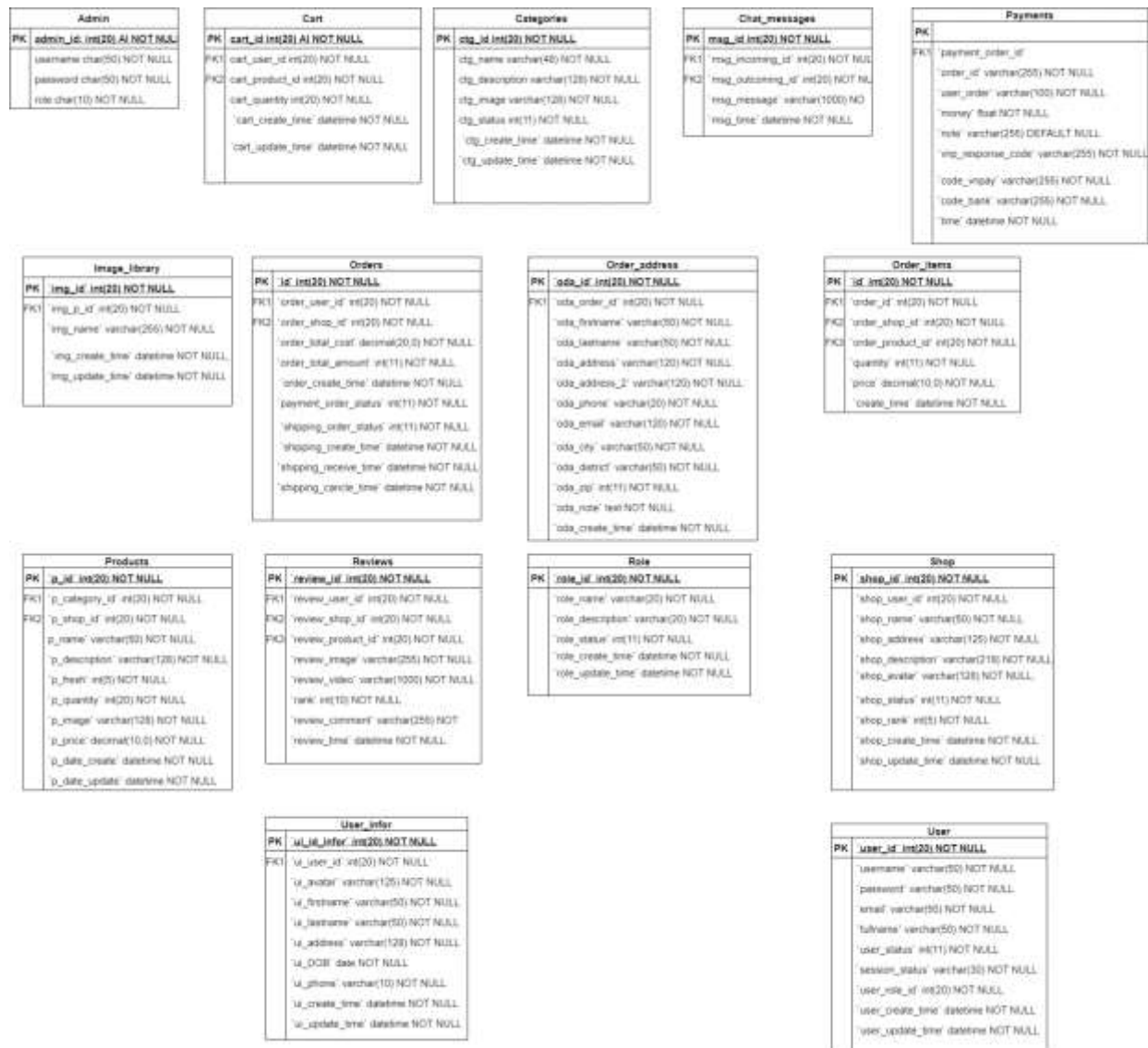


Figure 12. Physical Database

4.7. Core Functions of Database

4.7.1. Manage user

There are 3 tables to manage products by category including "user", "user_info", "role".

- "role" table is for the user rights section of the site.
- "user" table contains the necessary information of the user. required to login and access the website to make a purchase.

- "user_info" table contains additional information of the user to facilitate advertising and display the user's profile on the website.

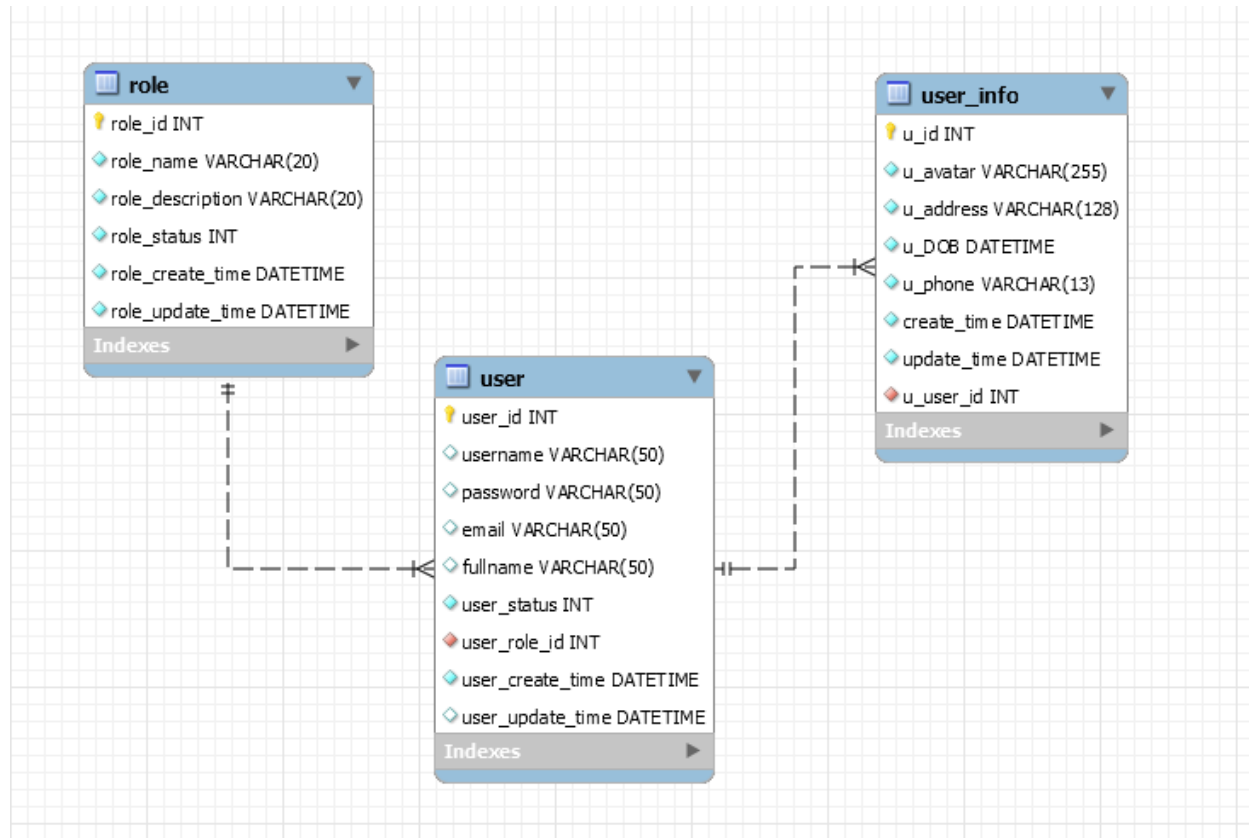


Figure 13. Manage user

4.7.2. Product management

There are 3 tables to manage products by category including "products", "categories", "image_details" tables.

- "categories" is a table that identifies the categories of products that the CILI Decoration website offers to customers.
- "products" is a table that stores information about products by category.
- "image_details" is the table that stores all additional images of the product.

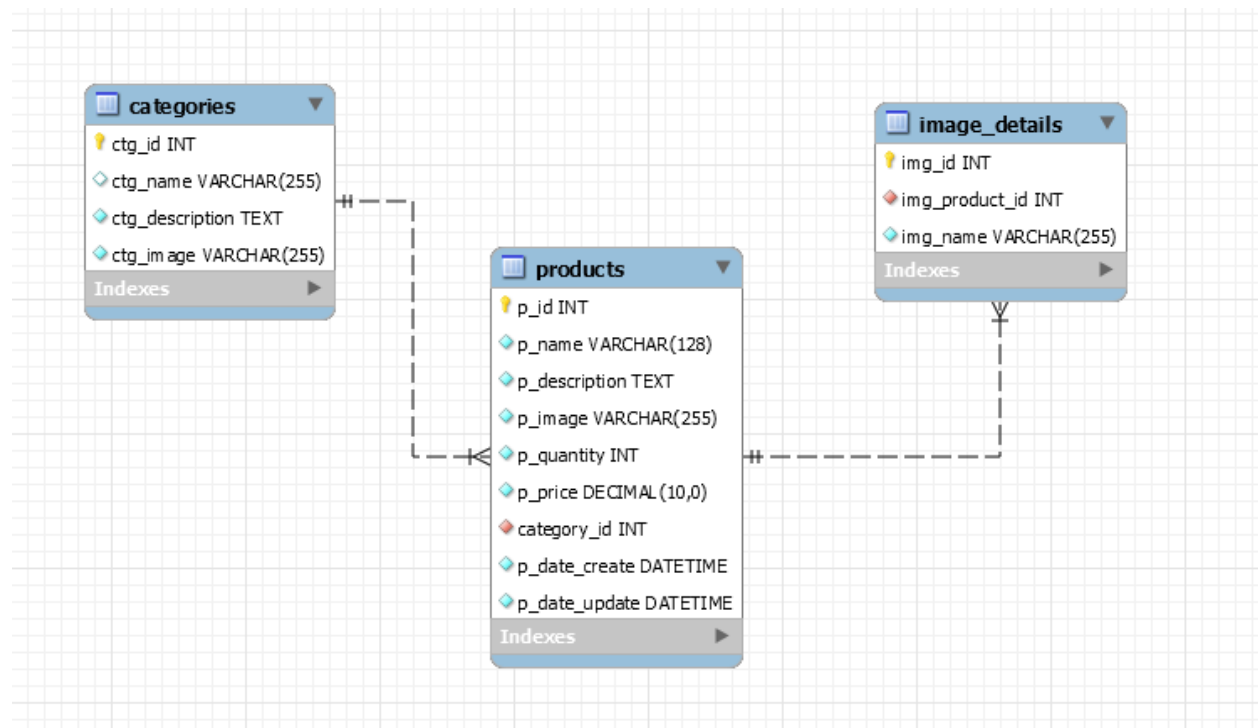


Figure 14. Product management

4.7.3. Shopping cart process

Shopping cart process is an important and core function of the system. Therefore, in the process of designing the database, the website developer has analyzed and considered carefully to choose tables as shown below to store information of the purchase process. In which,

- “cart” is a table storage place for the products that customers have added to their shopping cart.
- “order” table has a many-to-many relationship with the “products” table. This table is where the user's id is stored, and that customer's order id.
- “order_details” is a table created to solve the many-to-many relationship of the two tables “products” and “order”, the “order_details” table is where the product id and order id information is stored.
- “order_address” is a table that stores customer information about where to receive goods

- “online_payment” is a table that stores online order information when users place an order online

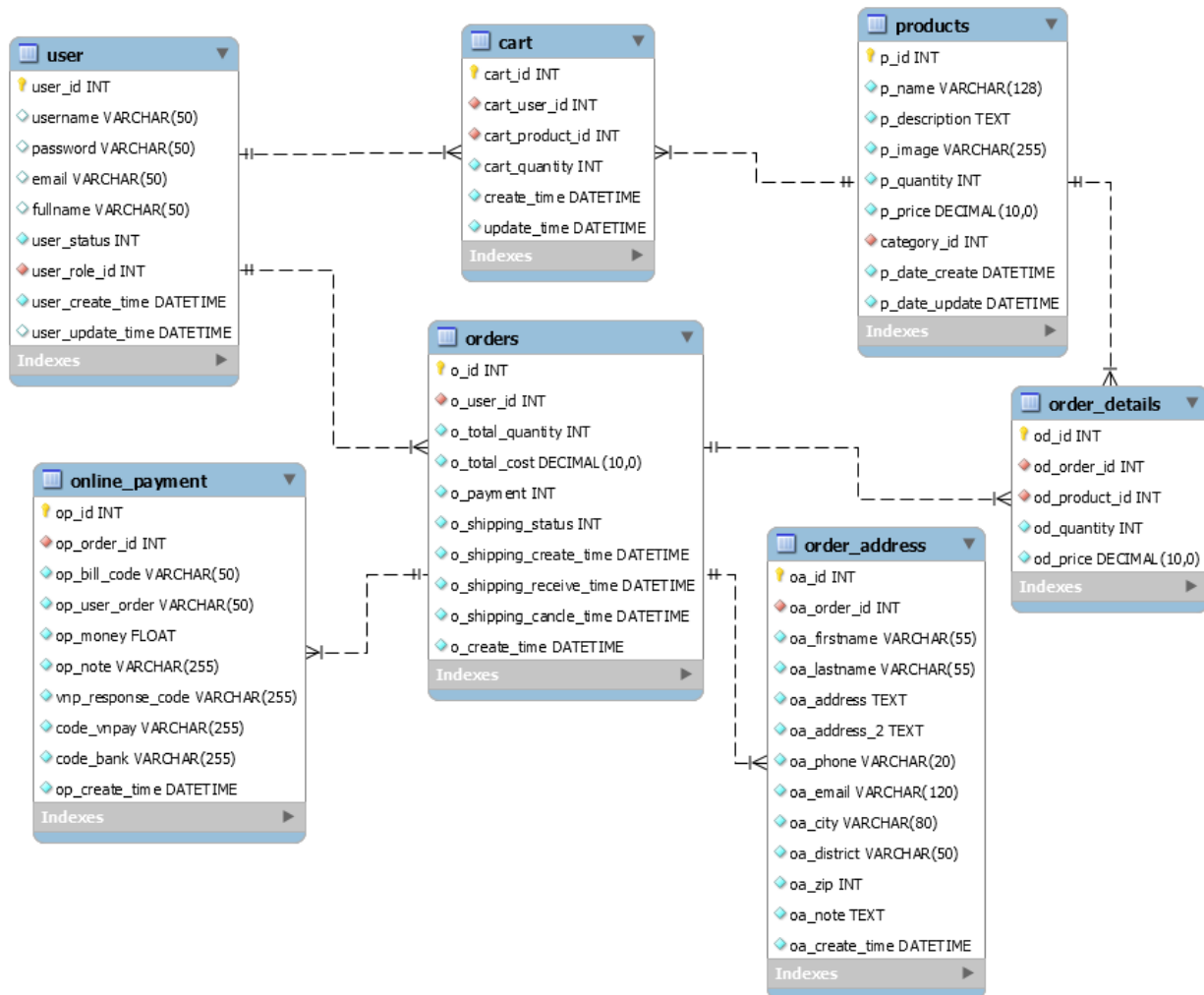


Figure 15. Shopping cart process

4.7.4. Additional functions of database

These additional function are designed to increase the user experience of the CiLI Decoration website, Below is the design of the database to store additional functions. Below is the database that stores the information of additional functions.

- “chat_messages” is table use to store customer and adminitrator conversations.

- “reviews” table is use to store user's product reviews information when they have successfully ordered and received that product
- “blogs” is a table that stores the types of blogs that will be included in the website such as:
"kitchen blogs, living room blogs
- “blog_post” is a table that stores posts by category blogs and write by adminitrator
- “comment” is a table that stores everyone's comments with posts admin posted to public

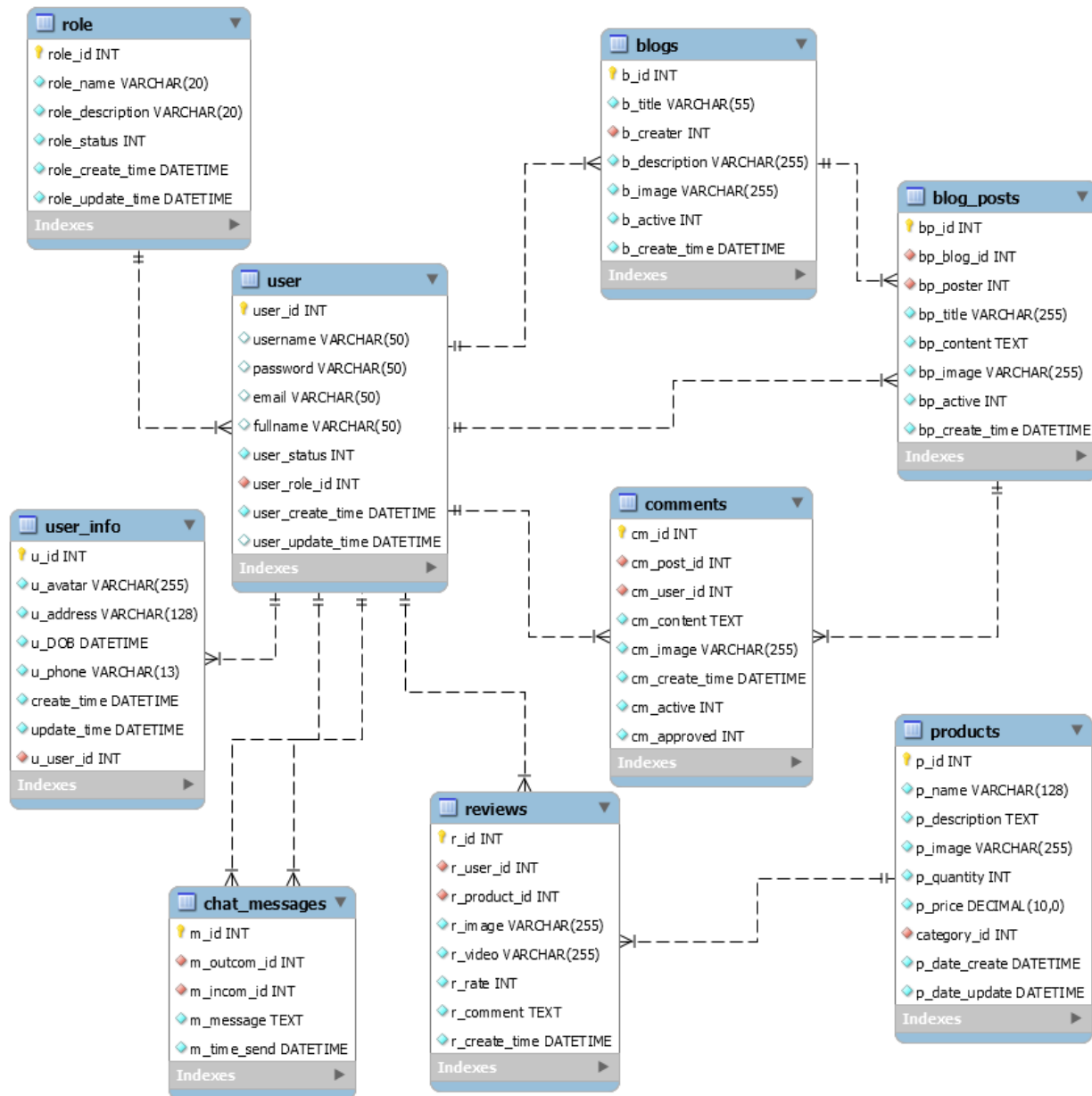


Figure 16. Additional functions of database

4.8. Summary

In general, The CILI Decoration website database has been completely designed based on a defined scope. Database design process has been done in sequence and rules to ensure that the database is completely clean and does not take up too much energy. The above designed database is a good condition for CILI Decoration website programmers to query information and return the results to the client.

5. Flow chart diagrams

5.1. Login and signup

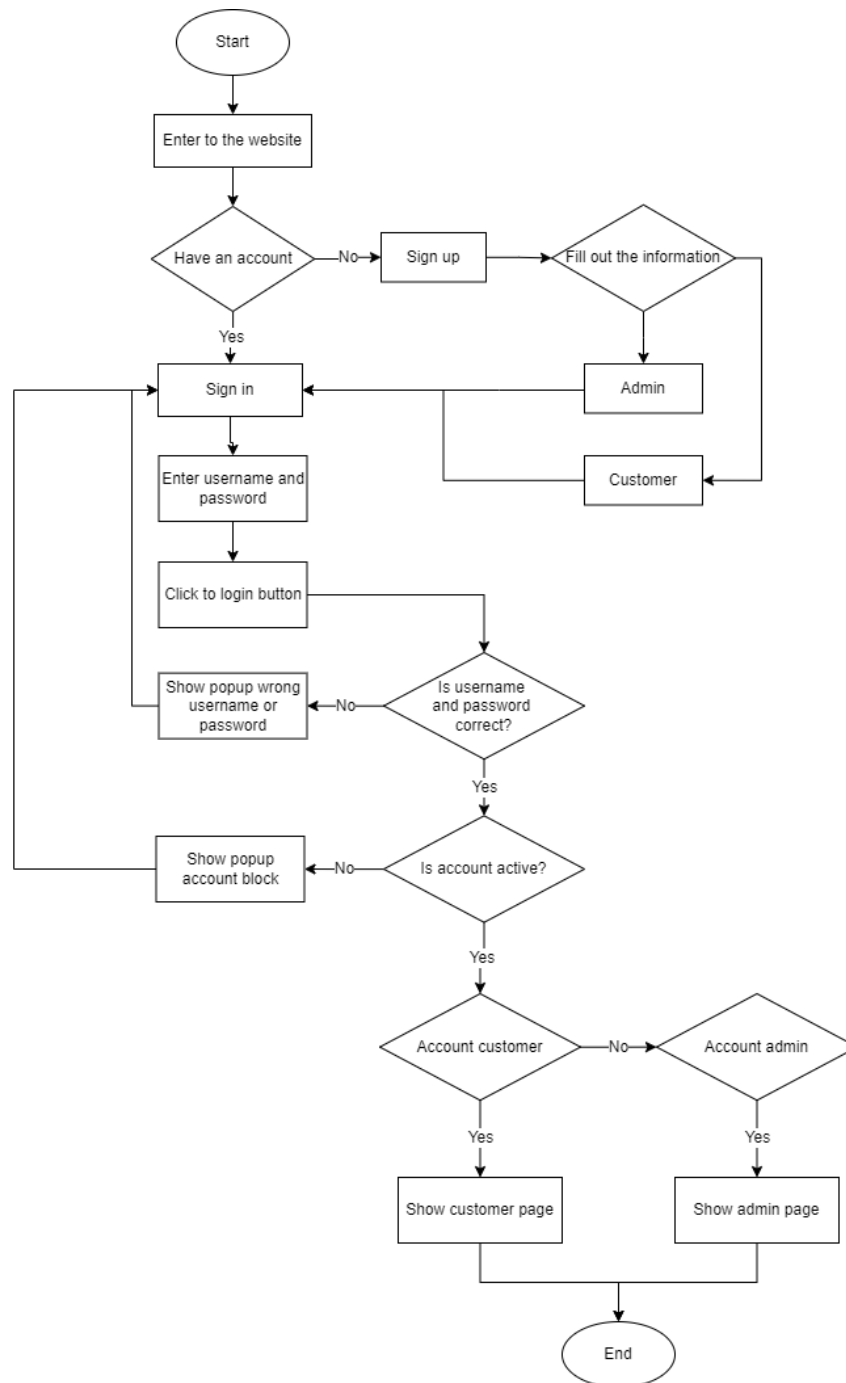


Figure 17. Flow chart of Login / Signup

According to the flowchat in the image above, this is the process of logging in and registering a user's account before accessing the website to buy products.

The process includes the following main contents:

- Step 1: If customers do not have an account, they will have to register for a new account to access and buy products of the website.
- Step 2: After you have an account, you will log in to the website, the system will check the permission of the login account. If the login account is an admin account, it will access the admin screen and if the login account is a customer, it will access the system's purchase page. In case the wrong username and password are entered, the system will give notices that the customer has entered wrongly and re-login.

5.2. Shopping cart

The customer's shopping process is shown in the flowchat in the figure below, including:

In case customers do not have an account, they can view all products but cannot add products to the cart. In order to be able to add products to the cart and make payments, customers need to log in first and if If you do not have an account to log in, you need to register and then log back in to continue.

In case the customer already has an account, the customer will follow the steps that are:

- Step 1: Find the products you want to buy and add them to your cart.
- Step 2: Go to the shopping cart to check the products just added, check the quantity, the characteristics and proceed to checkout.
- Step 3: Checkout, enter all details to confirm purchase then select payment method and finish.

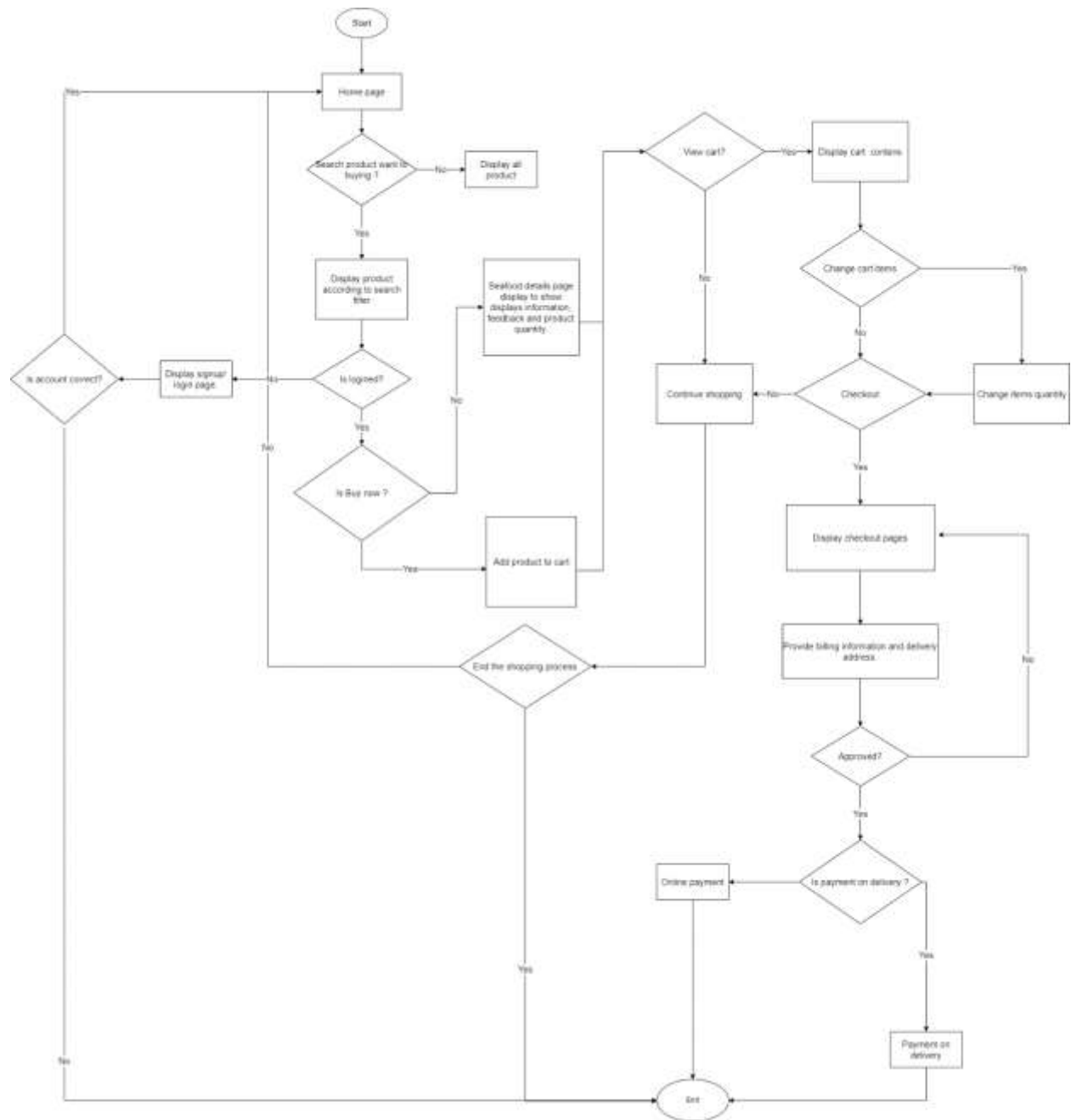


Figure 18. Flow chart of shopping cart

5.3. Chat

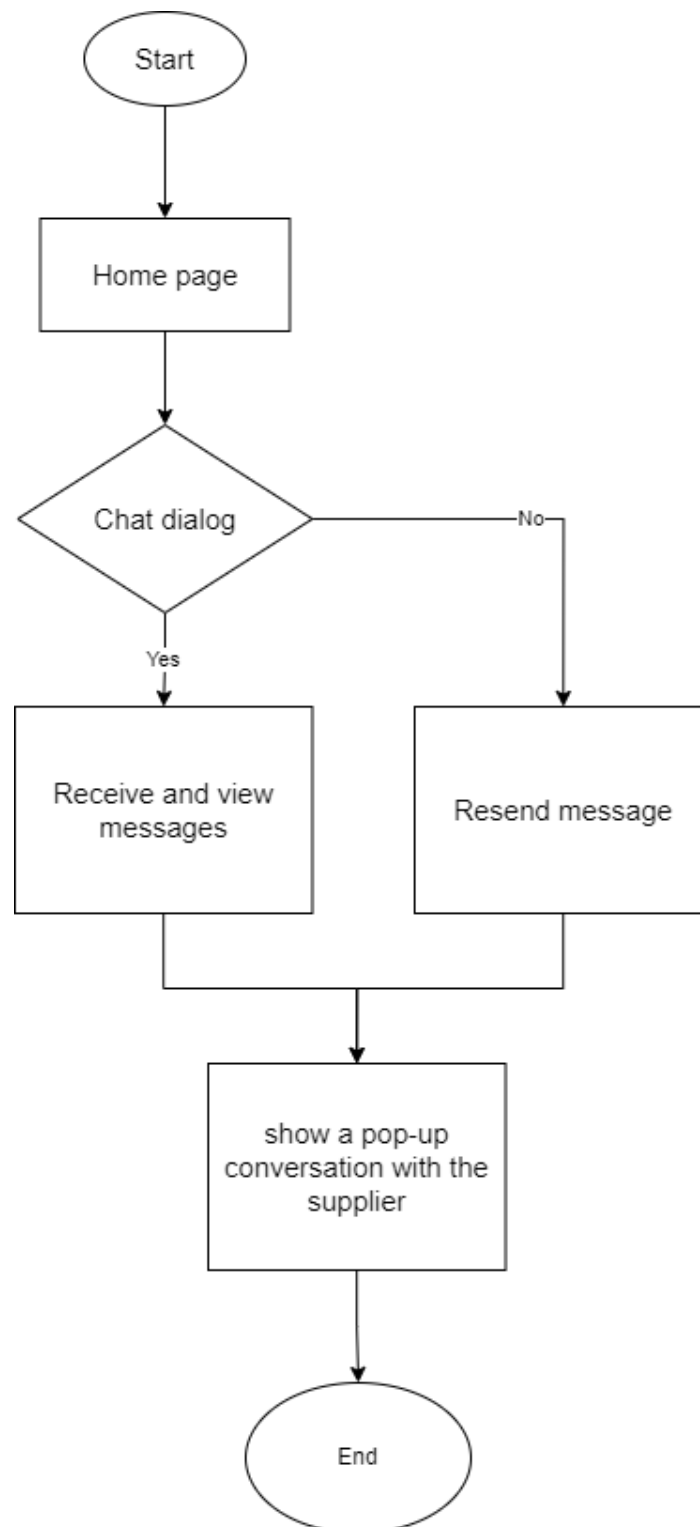


Figure 19. Flow chart of chat

The exchange process of the customer and the website is shown as shown above. When accessing the website, customers will see a chat dialog on the right, when clicking on the dialog box, the chat box opens, customers can check new incoming messages and read messages, send messages back to them. website for support and information exchange.

5.4. Blogs

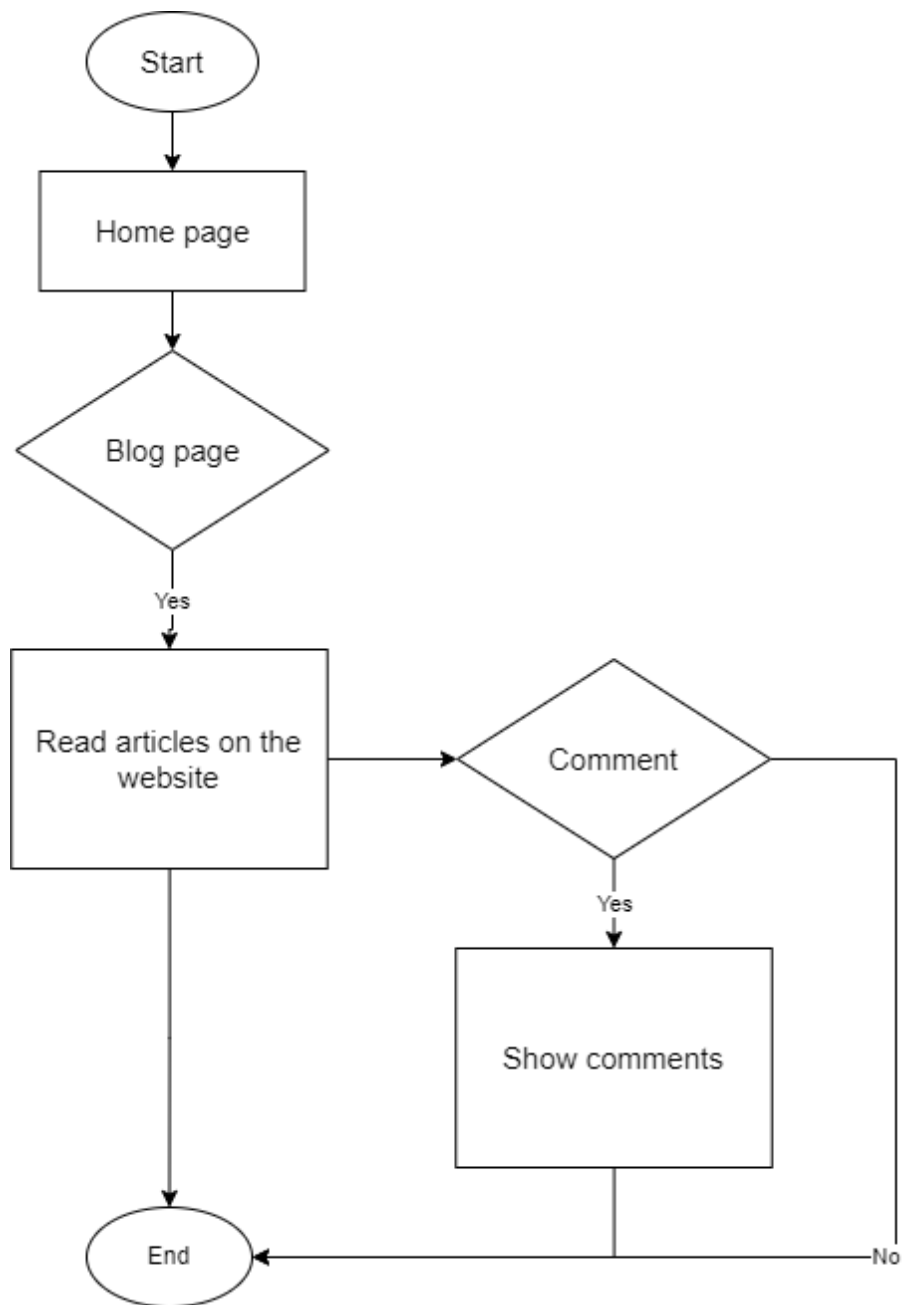


Figure 20. Flow chart of blogs

Customers can go to the blogs menu to see the articles that the system administrator has uploaded to the website, customers can see the categories of blogs on the screen and click to see the details of that article. If you have comments or want to discuss the article, you can leave a comment under each article so that the administrator can understand the needs of the customer.

6. Wireframe

6.1. Administrator

6.1.1. Admin overview

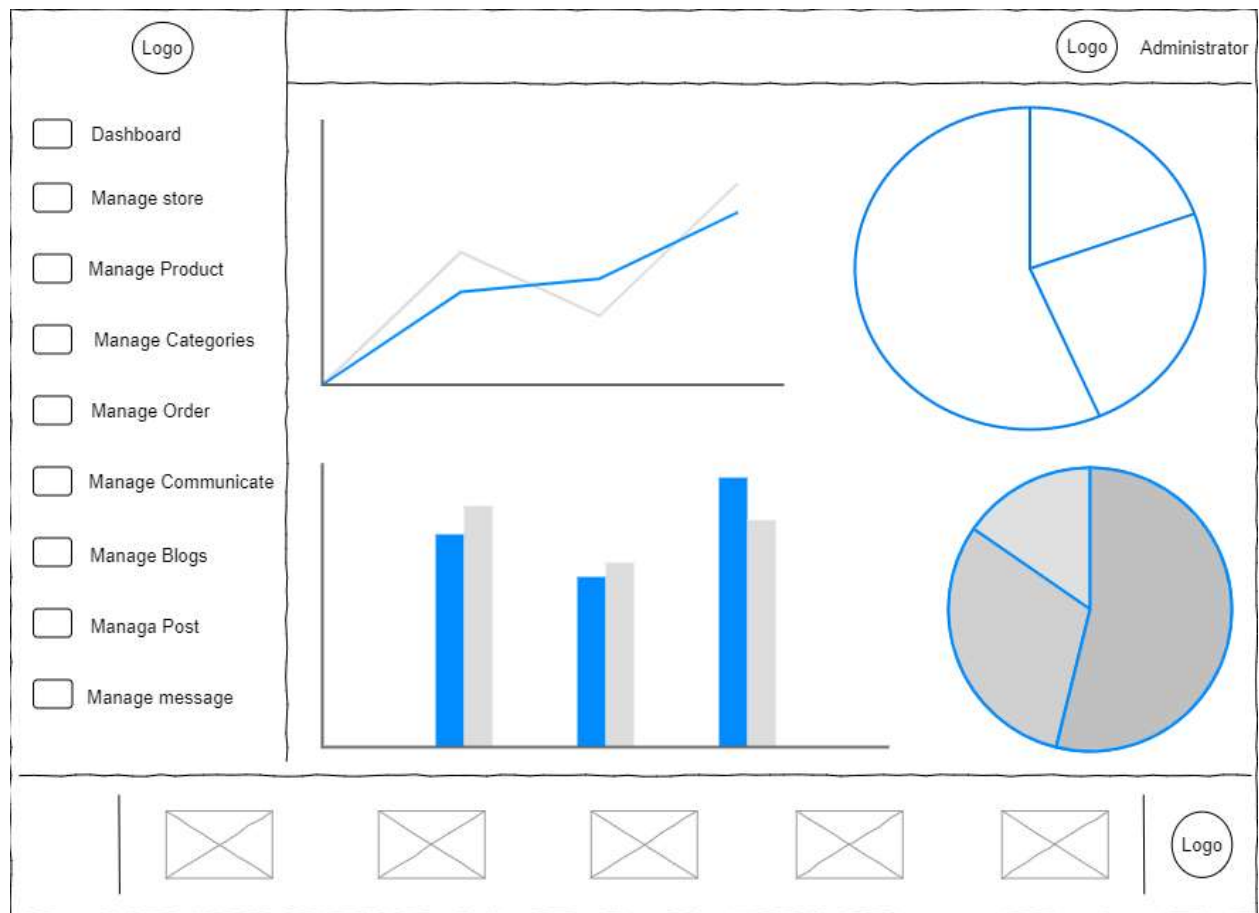


Figure 21. Admin overview

When the administrator logs in to the website, this overview screen will be displayed, but these charts have not been built and feature development yet, but this function will be developed in the future.

6.1.2. Admin manage category

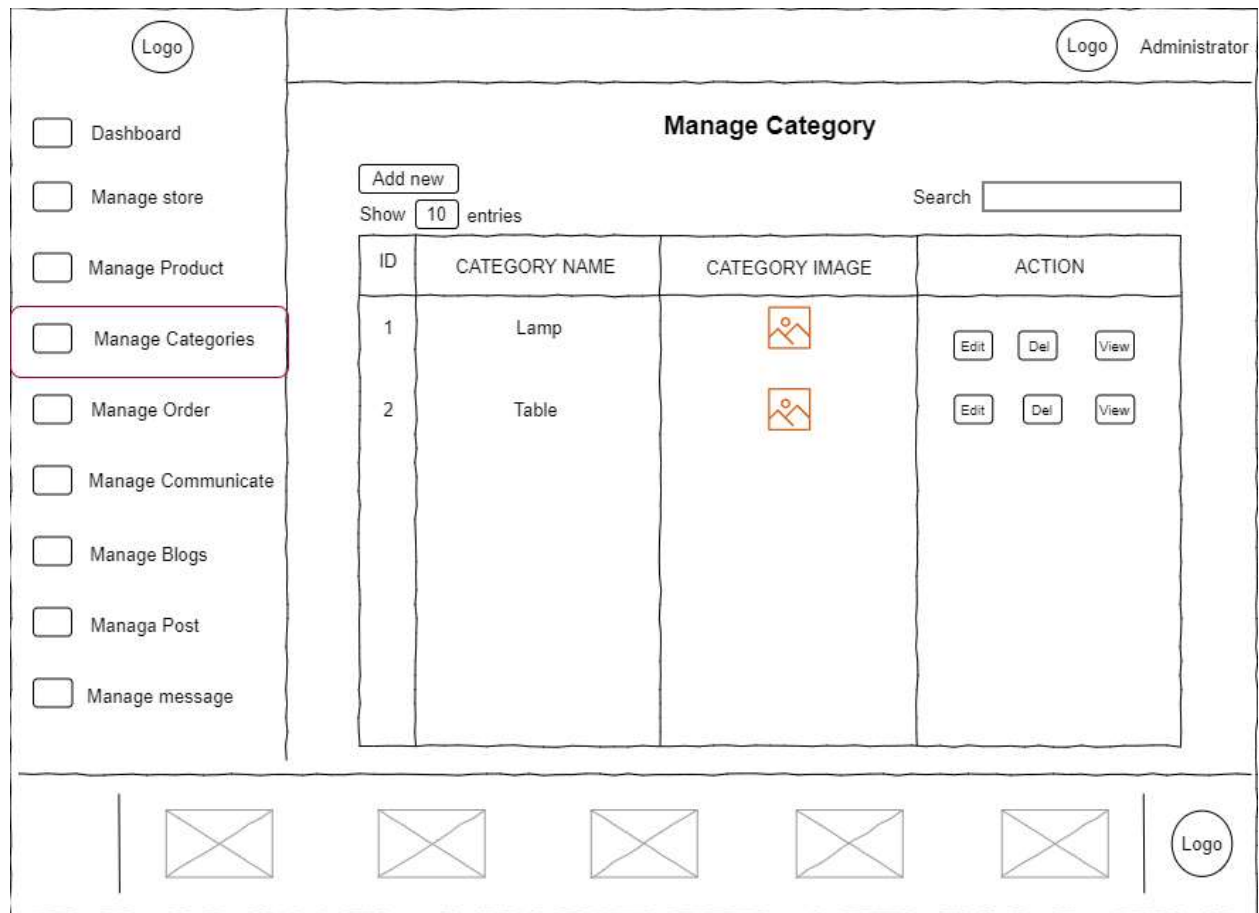


Figure 22. Admin manage category

This is the interface design of the admin's product category management screen interface design, in the screen includes functions such as: Add product categories, Edit product categories, View product category details, menu items, and more. show product category search, View product category list, Delete product category. Each function can be represented by buttons on the screen.

6.1.3. Admin manage product

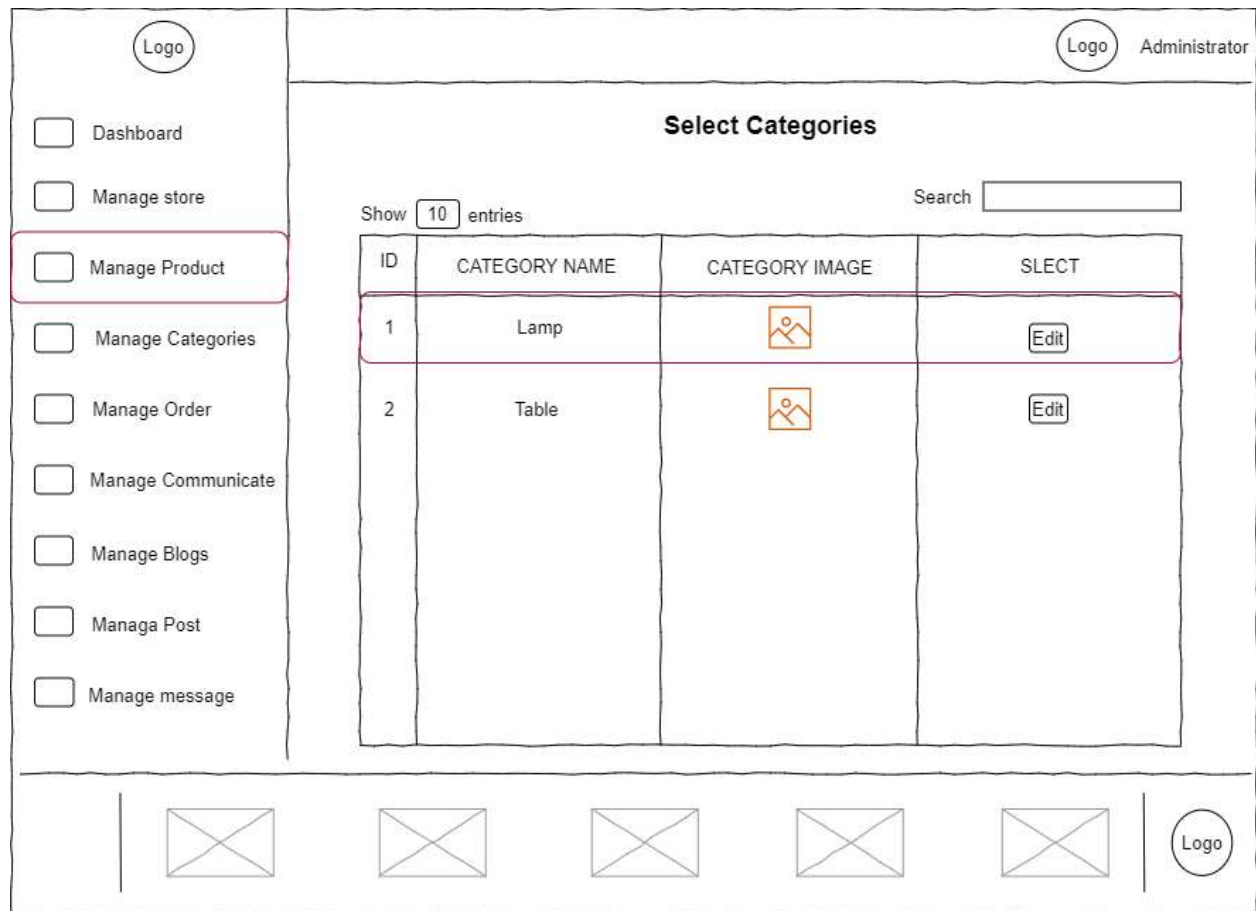


Figure 23. Admin manage product

This is the interface design of the product category selection screen to add products according to the admin's product category, the screen includes functions such as: Select each product category you want to add products and then press the edit button to switch to the screen to add products to the desired dialog as shown below. Each function can be represented by buttons on the screen.

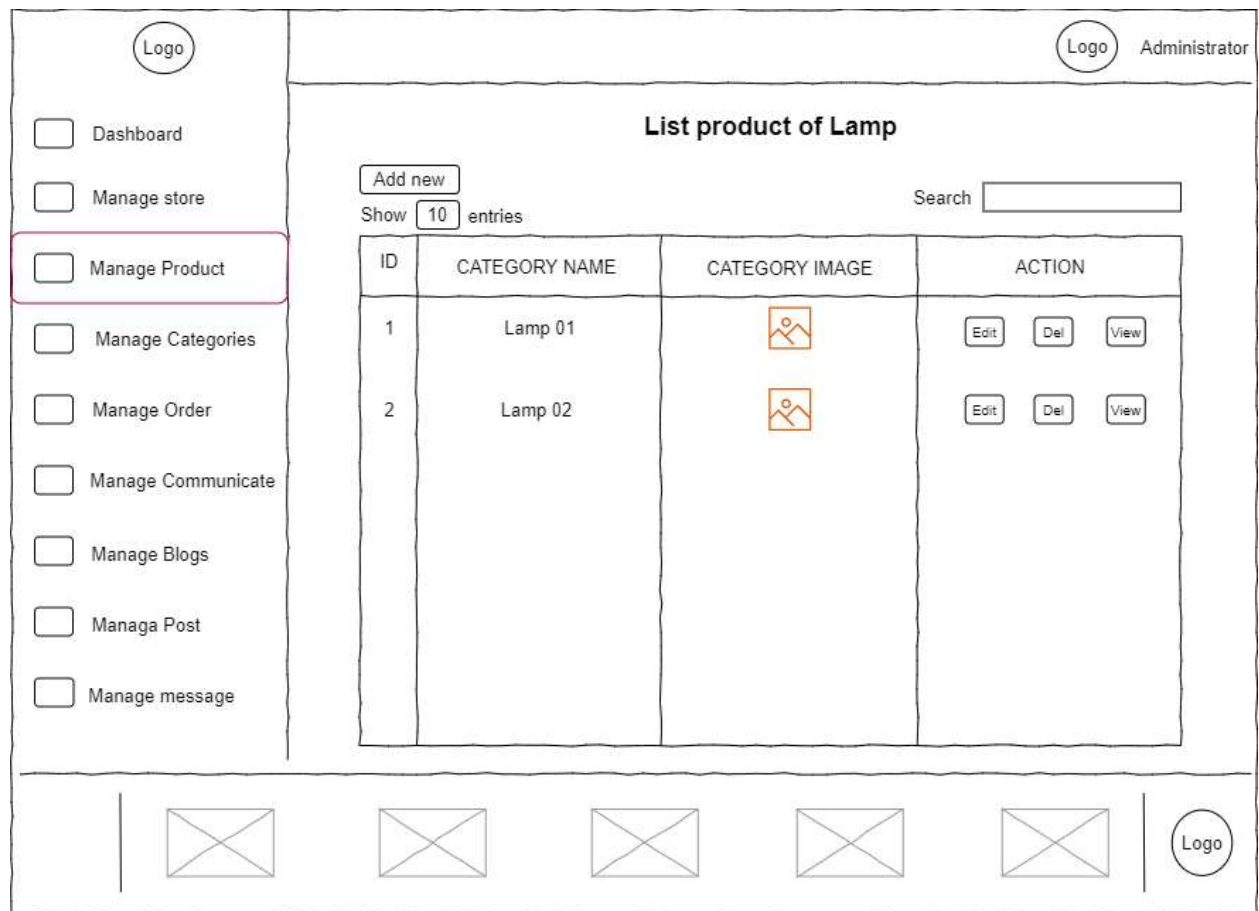
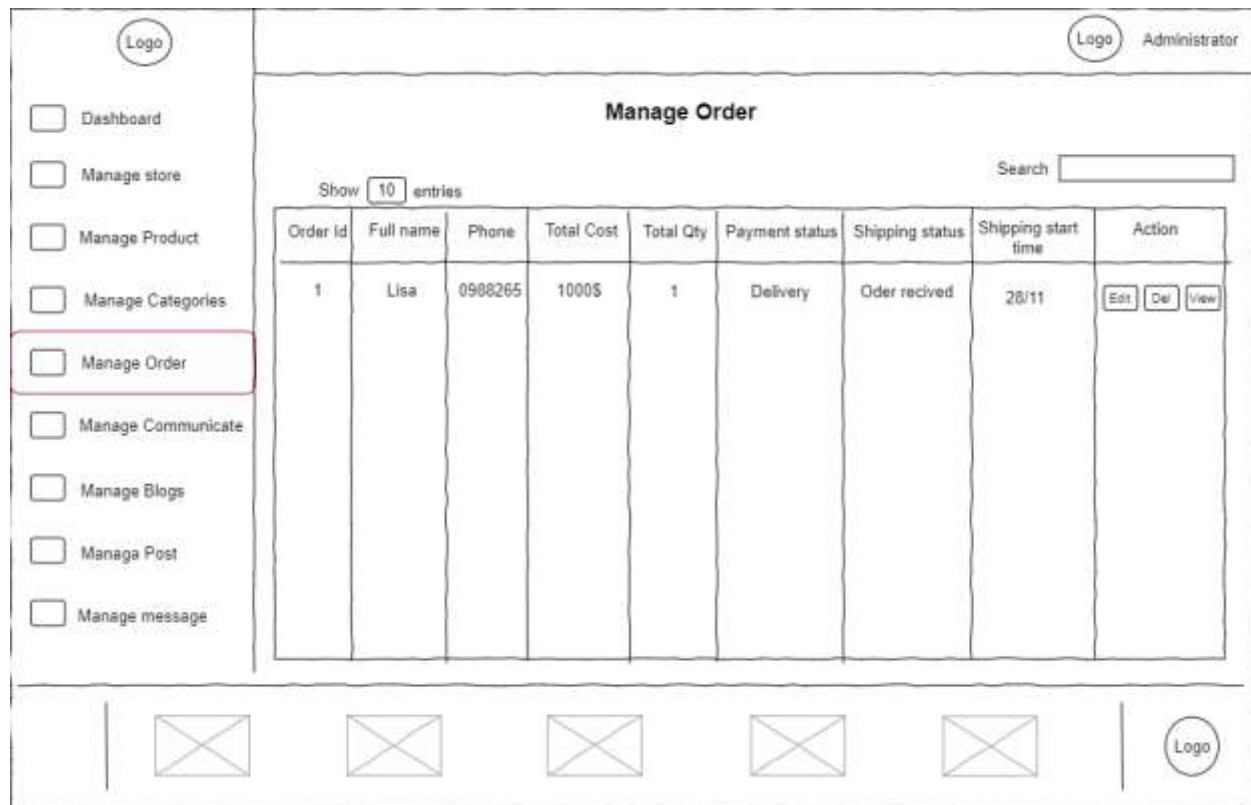


Figure 24. Admin manage list product

After selecting the product category you want to add new, this is the screen to add products according to that product category, in the screen include functions such as: Add product, Edit product, view list product, delete product, find product search,.. Each function can be shown by buttons on the screen.

6.1.4. Admin manage Order



The image shows a wireframe for an 'Admin manage Order' interface. It features a sidebar on the left with a 'Logo' and a list of menu items: Dashboard, Manage store, Manage Product, Manage Categories, Manage Order (highlighted with a red box), Manage Communicate, Manage Blogs, Managa Post, and Manage message. The main content area is titled 'Manage Order' and includes a 'Show 10 entries' label and a 'Search' input field. Below this is a table with columns: Order Id, Full name, Phone, Total Cost, Total Qty, Payment status, Shipping status, Shipping start time, and Action. The first row of data shows Order Id 1, Full name Lisa, Phone 0908265, Total Cost 1000\$, Total Qty 1, Payment status Delivery, Shipping status Oder recived, and Shipping start time 28/11. The Action column for this row contains three buttons: Edit, Del, and View. At the bottom of the interface, there are five placeholder icons (represented by boxes with an 'X') and a 'Logo' on the right.

Order Id	Full name	Phone	Total Cost	Total Qty	Payment status	Shipping status	Shipping start time	Action
1	Lisa	0908265	1000\$	1	Delivery	Oder recived	28/11	<button>Edit</button> <button>Del</button> <button>View</button>

Figure 25. Admin manage Order

This is the design of the screen interface design to manage the list of customers who ordered products on the website, the screen includes functions such as: Edit customer order information, delete customer orders, search for customers to order. , see detailed customer order information. Each function can be represented by buttons on the screen.

6.1.5. Admin manage blogs

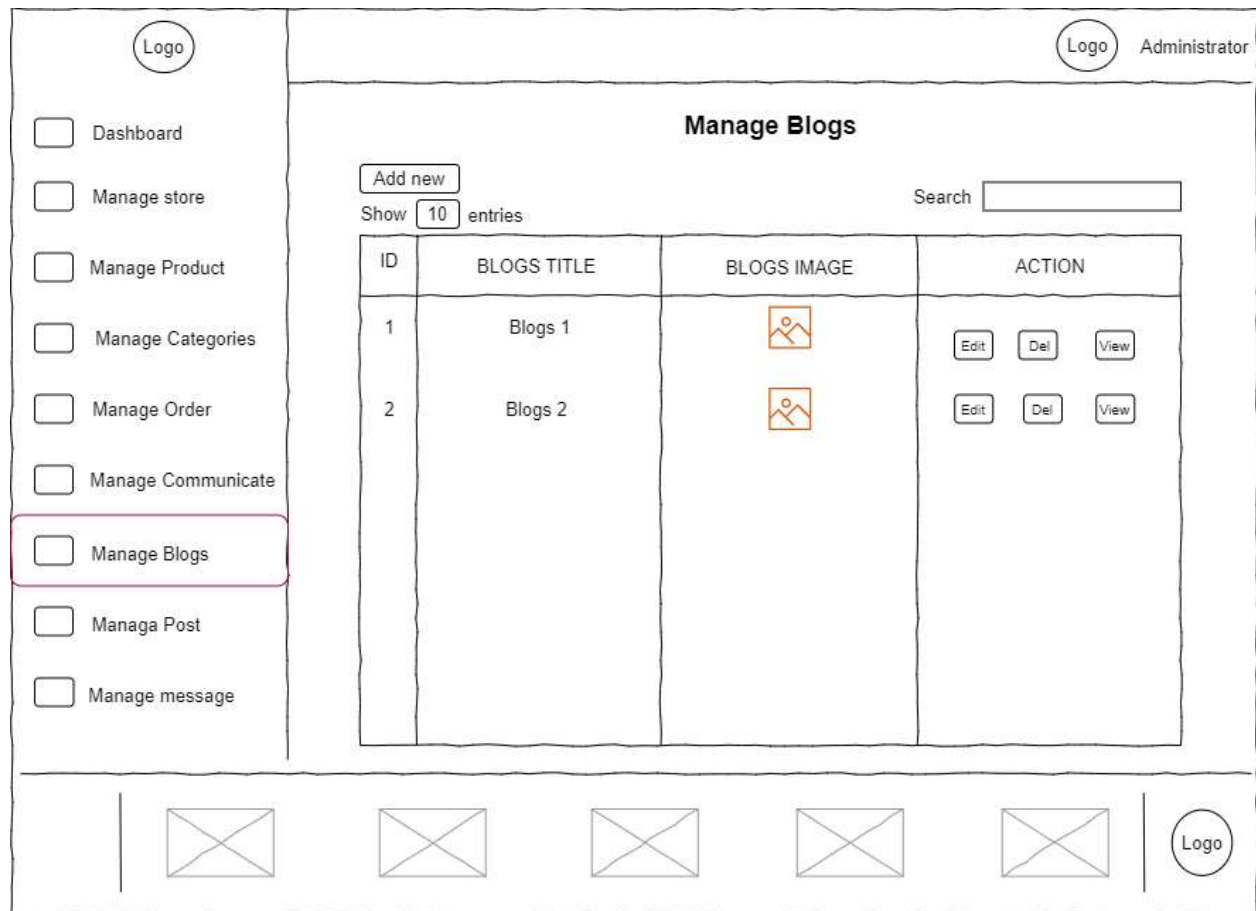


Figure 26. Admin manage blogs

This is the interface design of the website's blogs page management interface, in the screen includes functions such as: Add blogs, Edit blogs, view list of blogs, delete blogs, search blogs, .. Each function is can be represented by buttons on the screen.

6.1.6. Admin manage posts

Logo

☐ Dashboard

☐ Manage store

☐ Manage Product

☐ Manage Categories

☐ Manage Order

☐ Manage Communicate

☐ Manage Blogs

☐ Managa Post



☐ Manage message

Logo Administrator

Select Categories

Show entries

Search

ID	CATEGORY NAME	CATEGORY DESCRIPTION	CATEGORY IMG	SLECT
1	Blogs 1	Categoty Blogs 1		<input type="button" value="Edit"/>
2	Blogs 2	Categoty Blogs 2		<input type="button" value="Edit"/>



Logo

Figure 27. Select categories blogs

This is the interface design of the blog category selection screen to add posts according to the admin's blogs category, in the screen include functions such as: Select each blog category you want to add a post and then press the edit button to switch to The screen adds post to the desired dialog box as shown below. Each function can be represented by buttons on the screen.

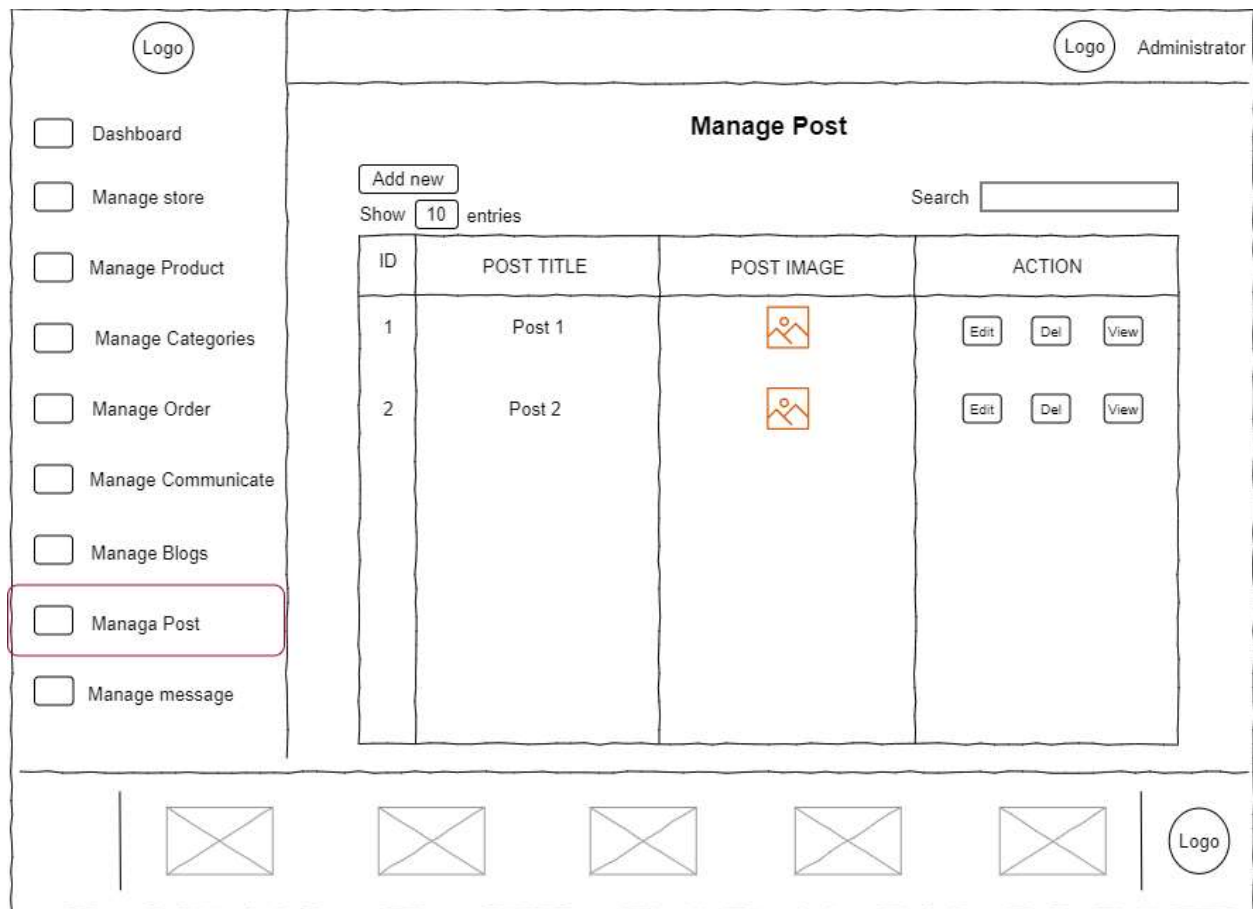


Figure 28. Admin manage posts

This is the design of the screen interface to manage the list of posts of the website, the screen includes functions such as: Add post, Edit post, view list post, delete bpost, search for posts, .. All functions can be represented by buttons on the screen.

6.1.7. Admin manage chat



Figure 29. Admin manage chat

This is the interface design of the screen interface to manage the message list of chat users on the website, in the screen includes functions such as: view the list of messages and view message details, reply to messages message. Each function can be represented by buttons on the screen.

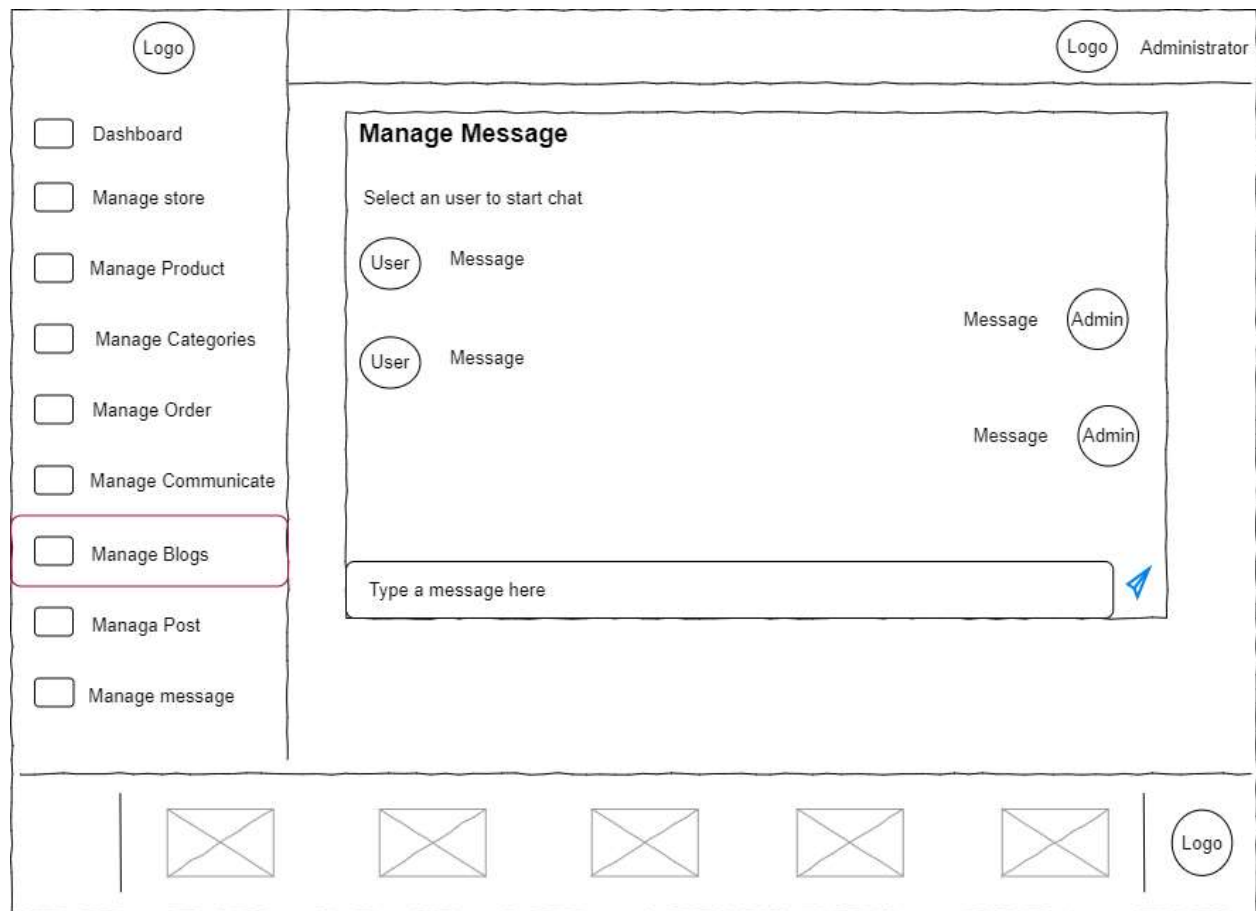
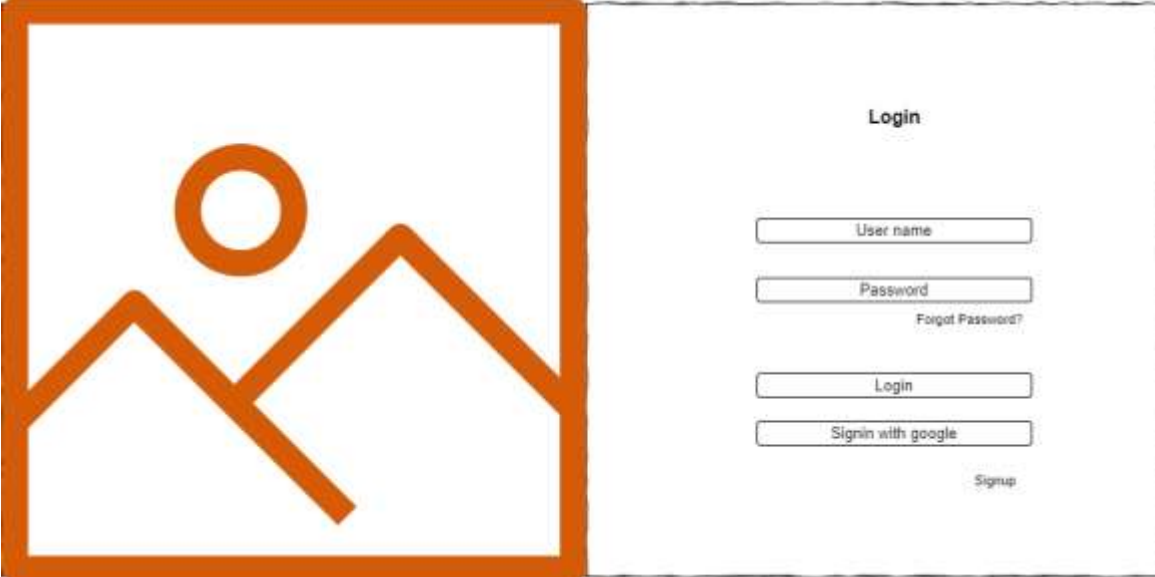


Figure 30. Admin manage chat

6.2. Customer

6.2.1. Login

The image shows a login form. On the left is a large square placeholder with an orange border and a stylized orange icon of a person and mountains. To the right, the form is titled "Login". It contains a "User name" input field, a "Password" input field, a "Forgot Password?" link, a "Login" button, a "Signin with google" button, and a "Signup" link at the bottom right.

Login

User name

Password

[Forgot Password?](#)

Login

Signin with google

[Signup](#)

Figure 31. Login

This is the login screen, once you have registered an account, you will enter your username and password in the corresponding boxes and click login.

6.2.2. Signup

The image shows a signup form. On the left is a large square placeholder with an orange border and a stylized orange icon of a person and mountains. To the right, the form is titled "Signup". It contains input fields for "Full name", "User name", "Email", "Password", and "Confirm password", followed by a "Signup" button.

Signup

Full name

User name

Email

Password

Confirm password

Signup

Figure 32. Signup

This is the registration screen when the user registers an account, he will enter all the information in the corresponding boxes as shown in the image above and click register.

6.2.3. Home page

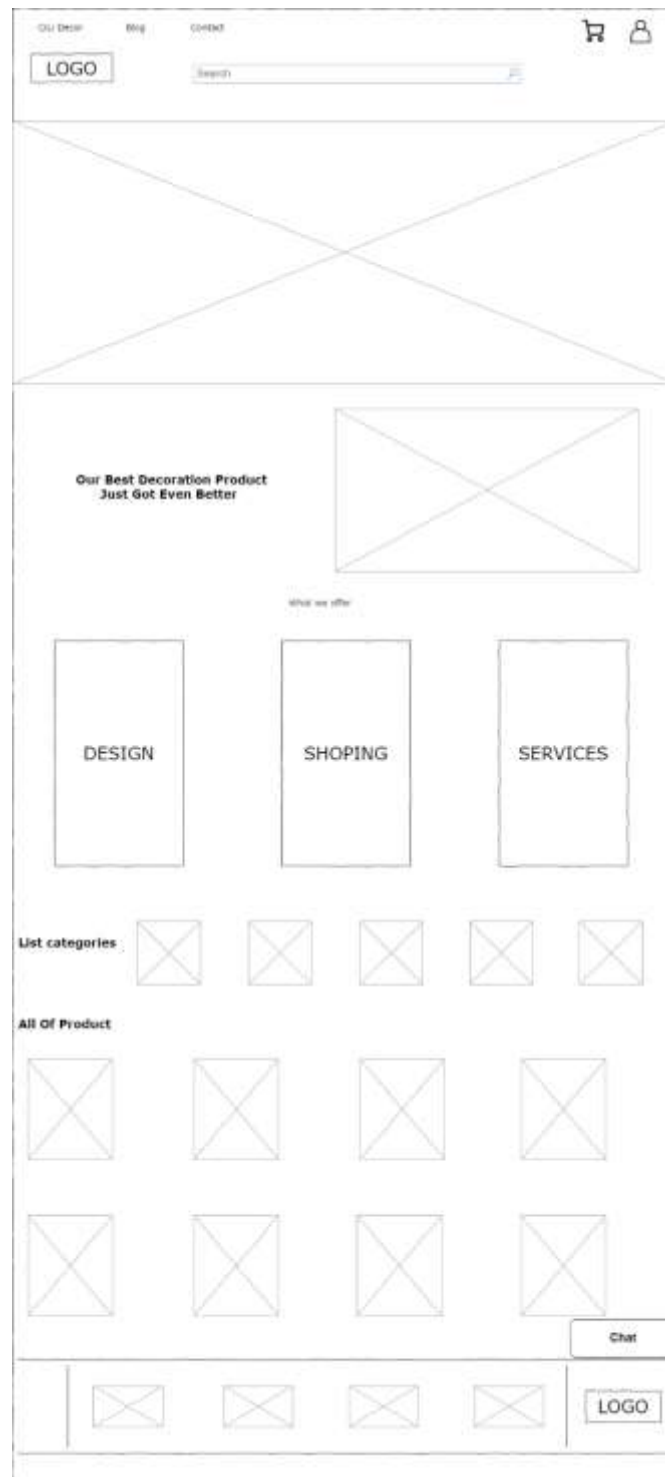


Figure 33. Home page

This is the home screen that includes the functions that are displayed on the screen respectively, the home screen is applied the type of website that combines all the functions into one page so it is easy to do all the operations. on the same website.

6.2.4. View detail product

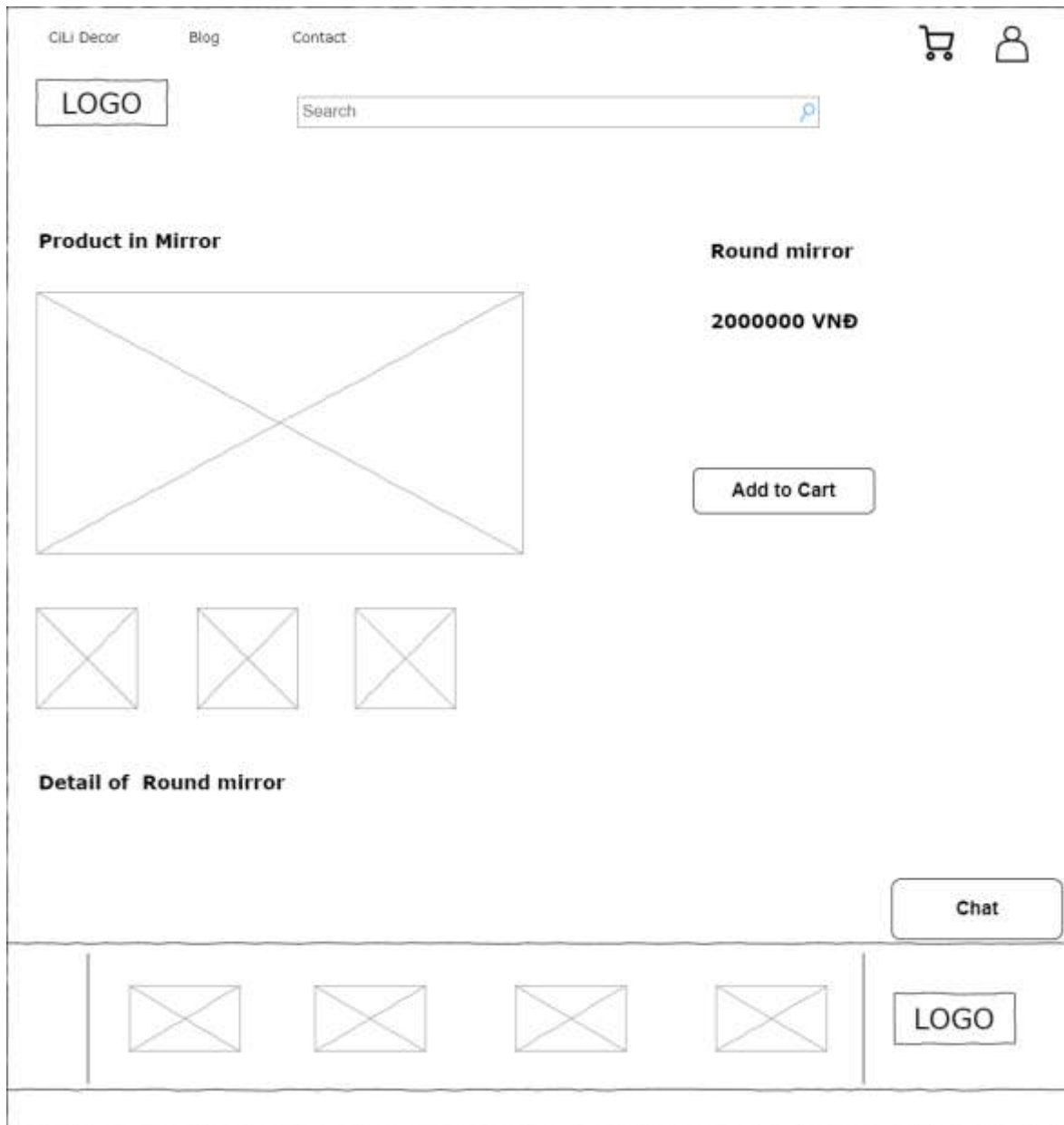





Figure 34. View detail product



Clicking on a product will display detailed information about that product as shown in the screenshot above. Then click add to cart, the product will be transferred to the customer's cart.

6.2.5. Shopping cart

[CILI Decor](#) [Blog](#) [Contact](#)  

LOGO





Search 

NO	PRODUCT NAME	IMAGE	AMOUNT	PRICE (VND)	DELETE
1	Round mirror		AMOUNT	2000000 VND	

Total : 2000000VND

Checkout

Chat



LOGO

Figure 35. Shopping cart

In the customer's shopping cart, the customer can delete unnecessary products or if purchased, the customer can proceed to checkout by clicking the Checkout button on the screen.

6.2.6. Blogs

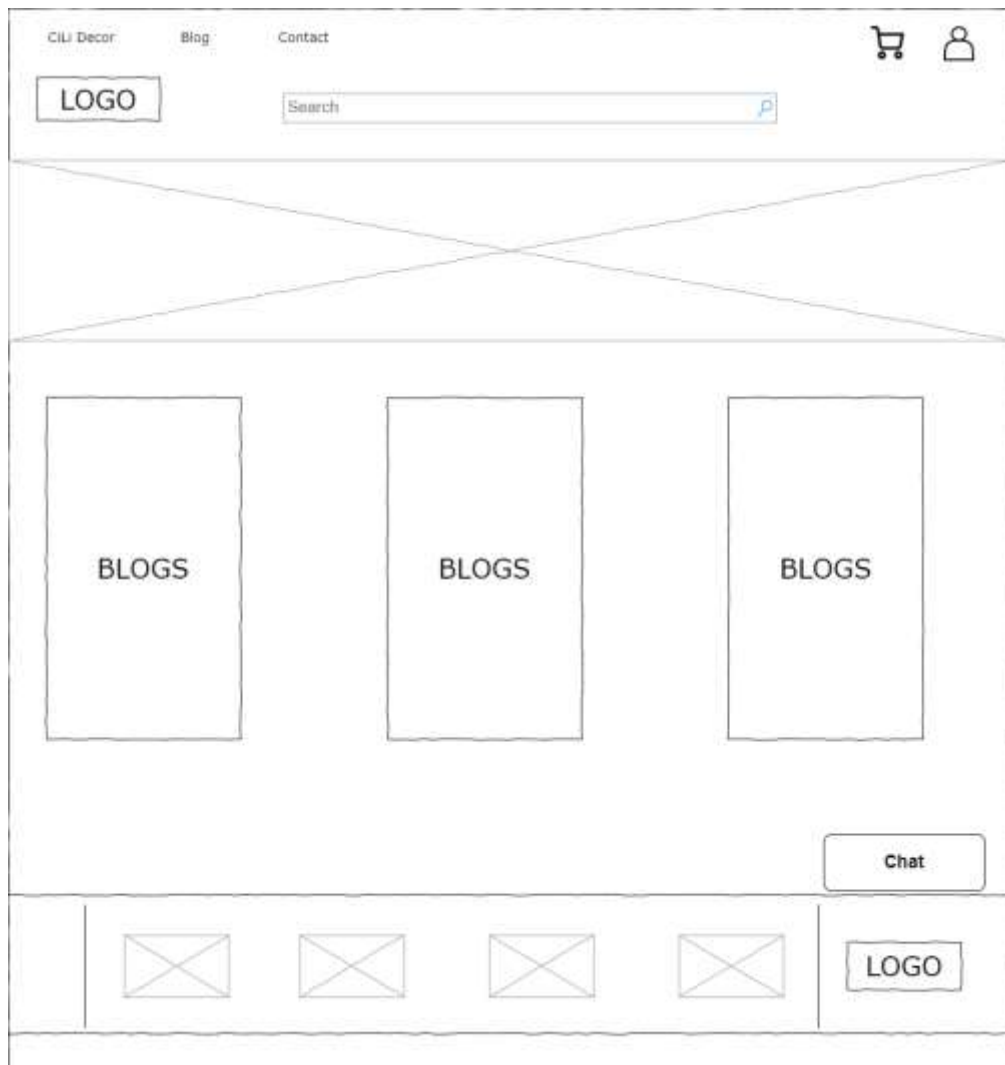


Figure 36. Blogs

This is the blog of CiLi Decor website, customers can view the articles in the blogs and can comment under each of them.

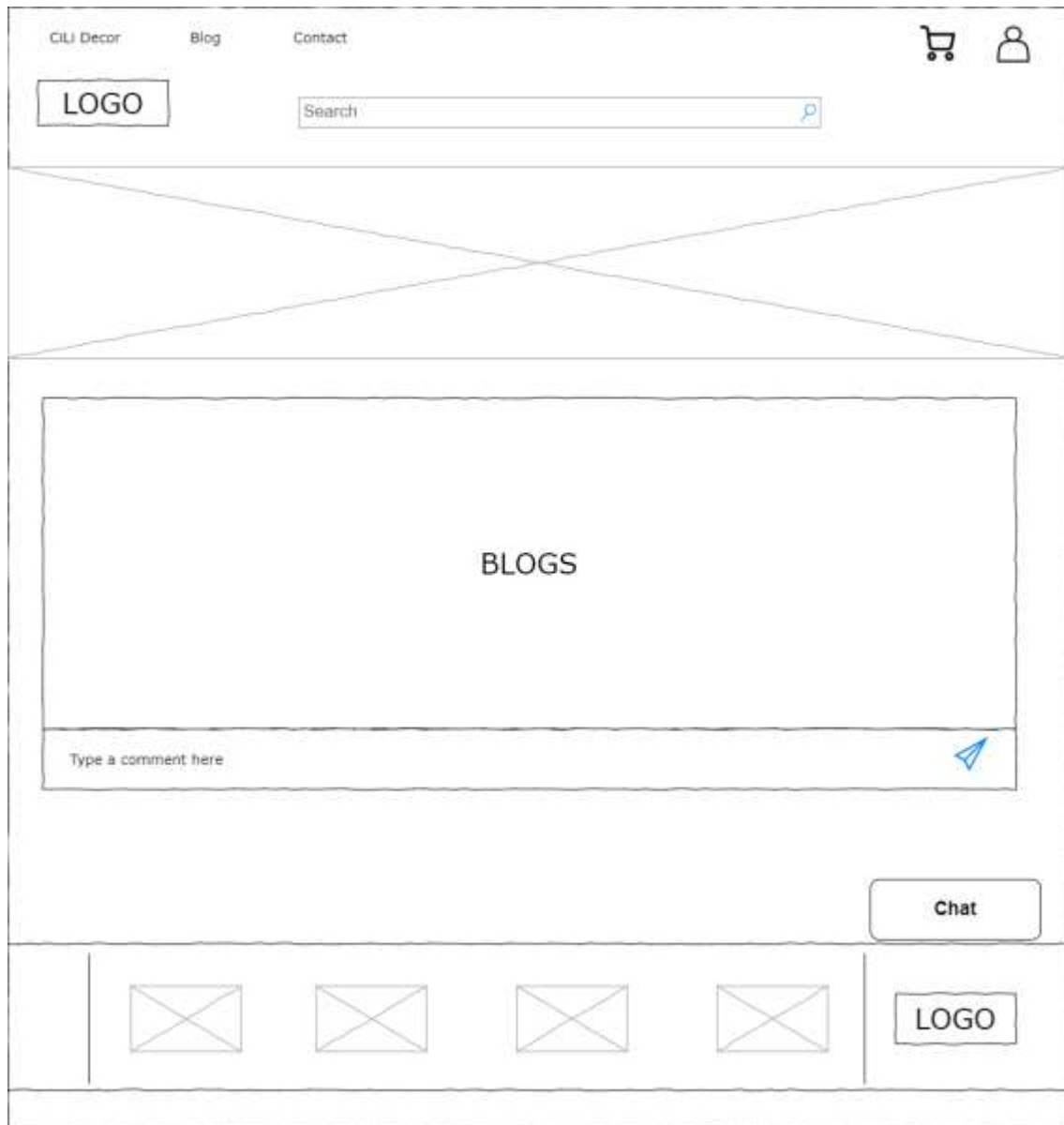


Figure 37. Comment Blogs

6.2.7. Design

This is a space design screen with available furniture, customers can custom design according to their needs

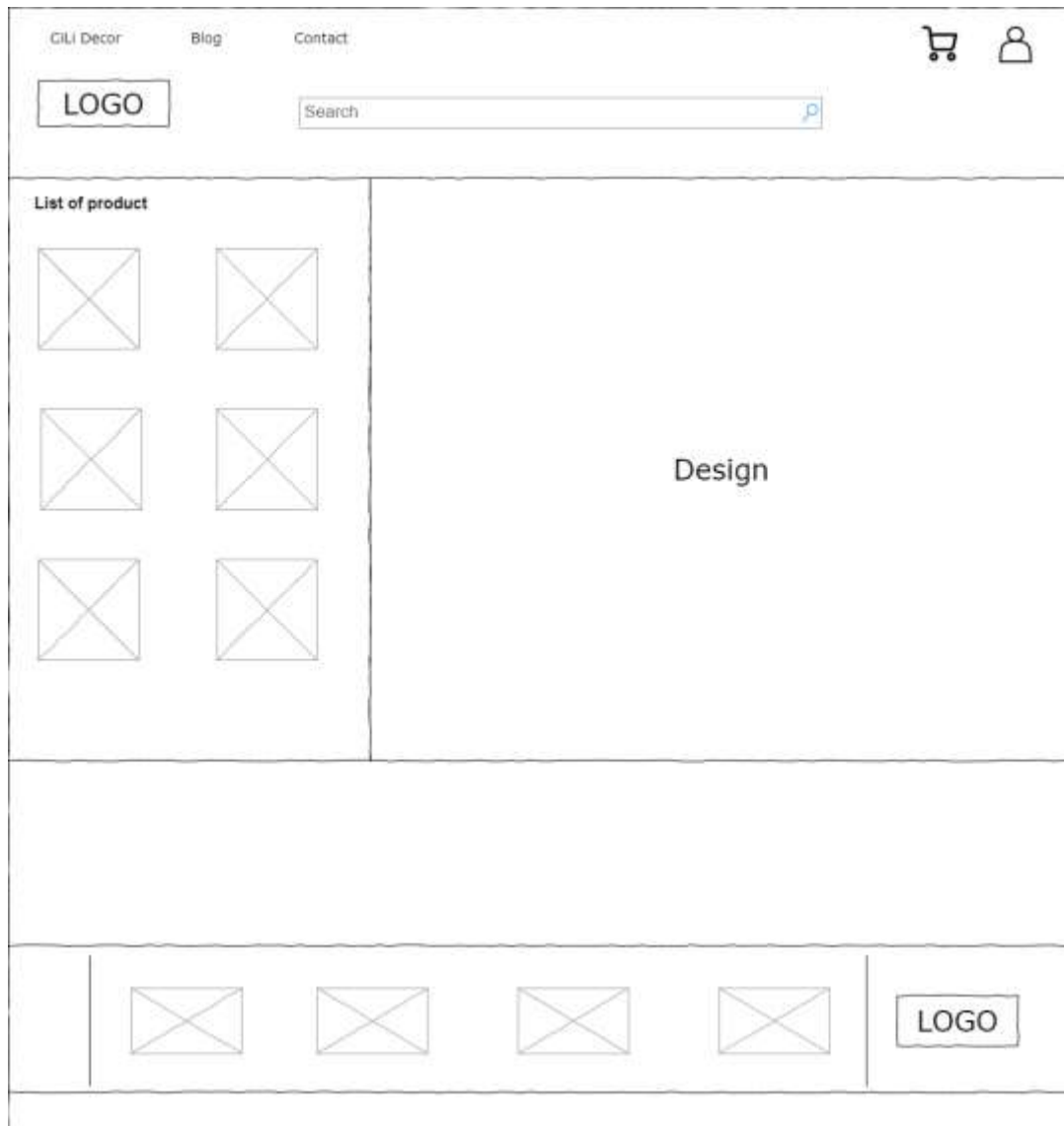


Figure 38. Design

V. Implementation

1. Development environment

The Software Development Environment (SDE) used to build and develop in the CiLi Decor furniture sales website includes the following hardware and software tools:

1.1. Tools

1.1.1. Visual Studio Code

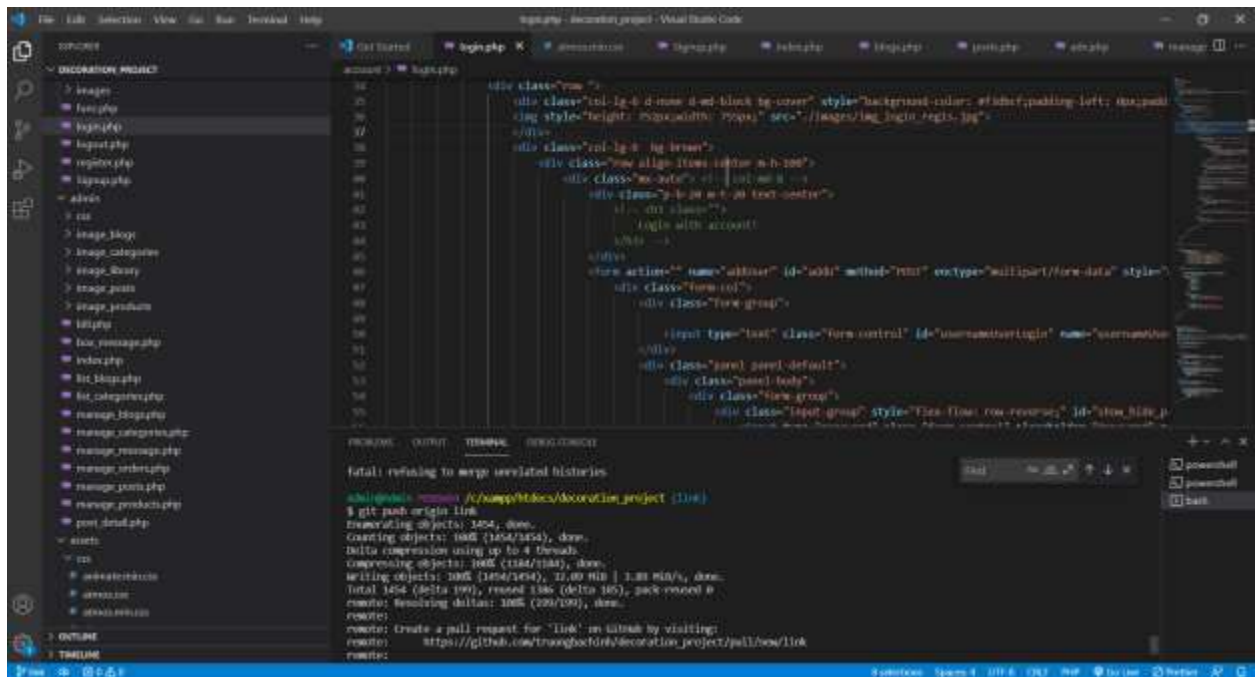


Figure 39. Visual Studio Code

The CiLi Decor sales website is built and developed using PHP, JQuery and Bootstrap languages and Visual Studio Code covers all of them.

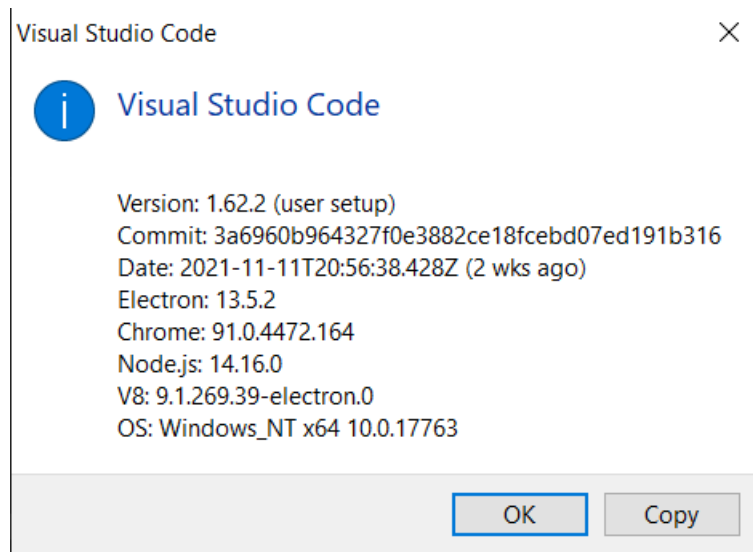


Figure 40. Visual Studio Code 1.62.2

Visual Studio Code is a completely free editor that allows programmers to write code, manage their structure, and find and fix errors, so it is widely used. Moreover, Visual Studio Code also helps programmers to detect incomplete code (for example, programmers forget to declare when using a certain variable, VS will notify them by reporting errors). and describe them) and continue writing using the "intelli sense" method of editing the code. Currently, the code developer for the CiLi Decor website is using version 1.62.2 to develop the code, after building and developing the code, VS also helps programmers easily push the code to github - a tool to Store and manage code as it integrates with github.

1.1.2. Github

The CiLi Decor furniture sales website project, after building and developing the code, is pushed to github and stored and managed here. Using github has many advantages for the code development of the CiLi Decor website because it integrates with Visual Studio Code as discussed above (section 1.1.1). The management on github is also highly appreciated github supports all the actions of the programmer during source code checking such as diff, merge source, check modifications, show history, ... In addition, while building Building and developing CiLi Decor website, developers can learn from other developers' experience from commit histories using social networking features like network graph, feeds and followers.

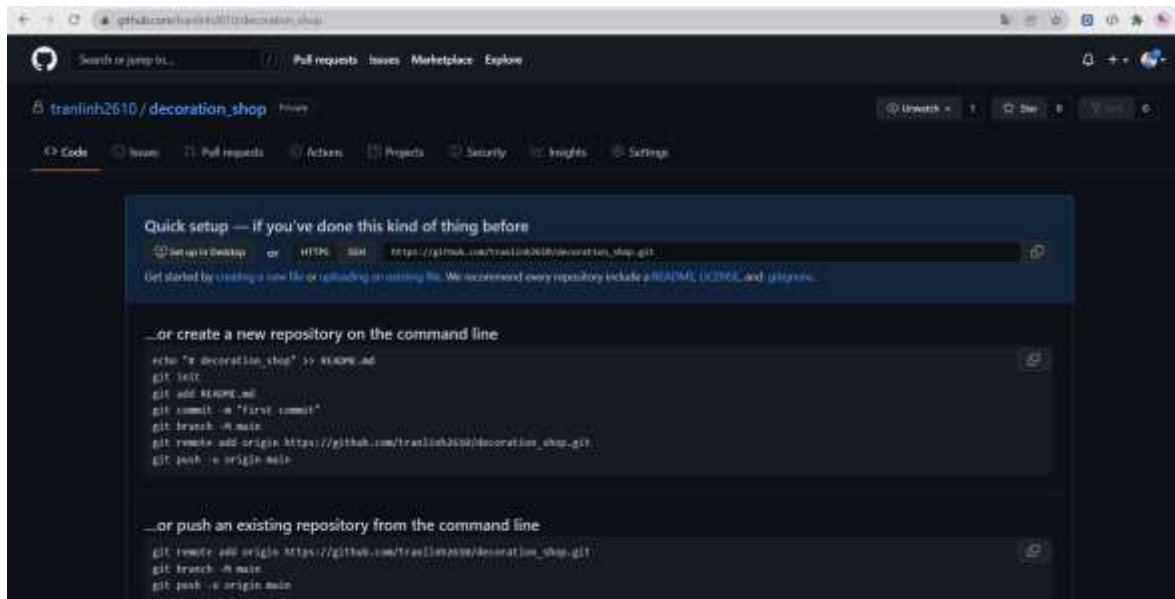


Figure 41. Github

1.1.3. phpMyAdmin

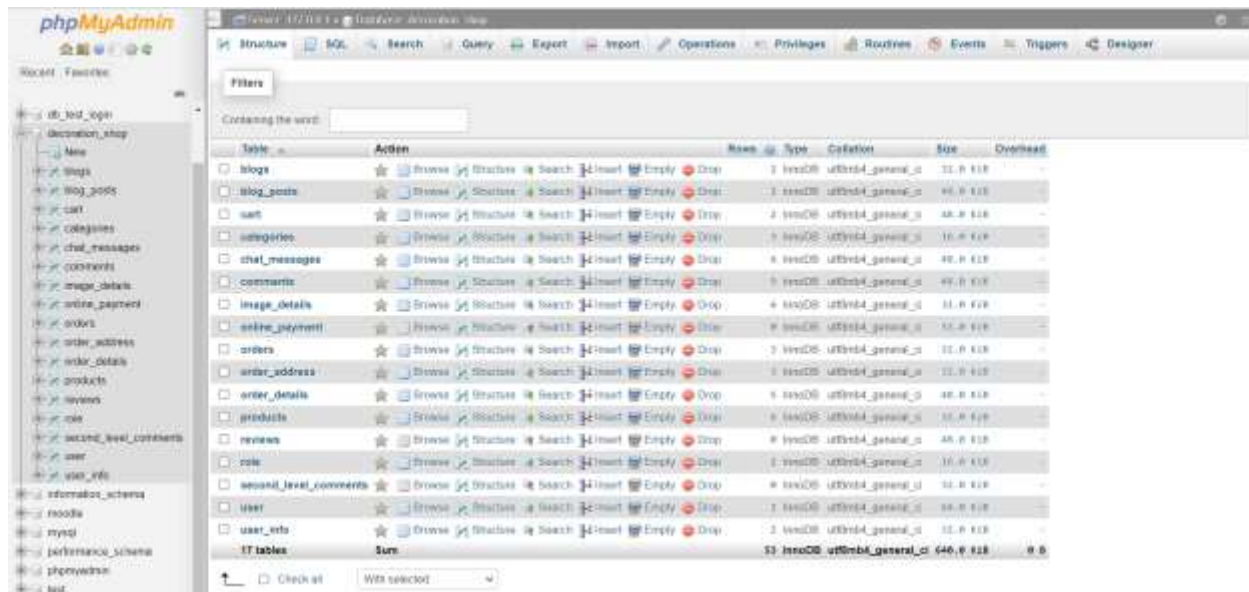


Figure 42. phpMyAdmin

phpMyAdmin is an open source software that helps manage MySQL databases through a web interface and is written in PHP language. The image above is the data tables of the CiLi Decor sales website built on the phpMyAdmin database. Programmers have used phpMyAdmin because of some features of phpMyAdmin such as being able to import and export simple data with all formats such as CSV, SQL, XML, .. and can perform MySQL queries.

1.2. Server (Xampp Control Panel)

Furniture sales website CiLi Decor used Xampp to run the emulator using a server hosting environment on the developer's computer. Thanks to that, when building and developing websites, developers do not have to pay to buy hosting or VPS. Moreover, the CiLi Decor furniture sales website is developed in PHP language, so using Xampp is considered the most reasonable choice.

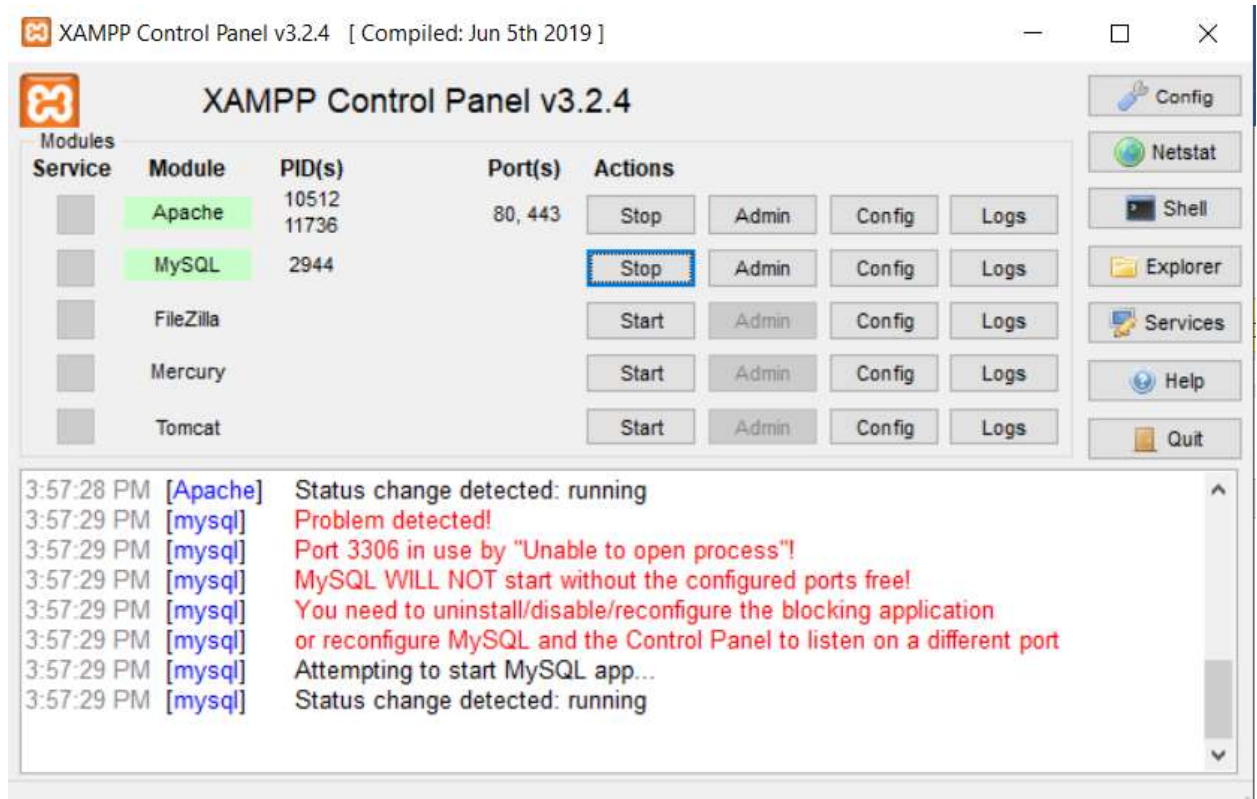


Figure 43. Server (Xampp Control Panel)

The image below is a CiLi Decor website that is run by a local host using Xampp to create and operate the internal server.

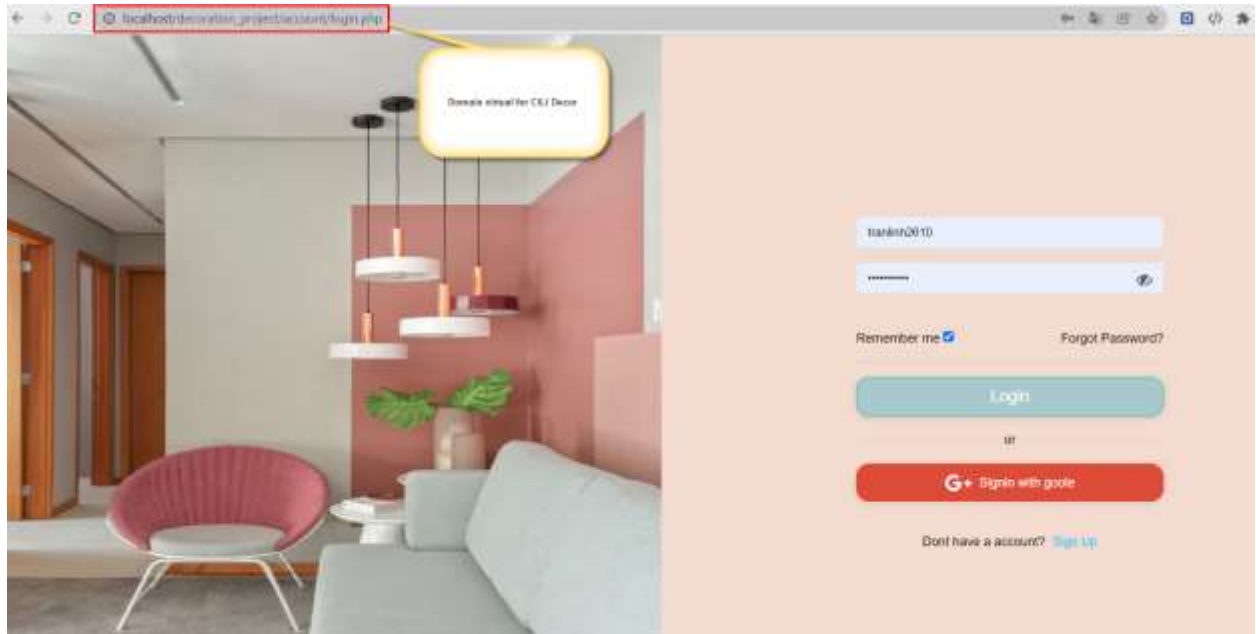


Figure 44. Domain virtual for CiLi Decor

1.3. Hosting (Infinity Free)

Infinity Free is a free hosting, so to deploy this CiLi Decor sales website project, the developer chose Infinity Free to deploy. The domain name of the CiLi Decor website is:

<http://cilidecor.infinityfreeapp.com/>

Infinity Free was chosen to deploy for a number of reasons, which are: Firstly, Infinity Free does not charge for domain name creation and also supports unlimited system storage capacity. Secondly, the CiLi Decor website uses the database as MySQL and phpMyAdmin as the administration system, all of which Infinity Free is fully responsive and suitable for the system, so using Infinity Free is the right thing for you. programmer. Finally, the programmer can easily operate the hosting when adding the database and the source code in case the user logs into the system and registers his account.



Free Website Hosting for over 9 years

Figure 45. Hosting (Infinity Free)

As shown in the figure below, Infinity Free has two main components: Control panel and File Manager. In which, the database of the entire CiLi Decor website system is stored in the Control panel and all the system's source code will be managed and stored in the File Manager. This is really convenient to manage as well as handle data and code file problems.

According to the picture below is the link of the CiLi Decor website after completing the development process with Infinity Free

2. Important functions and codes

2.1. Structure code

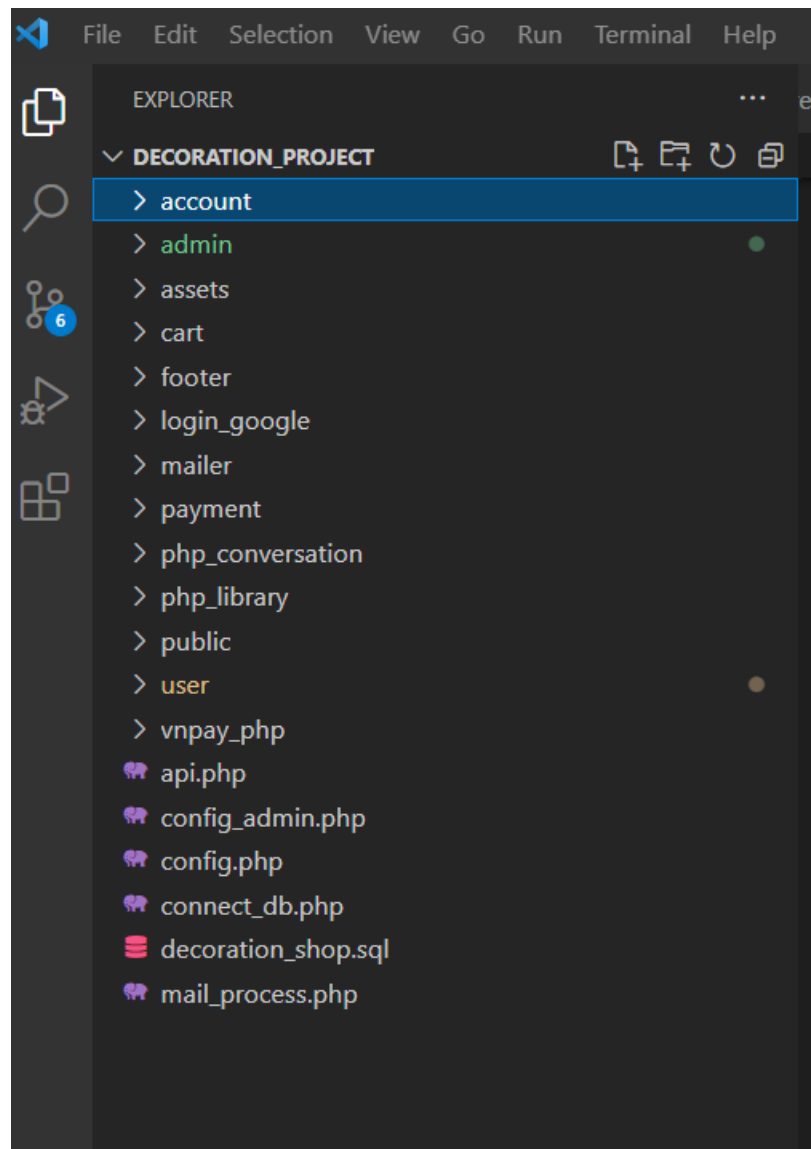


Figure 46. Structure code

The above code structure is divided according to the user, and the functions available on the website

2.2. Single page application

Single-page applications are both a popular way to develop e-commerce websites and a stumbling block in the CILI e-commerce website project's execution. Because fundamental technologies like

JQuery, Bootstrap, and PHP were used for ecommerce website implementation, the SPA design process is more challenging than with frameworks like Angular and React JS. The following are the steps done to make the CILI e-commerce website more efficient and compliant with the SPA standard.

Modal bootstrap in a single page

The major approaches utilized to build the administration functions of the CILI e-commerce website, such as manage account, manage order, and so on, are modal bootstrap, JQuery core, and PHP core. JQuery is used to show the Modal Bootstrap along with the related data on the CILI ecommerce website using methods like modal (). It can ensure that users of the CILI ecommerce website are able to complete required functions without being sent to another page. The order information update configuration and coding function is shown below.

2.3. Payment gateway VNPAY-QR - VNPAY

This code inserts data along with online payment information into the database. When the user enters correct and sufficient payment information according to VNPAY's API. VNPAY will return an API with successful online payment results. The application will process that API and get the results to insert into the Database


```

136 <?php
137 if ($secureHash == $vnp_SecureHash) {
138     if ($_GET['vnp_ResponseCode'] == '00') {
139         $bill_code = $_GET['vnp_TxnRef'];
140         $note = $_GET['vnp_OrderInfo'];
141         $vnp_response_code = $_GET['vnp_ResponseCode'];
142         $code_vnpay = $_GET['vnp_TransactionNo'];
143         $code_bank = $_GET['vnp_BankCode'];
144         $time = $_GET['vnp_PayDate'];
145         $taikhoan = $_SESSION['current_user']['username'];
146         $cartOrder = $link->query("SELECT c.cart_id, SUM(c.cart_quantity) as
147 total_amount, c.cart_user_id, c.cart_product_id, p.p_name, p.p_image
148 FROM cart as c
149 INNER JOIN products as p ON c.cart_product_id = p.p_id
150 WHERE cart_user_id = '$cartUserId'");
151 $cartInforOrder = array();
152 while ($rowCart = mysqli_fetch_array($cartOrder)) {
153     $cartInforOrder[] = $rowCart;
154 }
155 $order = $link->query("INSERT INTO `orders` ('o_id', 'o_user_id', 'o_total_cost',
156 'o_total_quantity', 'o_payment', 'o_shipping_status', 'o_create_time')
157 VALUES (NULL, '' . $cartUserId . '', '' . ($GET['vnp_Amount'] / 100) . '',
158 '' . $_SESSION['quantity-online'] . ', '1', '1', '' . $timeInVietNam . '');"
159 $insertString = "";
160 $orderId = ($link->insert_id);
161 $resultCart = $link->query("SELECT cart.*, products.* FROM cart
162 INNER JOIN products ON products.p_id = cart.cart_product_id
163 WHERE cart.cart_user_id = '$cartUserId'");
164 $cartInforCheckout = array();
165 while ($rowC = mysqli_fetch_array($resultCart)) {
166     $cartInforCheckout[] = $rowC;
167 }
168 foreach ($cartInforCheckout as $key => $cart) {
169     $insertString .= "(NULL, '' . $orderId . ', '' . $cart['cart_product_id'] . ', '
170 '' . $cart['cart_quantity'] . ', '' . $cart['p_price'] . ')"";
171     if ($key != count($cartInforCheckout) - 1) {
172         $insertString .= ",";
173     }
174 }
175 $orderDetail = mysqli_query($link, "INSERT INTO `order_details`
176 ('od_id', 'od_order_id', 'od_product_id', 'od_quantity', 'od_price')
177 VALUES '' . $insertString . '");
178 $orderAddress = $link->query("INSERT INTO `order address` ('oa_id', 'oa_order_id', 'oa fi
179 $orderPayment = $link->query("INSERT INTO `online payment` ('op_id', 'op_order_id', 'op bil
180 if (isset($order) && isset($orderDetail) && isset($orderAddress) && ($orderPayment)) {
181
182     $link->query("DELETE FROM cart WHERE 'cart_user_id' = '$cartUserId'");
183     echo "Order successfully";
184 }
185
186 } else {
187     echo "Order un-successfully";
188 }
189 } else {
190     echo "Invalid signature";
191 }
192 }>

```

Figure 47. Payment gateway VNPAY-QR - VNPAY

2.4. Forgot password

```
<?php
if (isset($_POST["forgotButton"])) {
    $result = $link->query("SELECT user.email , user.password FROM `user`
    where `username` = '$_POST[usernameUser]' AND `email`='$_POST[emailUser]'");
    $checkAccount = $result->fetch_assoc();
    if (empty($checkAccount)) {
        <script type="text/javascript">
            document.getElementById("checkMailAndUser").style.display = "block";
            document.getElementById("forgotSuccess").style.display = "none"
        </script>
    } else {
        <?php
        $email = $_POST['emailUser'];
        $message = 'Your password is: ' . $checkAccount['password'];
        $subject = "Notification from Cili Decor website";
        $text_message = "Reset Password";
        send_mail($email, $subject, $message, $text_message);
    }
    <script type="text/javascript">
        const a = document.getElementById("forgotSuccess");
        document.getElementById("checkMailAndUser").style.display = "none";
        document.getElementById("forgotSuccess").style.display = "block";
        document.getElementById("checkUsername").style.display = "none";
        document.getElementById("checkMail").style.display = "none";
        if (a.style.display == "block") {
            swal("Notice", "Password has been sent. Please check your email!", "success");
            setTimeout(function() {
                window.location.href = "../account/login.php";
            }, 2000);
        }
    </script>
}
<?php
```

Figure 48. Forgot password

This code executes the gmail and password query according to the username and gmail condition in the database to confirm if it is correct. then get password information and gmail information to perform the feature of sending password to gmail of users who forgot their password

2.5. Sign in with your social network account

CiLi Decor website developer has created an application on <https://console.cloud.google.com/> to act as a platform that allows login with a Google account.

```

*/

if (isset($_GET['code'])) {
    // kiểm tra code có tồn tại
    $client->authenticate($_GET['code']);
    $_SESSION['access_token'] = $client->getAccessToken();
    //getAccessToken(); để lấy token đăng nhập
    header('Location: ' . filter_var($redirect_uri, FILTER_SANITIZE_URL));
    exit;
}

/* * *****
If we have an access token, we can make
requests, else we generate an authentication URL.
* ***** */
if (isset($_SESSION['access_token']) && $_SESSION['access_token']) {
    $client->setAccessToken($_SESSION['access_token']);
} else {
    $authUrl = $client->createAuthUrl();
}
if ($client->isAccessTokenExpired()) {
    $authUrl = $client->createAuthUrl();
    // header('Location: ' . filter_var($authUrl, FILTER_SANITIZE_URL));
}

if (!isset($authUrl)) {
    $googleUser = $service->userinfo->get(); //get user info
    if (!empty($googleUser)) {
        include '../login_social.php';
        loginFromSocialCallBack($googleUser);
    }
}
//End Google Code

```

Figure 49. Sign in with your social network account

VI. Applying Agile Scrum to implement website

The project of building and developing a website selling furniture CiLi Decor has adopted the Agile software development model for the following reasons:

For small-scale projects that need to be completed in a certain time like the CiLi Decor project, the agile model is the most suitable choice because this model will shorten the project completion time in a short time. short time.

Agile software development model makes project completion more efficient than other traditional models.

In the discussion above, I have clearly stated the definition, strengths and weaknesses of the agile model (section 3. Review of Software Development Methodologies), so this model has helped the developer of the CiLi Decor project to complete it properly deadlines and good results. The following is a presentation about the process and content of applying the Agile software development model to the CiLi Decor project.

1. User stories

The parts related to the definition of agile, user story, product backlog are mentioned in section 3.3. Agile model therefore here, User story is a simple form of documentation that is synthesized from the functional and non-functional requirements of the user and the system and built from the point of view of the user. User stories have the following rules:

As a / an <user specific / role>

I want to <do something>

so that <serves some purpose>

USER STORY				
No	User story name	Progress	Priority	Sprint
1	As a User, I can view the site's overview page	100% -	Must have -	1 -
2	As a User, I can register an account to login to the website	100% -	Must have -	1 -
3	As a User, I can login/logout to website after account registration	100% -	Must have -	1 -
4	As a User, I can create a new password when forgetting the password or to secure information	100% -	Should have -	2 -
5	As a User, I can view website without registration and login	100% -	Should have -	4 -
6	As a User, I can view my account details	100% -	Should have -	3 -
7	As a User, I can view website contact information	100% -	Could have -	4 -
8	As a User, I can view all the products of the website catalog	100% -	Should have -	2 -
9	As a User, I can view details (color, size, ...) of all products of the website	100% -	Should have -	3 -
10	As a User, I can select products and add to cart	100% -	Must have -	2 -
11	As a User, I can manage my shopping cart	100% -	Should have -	2 -
12	As a User, I can make purchases	100% -	Must have -	2 -
13	As a User, I can pay when receiving goods or pay online	100% -	Must have -	2 -
14	As a User, I can design their own room	100% -	Could have -	3 -
15	As a User, I can see the posts the website uploads	100% -	Should have -	3 -
16	As a User, I can comment under each blog post	100% -	Should have -	4 -
17	As a User, I can chat with the system	100% -	Should have -	3 -
18	As an Admin, I can login/logout to the system	100% -	Must have -	1 -
19	As an Admin, I can manage product catalog	100% -	Must have -	1 -
20	As an Admin, I can manage all products by category	100% -	Must have -	1 -
21	As an Admin, I can manage information of customers who have purchased products	100% -	Should have -	2 -
22	As an Admin, I can manage post categories on blogs	100% -	Should have -	4 -
23	As an Admin, I can manage blog posts	100% -	Must have -	3 -
24	As an Admin, I can manage the conversation between the client and the system	100% -	Should have -	3 -
25	As an Admin, I can maintain the system	100% -	Must have -	4 -

Figure 50. User story

2. Product backlog

The project of building and developing a sales website CiLi Decor is an individual project, so all the roles of product owner, scrum master, developer, tester are performed by an individual and supported by an individual. Directly from the trainer, the trainer has reviewed each sprint, so the list is made as all roles. To build this product backlog, project developer CiLi Decor applied the Moscow requirements analysis model to prioritize tasks to be done first at the beginning, thereby completing the product backlog. The following is a list of product backlogs.

The list of product backlogs below clearly shows the roles from the user's requirements, how the user views the system, what functions are needed and required, all arranged in order of priority first.

PRODUCT BACKLOG				
No	As a / an	I want to	So that	Priority
1	User	view the site's overview page	to view the website overview before registering and buying products	Must have +
2		register an account to login to the website	to login to the website	Must have +
3		login/logout to website after account registration	to access the page that matches your role on the system	Must have +
4		create a new password	when forgetting the password or to secure information	Should have +
5		view website without registration and login	to view the website overview before registering and buying products	Should have +
6		View detailed information about your account	for account information	Should have +
7		view website contact information	for site contact information	Could have +
8		view all the products of the website catalog	to select the products in the list to buy	Should have +
9		view details (color, size, ...) of all products of the website	to know the information, size of product	Should have +
10		select products and add to cart	to make a purchase or save the product I want to select	Must have +
11		manage your shopping cart	to make a purchase, delete products not purchased	Should have +
12		make purchases	to have the product shipped to my address	Must have +
13		pay on delivery or pay online	to pay via electronic devices without having to use cash or pay on delivery	Must have +
14		design their own room	to be able to imagine the space where the product will be placed	Could have +
15		see the articles uploaded by the website	to collect and learn useful information about interior design, space	Should have +
16		comment under every post in blogs	the system update the issues that customers comment on	Should have +
17		chat with the system	to exchange faster with the system when buying on the website	Should have +
18	Admin	login/logout to the system	to access the website as admin	Must have +
19		manage product catalog	to add, edit, delete product categories	Must have +
20		manage all products by category	to add, edit, delete products in the product list	Must have +
21		manage information of customers who have purchased products	to know the number and information of customers who have purchased products on the website	Should have +
22		Manage post categories on blogs	to add, edit, delete post categories on blogs	Should have +
23		Manage blog posts	to add, edit, delete blog posts	Must have +
24		manage the conversation between the customer and the system	answer questions and communicate with customers via chat	Should have +
25		maintain the system	maintain system data: backup, restore database, ...	Must have +

Figure 51. Product backlog

The content in each sprint is formed from user stories, and is broken down into tasks that have different characteristics to perform but must include the process of designing, coding and testing, ensuring the task. Once the time is up for a sprint, the remaining tasks that have not yet been completed will be moved to the next sprint.

I used google sheet as a tool to list and manage a list of agile related documents. The google sheet link detailing all the documents on agile is summarized here:

<https://docs.google.com/spreadsheets/d/1UUsOKAV5cMqcbg7oMYm-5gnWQjsMdUnMkod8-MipJ8g/edit#gid=980671004>

3. Sprint 1

3.1. Sprint backlog sprint 1

In the first sprint, the user stories I implemented included:

- As a User, I can view the site's overview page
- As a User, I can register an account to login to the website
- As a User, I can login/logout to website after account registration

- As an Admin, I can login/logout to the system
- As an Admin, I can manage product catalog
- As an Admin, I can manage all products by category

3.2. Burn down chart sprint 1

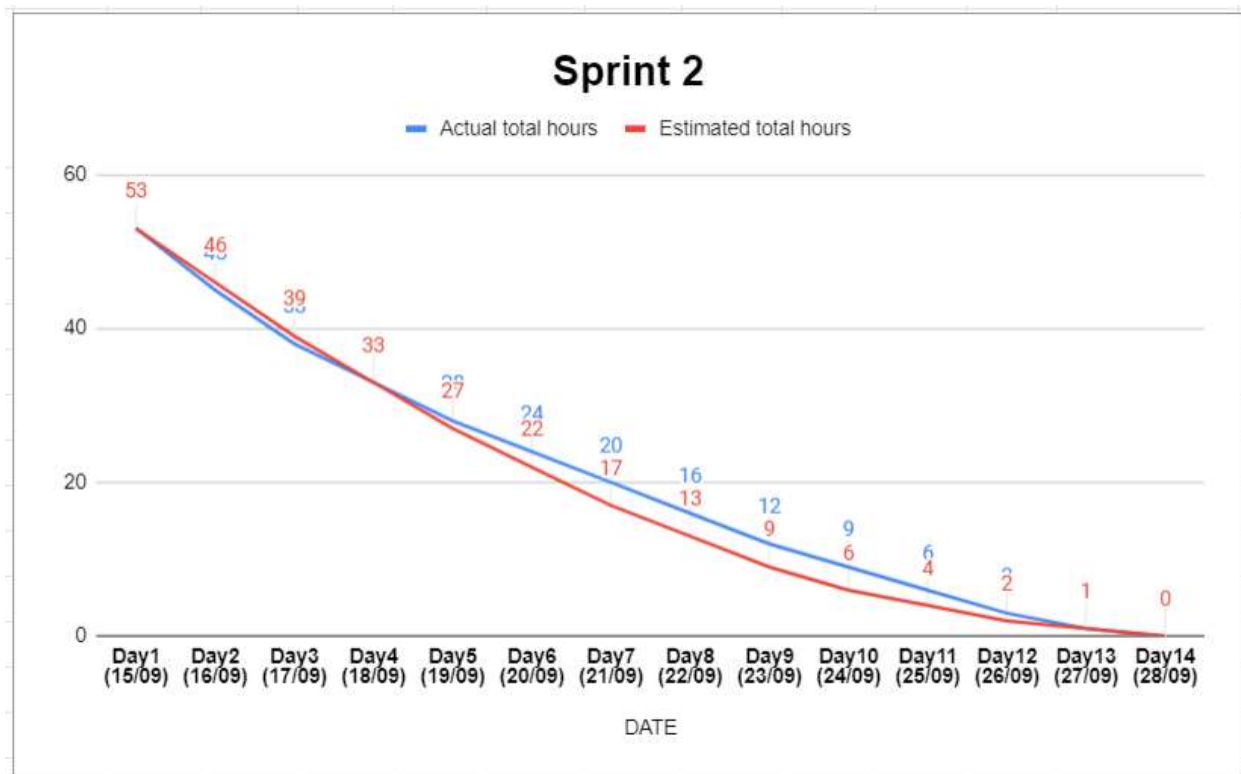


Figure 52. Burn down chart sprint 1

According to the image of the burn down chart above, it can be seen that the predefined amount of time and the actual amount of time are almost the same, only about 1 to 2 hours difference. This shows that sprint 1 has met the requirements.

3.3. Daily meeting sprint 1

Time	17/09 - 29/09	
Planning		
Date	Hours	Attendance
17/09/2021	7PM - 10PM	1/1
Tool: Google meet		
Tasks		
As a User, I can view the site's overview page		
As a User, I can register an account to login to the website		
As a User, I can login/logout to website after account registration		
As an Admin, I can login/logout to the system		
As an Admin, I can manage product catalog		
As an Admin, I can manage all products by category		
Deadline	29/09/2021	

Figure 53. Daily meeting sprint 1

The first daily meeting did not have an evaluation of the trainer, instead, it was given the work to be done in sprint 1 for the trainer to understand and support in the evaluation part of sprint 2.

4. Sprint 2

4.1. Sprint backlog sprint 2

In the second sprint, the user stories I implemented included:

- As a User, I can create a new password when the password or to secure information
- As a User, I can view all the products of the website catalog
- As a User, I can select products and add to cart
- As a User, I can manage my shopping cart
- As a User, I can make purchases
- As a User, I can pay when receiving goods or pay online
- As an Admin, I can manage information of customers who have purchased products

4.2. Burn down chart sprint 2

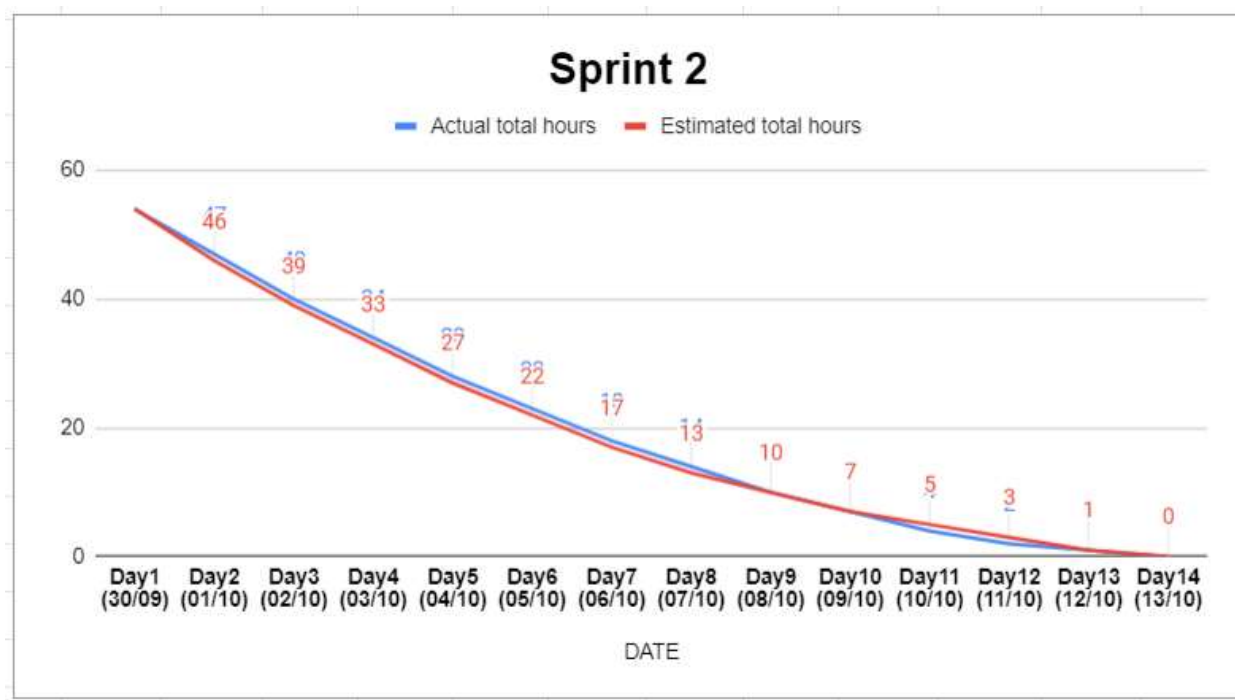


Figure 54. Burn down chart sprint 2

According to the image of the burn down chart above, it can be seen that the predefined amount of time and the actual amount of time are almost the same, only about 1 to 2 hours difference. This shows that sprint 2 has met the requirements.

4.3. Daily meeting sprint 2

Time	30/09 - 14/10	
Planning		
Date	Hours	Attendance
30/09/2021	7PM - 10PM	1/1
Tool: Google meet		
Review Tasks of sprint 1		
Review results with faculty work		
Discuss what needed in next week		
Tasks		
As a User, I can create a new password when the password or to secure information		
As a User, I can view all the products of the website catalog		
As a User, I can select products and add to cart		
As a User, I can manage my shopping cart		
As a User, I can make purchases		
As a User, I can pay when receiving goods or pay online		
As an Admin, I can manage information of customers who have purchased products		
Deadline	14/10/2021	

Figure 55. Daily meeting sprint 2

In sprint 2, there was an assessment of the trainer from the tasks in sprint 1, showing that the results of sprint 1 have fully met all the tasks and there are no tasks to be added to sprint 2. Also list tasks to be completed in sprint 3

5. Sprint 3

5.1. Sprint backlog sprint 3

In the third sprint, the user stories I implemented included:

- As a User, I can view my account details
- As a User, I can view details (color, size, ...) of all products of the website
- As a User, I can design their own room
- As a User, I can see the posts the website uploads
- As a User, I can chat with the system

- As an Admin, I can manage blog posts
- As an Admin, I can manage the conversation between the client and the system

5.2. Burn down chart sprint 3

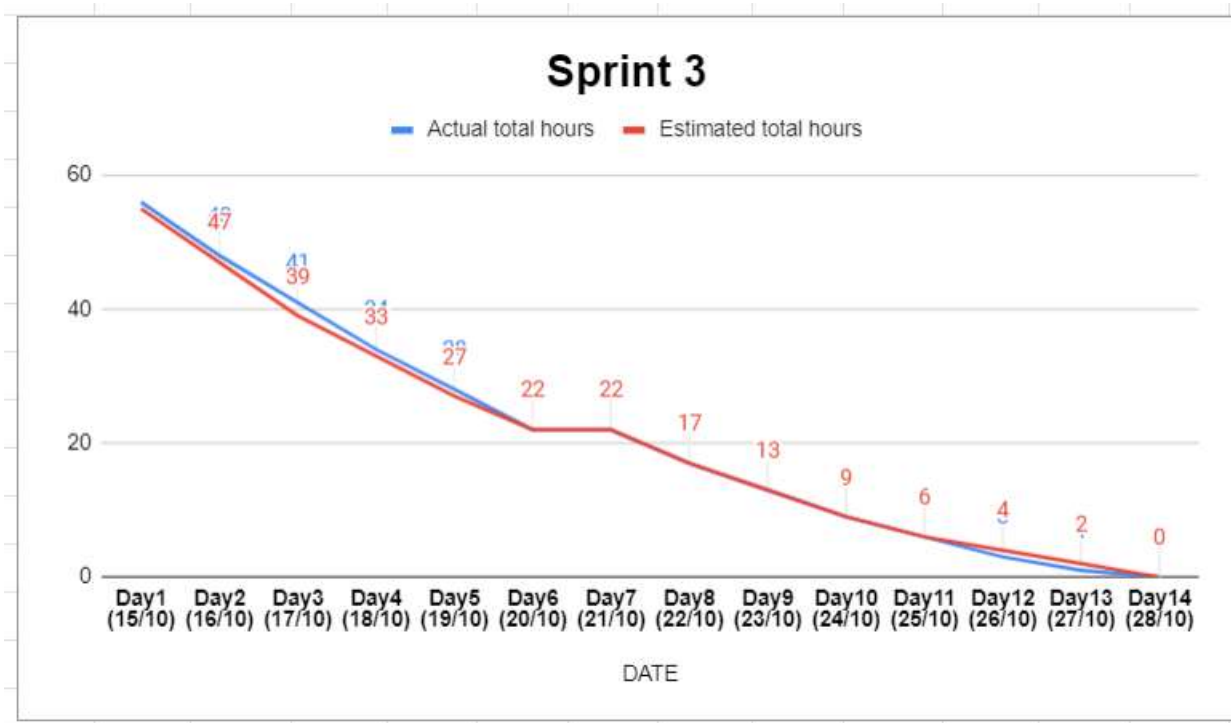


Figure 56. Burn down chart sprint 3

According to the image of the burn down chart above, it can be seen that the predefined amount of time and the actual amount of time are almost the same, only about 1 to 2 hours difference. This shows that sprint 3 has met the requirements.

5.3. Daily meeting sprint 3

Time	15/10 - 29/10	
Planning		
Date	Hours	Attendance
15/10/2021	7PM - 10PM	1/1
Tool: Google meet		
Review Tasks of sprint 2		
Review results with faculty work		
Discuss what needed in next week		
Tasks		
As a User, I can view my account details		
As a User, I can view details (color, size, ...) of all products of the website		
As a User, I can design their own room		
As a User, I can see the posts the website uploads		
As a User, I can chat with the system		
As an Admin, I can manage blog posts		
As an Admin, I can manage the conversation between the client and the system		
Deadline	29/10/2021	

Figure 57. Daily meeting sprint 3

In sprint 3 there was an evaluation of the trainer from the tasks in sprint 2, showing that the results of sprint 2 have fully met all the tasks and no tasks have to be added to sprint 3. Also list tasks to be completed in sprint 4

6. Sprint 4

6.1. Sprint backlog sprint 4

In the fourth sprint, the user stories I implemented included:

- As a User, I can view website without registration and login
- As a User, I can view website contact information
- As a User, I can comment under each blog post
- As an Admin, I can manage post categories on blogs

- As an Admin, I can maintain the system

6.2. Burn down chart sprint 4

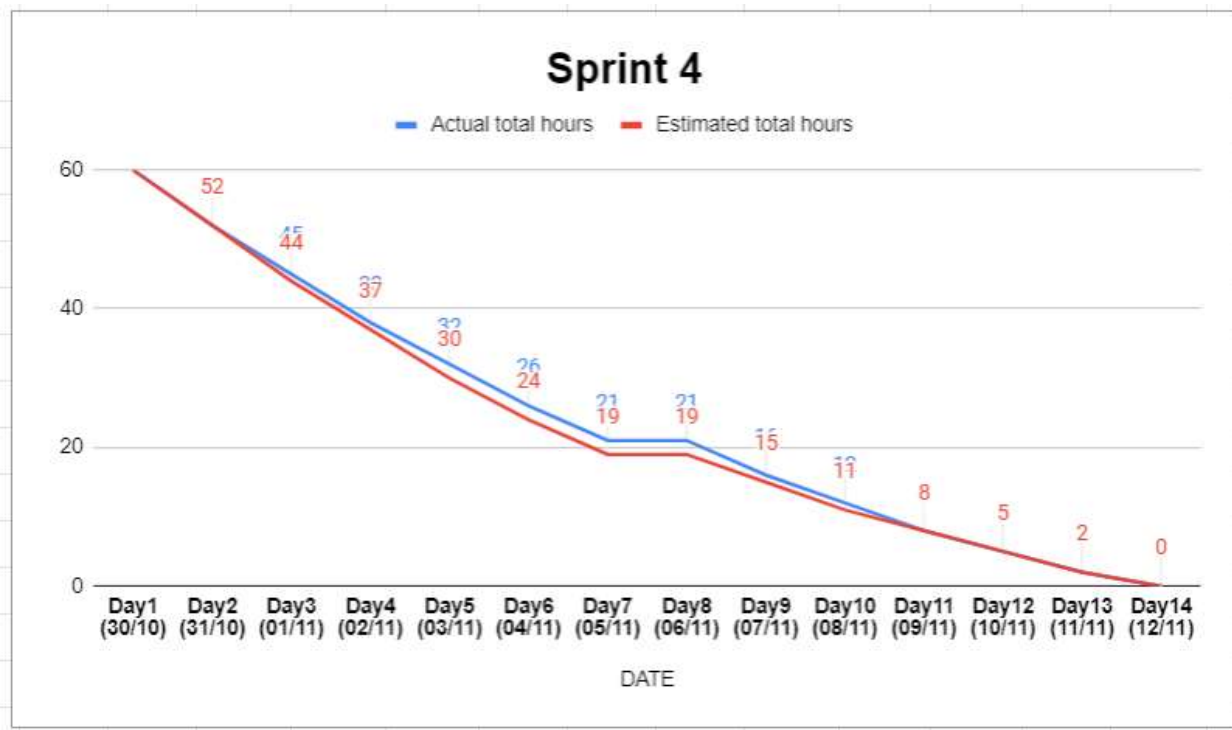


Figure 58. Burn down chart sprint 4

According to the image of the burn down chart above, it can be seen that the predefined amount of time and the actual amount of time are almost the same, only about 1 to 2 hours difference. This shows that sprint 4 has met the requirements.

6.3. Daily meeting sprint 4

Time	30/10 - 13/11	
Planning		
Date	Hours	Attendance
30/10/2021	7PM - 10PM	1/1
Tool: Google meet		
Review Tasks of sprint 3		
Review results with faculty work		
Discuss what needed in next week		
Tasks		
As a User, I can view website without registration and login		
As a User, I can view website contact information		
As a User, I can comment under each blog post		
As an Admin, I can manage post categories on blogs		
As an Admin, I can maintain the system		
Deadline		13/11/2021
Review Tasks of sprint 4		
Review results with faculty work		
Discuss what needed in next week		

Figure 59. Daily meeting sprint 4

In sprint 4, there was an evaluation of the trainer from the tasks in sprint 3, showing that the results of sprint 3 have fully met all the tasks and no tasks have to be added to the sprint 4. At the same time, schedule an appointment. assessment sprint 4 on the last day of the course.

7. Summary

The project of building and developing a website selling furniture CiLi Decor has successfully applied the Agile software development model with 4 sprints with small tasks. Looking at the images of the burn down chart and the daily meeting above, it shows that the plan and the experiment are almost balanced, showing that the website developer has tried very hard to complete the set time. out though with so many roles.

VII. Evaluation

1. Results - Screenshots important features

1.1. Administrator

1.1.1. Admin overview page



Figure 60. Admin overview page

When the administrator logs in to the website, this overview screen will be displayed, but these charts have not been built and feature development yet, but this function will be developed in the future.

1.1.2. Manage Category

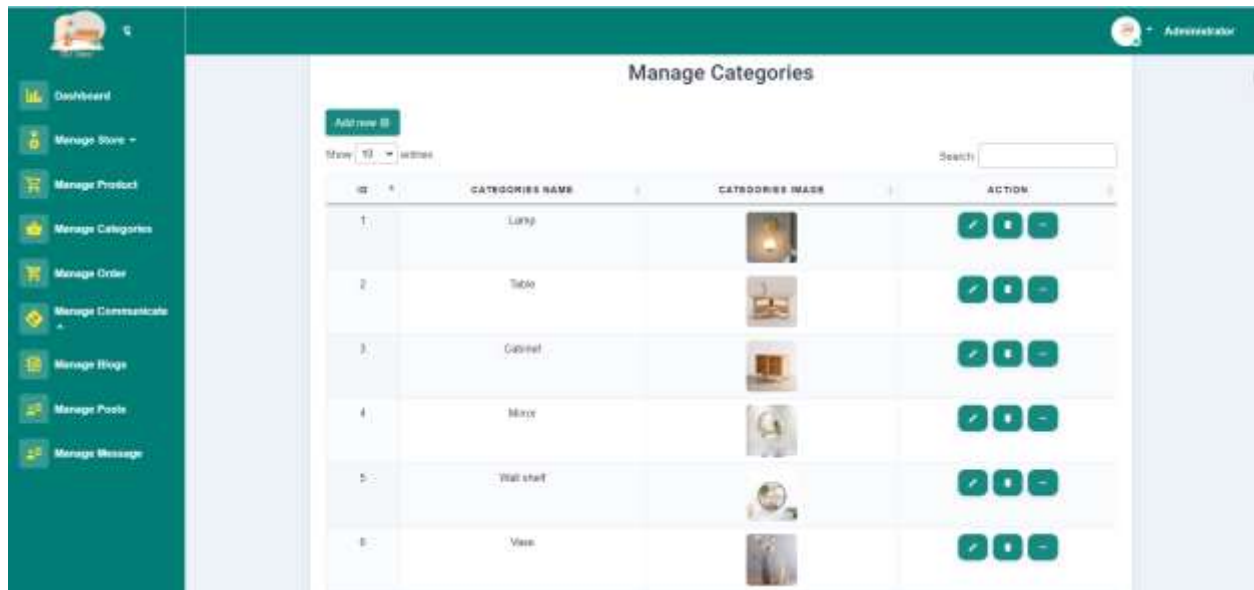


Figure 61. Manage Categories

This is the interface design of the admin's product category management screen interface design, in the screen includes functions such as: Add product categories, Edit product categories, View product category details, menu items, and more. show product category search, View product category list, Delete product category. Each function can be represented by buttons on the screen.

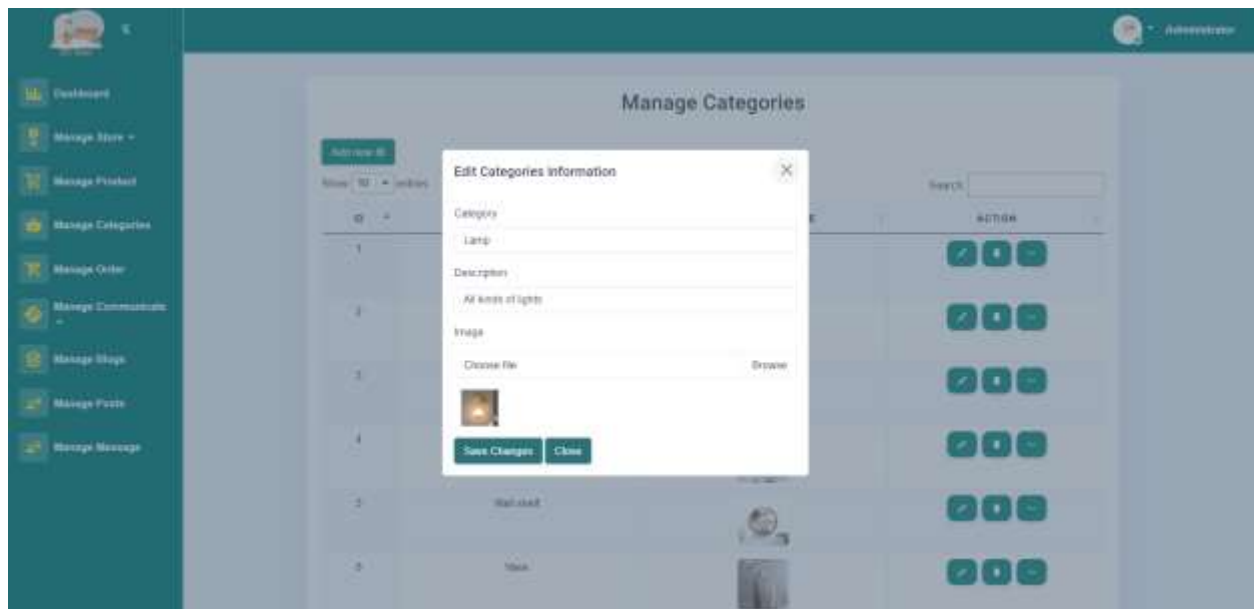


Figure 62. Edit categories information

This is the screen update category of admin, user to enter the full full information and save again the new information that to change or select the node kill to abc and close form

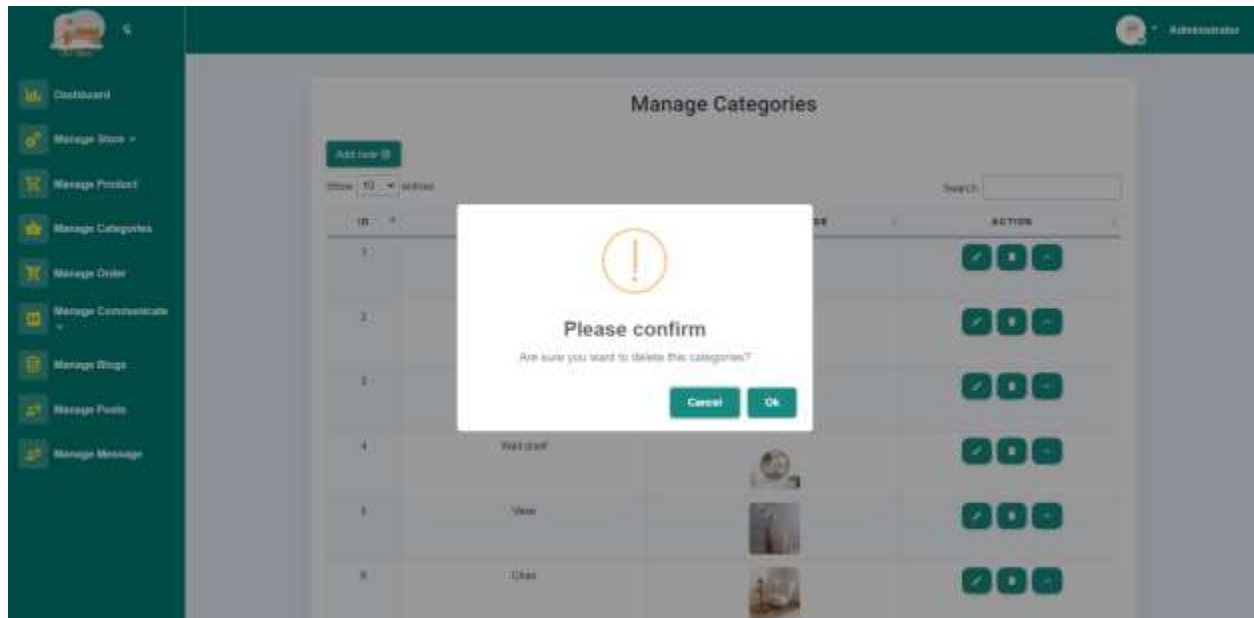


Figure 63. Category deletion confirmation form

This is the admin's delete categories screen, the user needs to select the record and then click the delete button or select the cancel button to cancel and close the form.

1.1.3. Manage Product

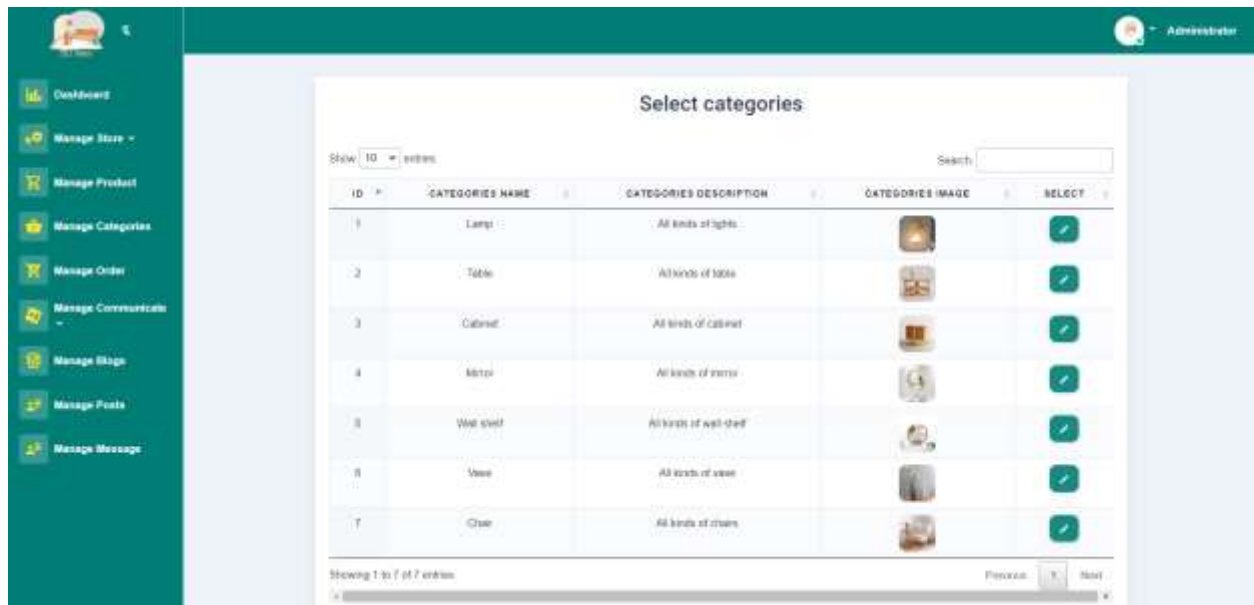


Figure 64. Select categories

This is the interface design of the product category selection screen to add products according to the admin's product category, the screen includes functions such as: Select each product category you want to add products and then press the edit button to switch to the screen to add products to the desired dialog as shown below. Each function can be represented by buttons on the screen.

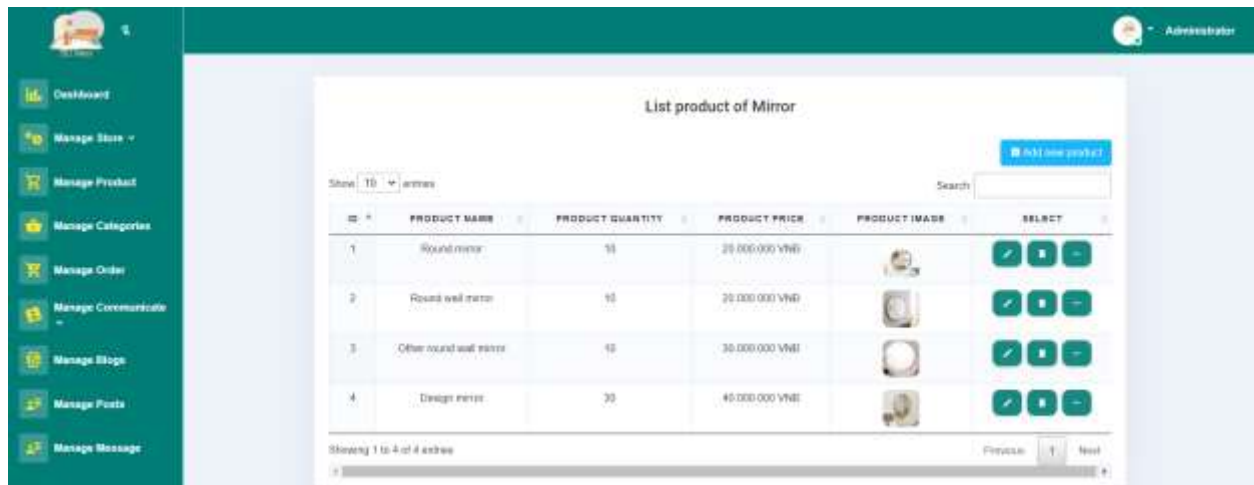


Figure 65. Add products by category mirror

After selecting the product category you want to add new, this is the screen to add products according to that product category, in the screen include functions such as: Add product, Edit product, view list product, delete product, find product search,.. Each function can be shown by buttons on the screen.

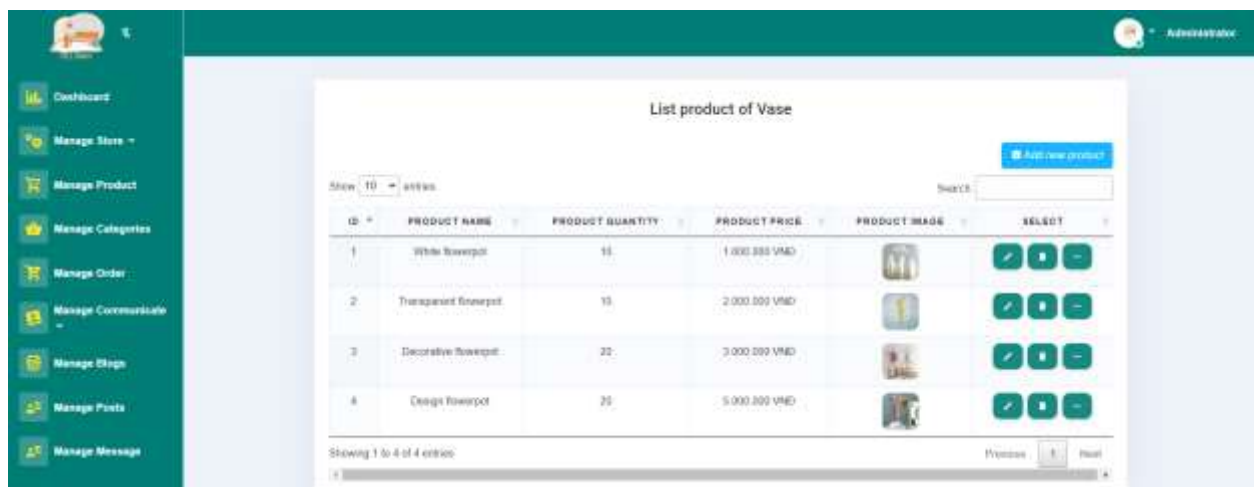


Figure 66. Add products by category vase

1.1.4. Manage Order

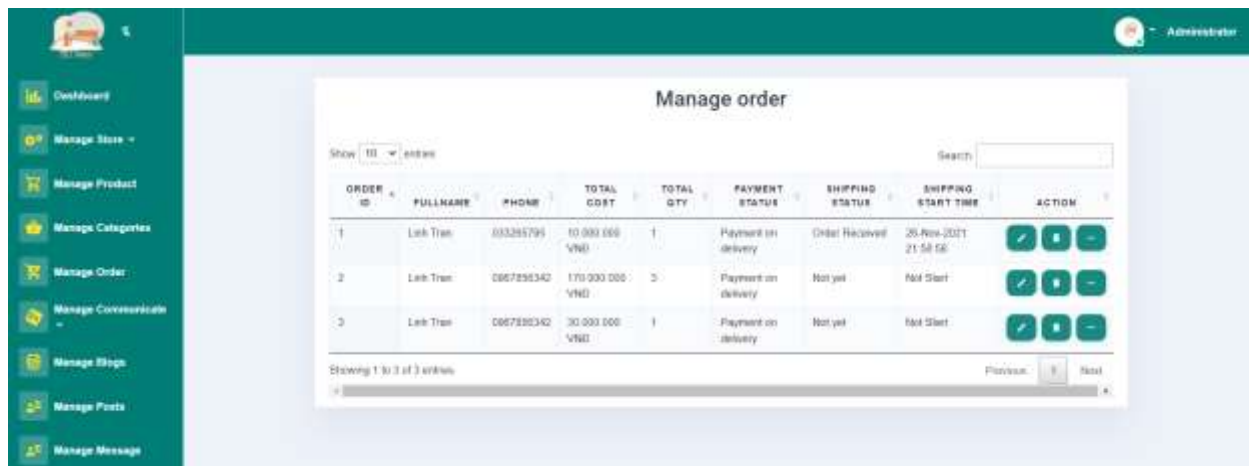


Figure 67. Manage Order

This is the design of the screen interface design to manage the list of customers who ordered products on the website, the screen includes functions such as: Edit customer order information, delete customer orders, search for customers to order. , see detailed customer order information. Each function can be represented by buttons on the screen.

1.1.5. Manage blogs



Figure 68. Manage blogs

This is the interface design of the website's blogs page management interface, in the screen includes functions such as: Add blogs, Edit blogs, view list of blogs, delete blogs, search blogs, .. Each function is can be represented by buttons on the screen.

1.1.6. Manage post

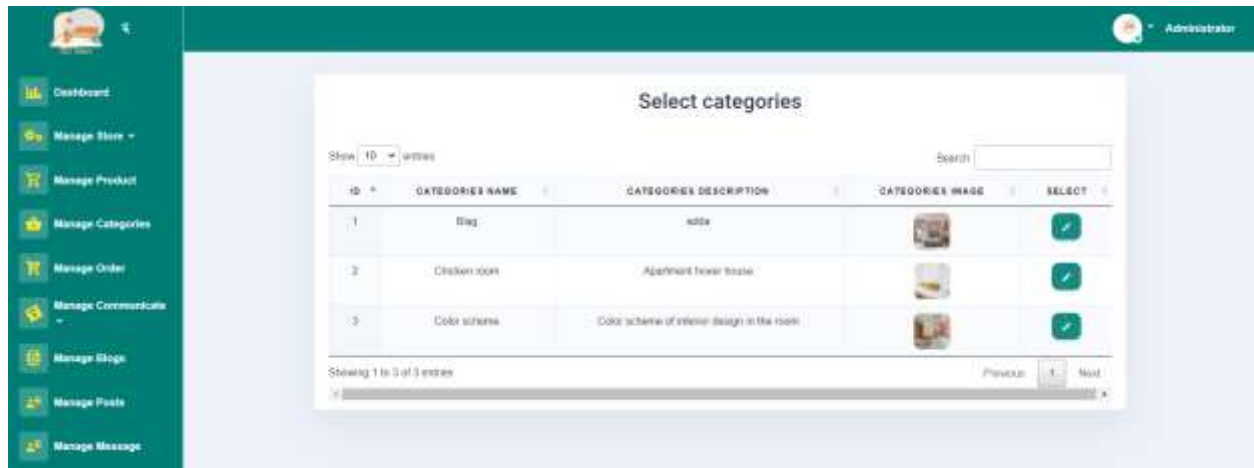


Figure 69. Select categories blogs

This is the interface design of the blog category selection screen to add posts according to the admin's blogs category, in the screen include functions such as: Select each blog category you want to add a post and then press the edit button to switch to The screen adds post to the desired dialog box as shown below. Each function can be represented by buttons on the screen.

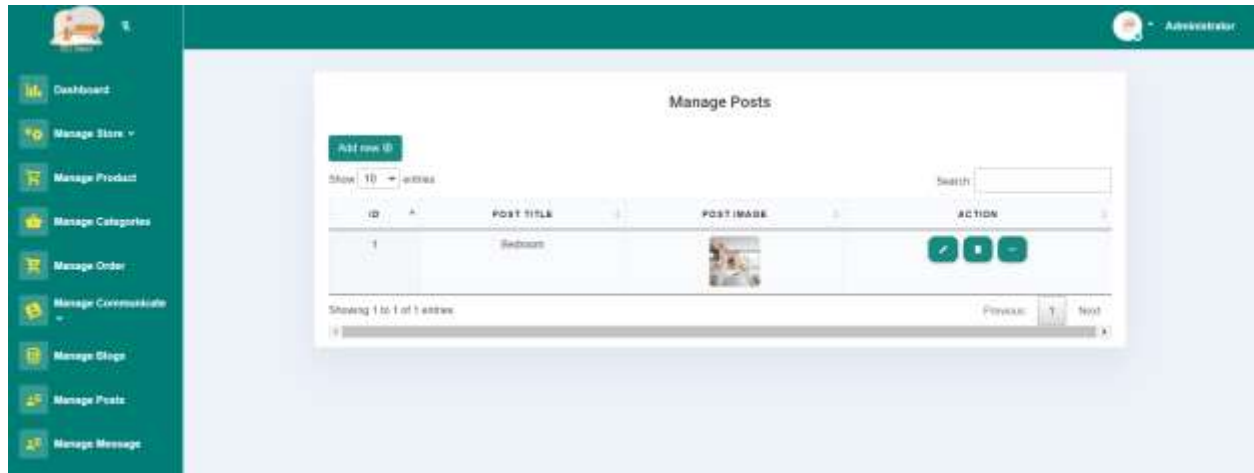


Figure 70. Manage post

This is the design of the screen interface to manage the list of posts of the website, the screen includes functions such as: Add post, Edit post, view list post, delete bpost, search for posts, .. All functions can be represented by buttons on the screen.

1.1.7. Manage chat

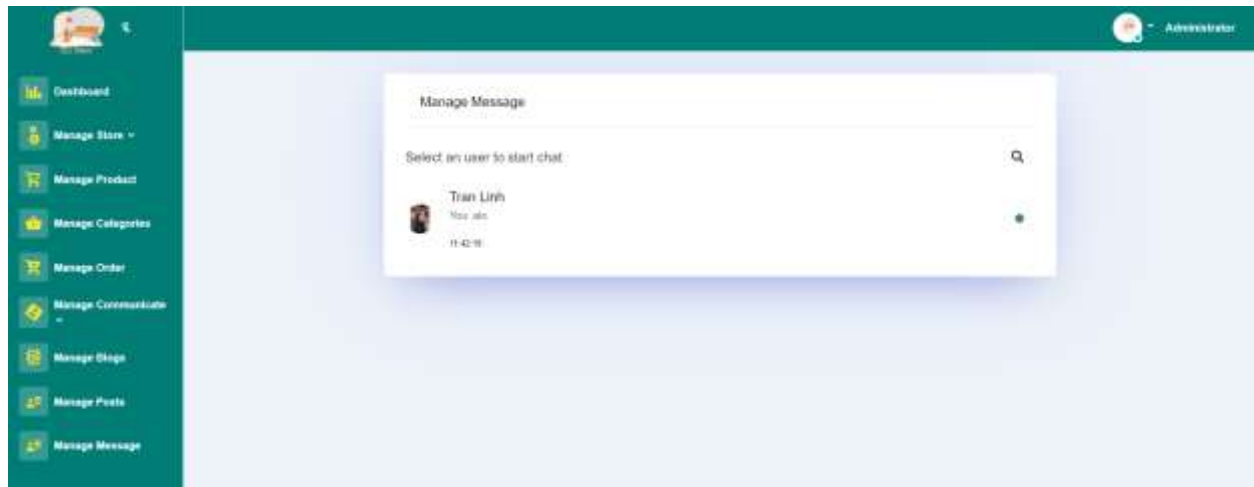


Figure 71. Manage chat

This is the interface design of the screen interface to manage the message list of chat users on the website, in the screen includes functions such as: view the list of messages and view message details, reply to messages message. Each function can be represented by buttons on the screen.

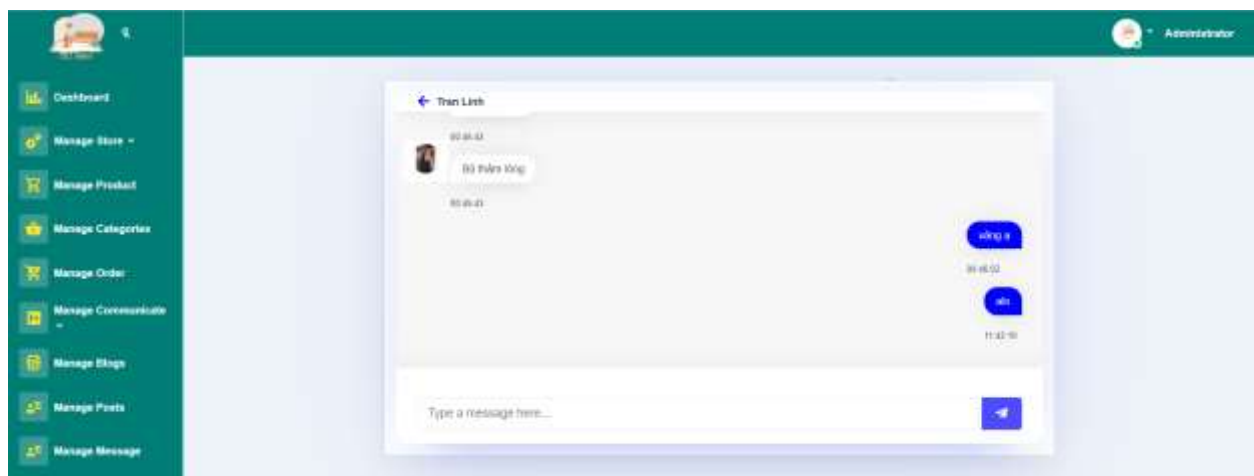


Figure 72. Manage chat

1.2. Customer

1.2.1. Login page

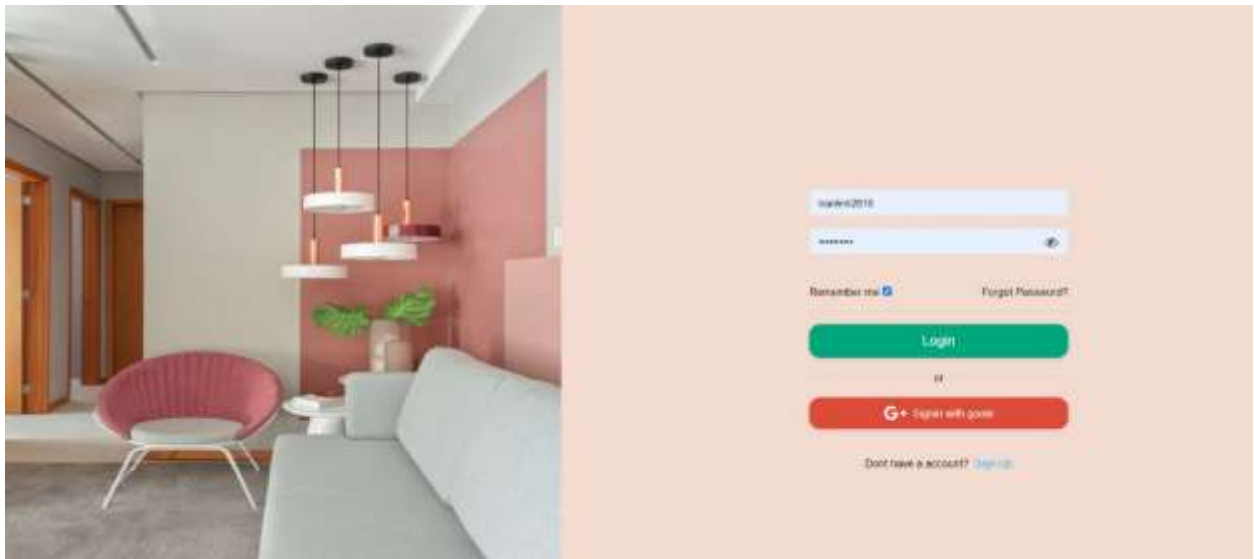


Figure 73. Login page

This is the login screen, once you have registered an account, you will enter your username and password in the corresponding boxes and click login.

If the user has not entered the information and clicked login, the screen will display a red message as follows:

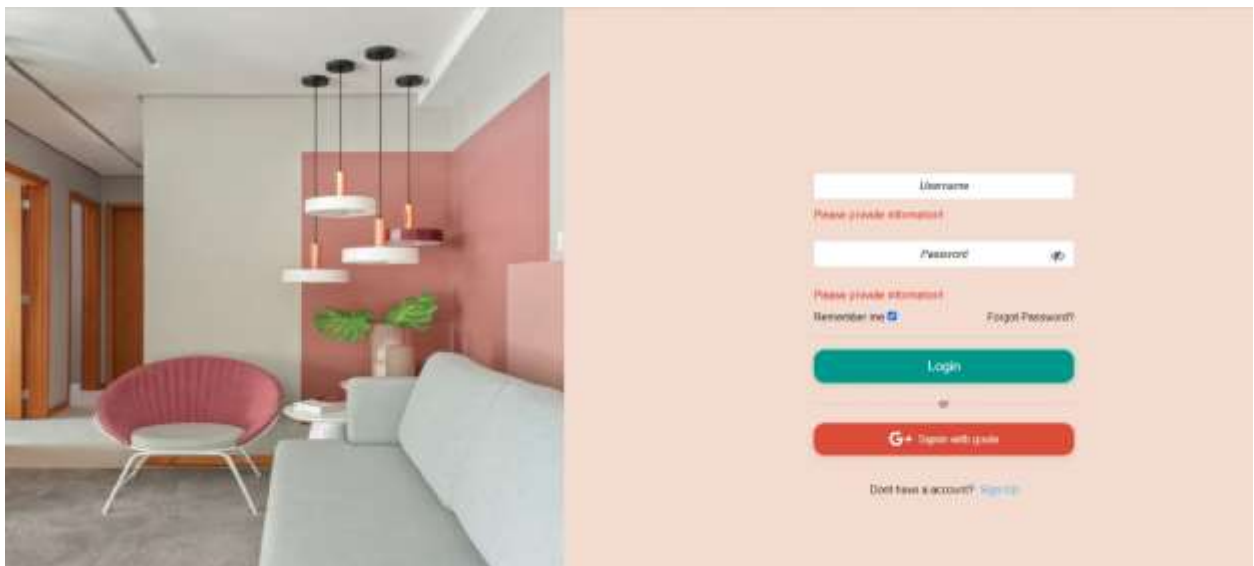


Figure 74. Login page

In case you are not logged in, you can switch to the account registration screen by clicking the register button below.

1.2.2. Signup page

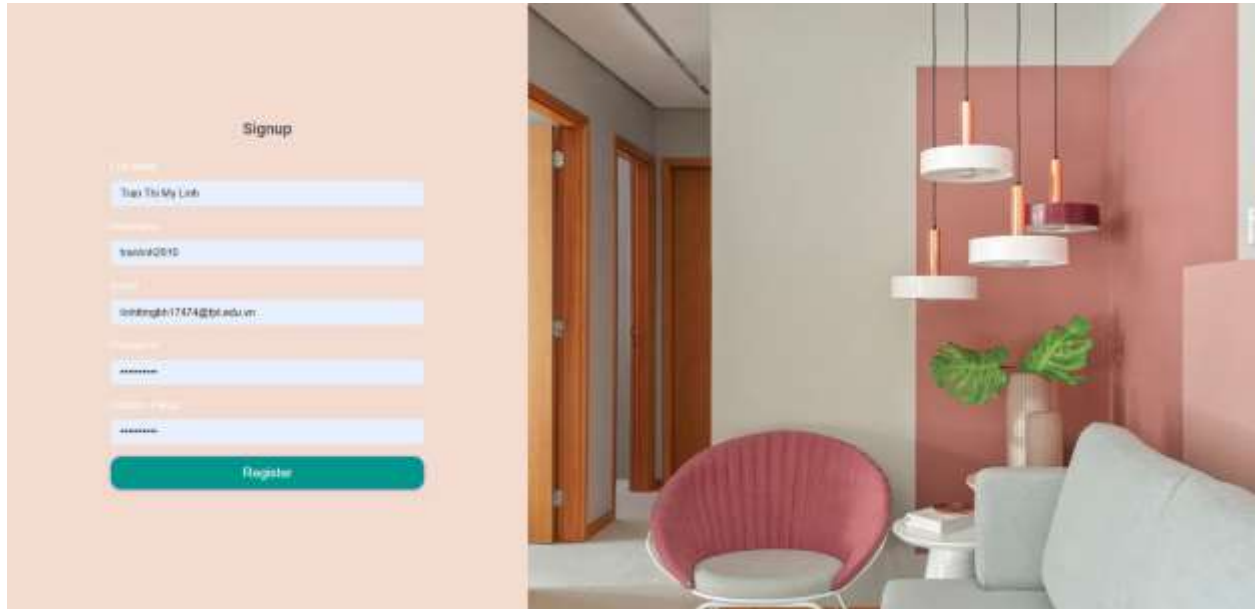


Figure 75. Signup page

This is the registration screen when the user registers an account, he will enter all the information in the corresponding boxes as shown in the image above and click register.

If the user has not entered the information and clicked register, the screen will display a red message as follows:

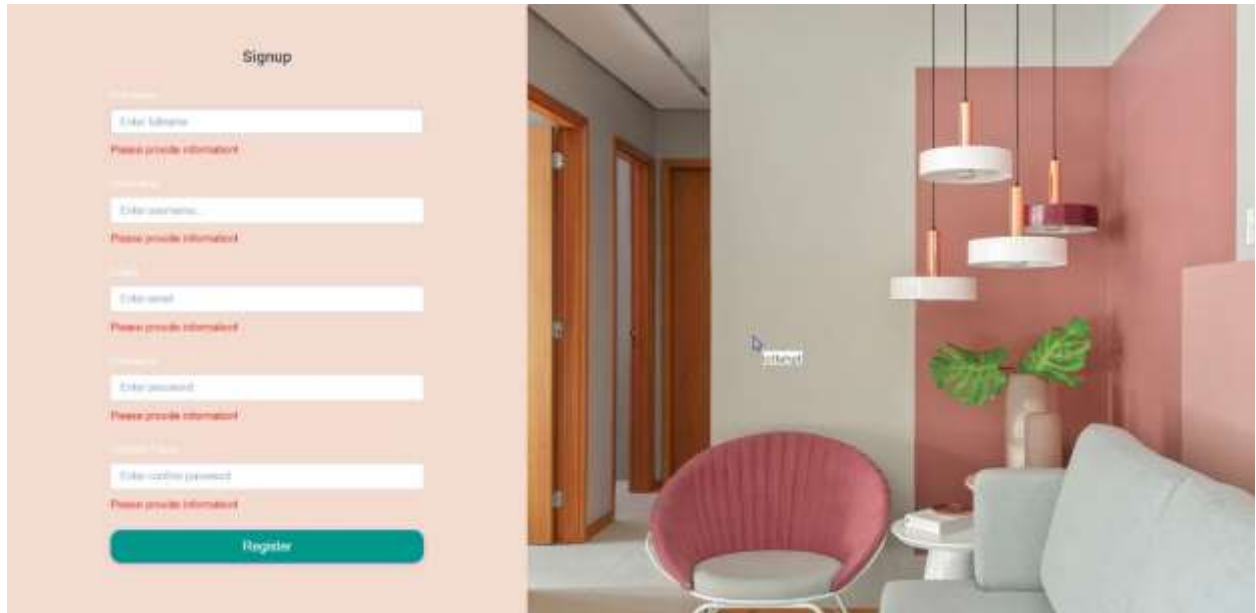


Figure 76. Signup page

1.2.3. Create new password and change password

In case the customer has already registered but forgot his password and cannot log in, click the forgot password button on the login screen to change the password.

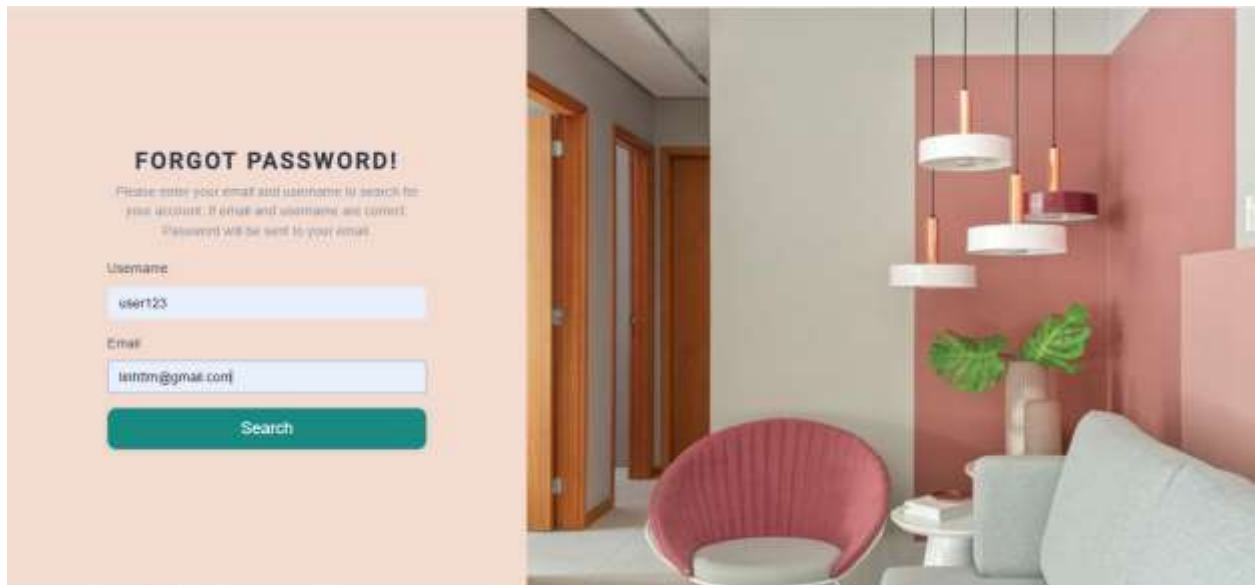


Figure 77. Create new password and change password

Enter your information here to retrieve your password. If the user has not entered the information and clicks search, the screen will display a red message as follows:

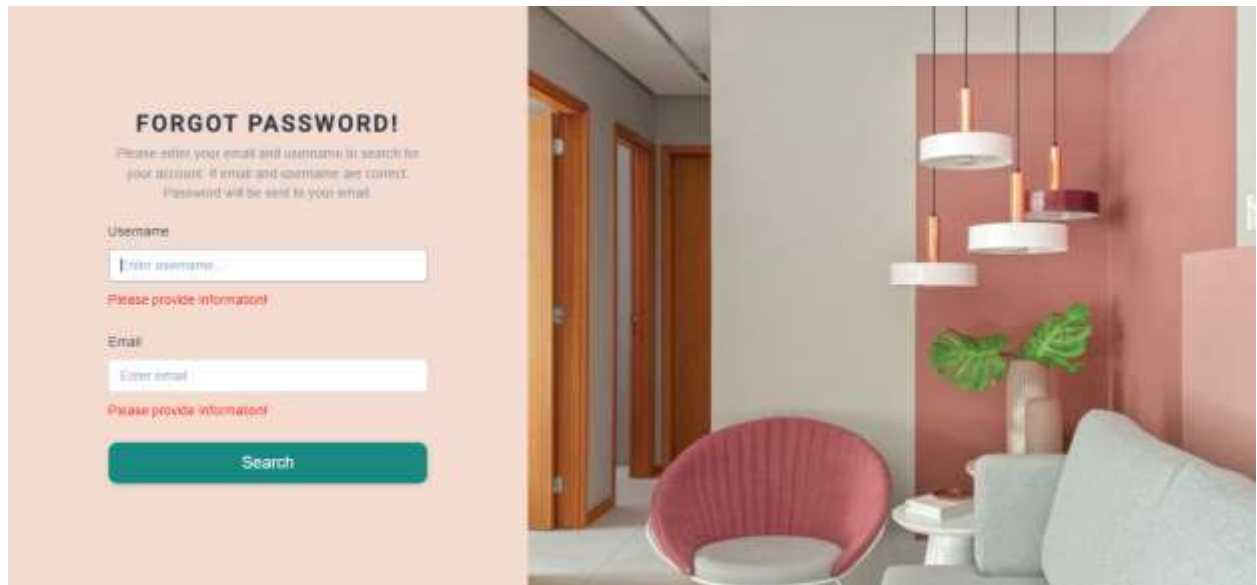


Figure 78. Create new password and change password

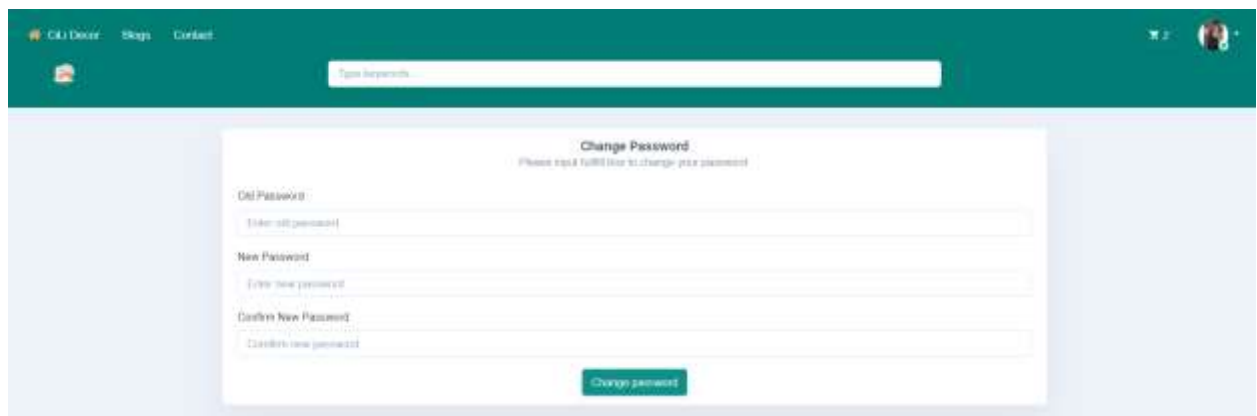


Figure 79. Reset password

Index page Blogs Contact

Type keywords...

Change Password

Please input full box to change your password.

Old Password

Enter old password.

This field is required.

New Password

Enter new password.

Information required! Please enter full information.

Confirm New Password

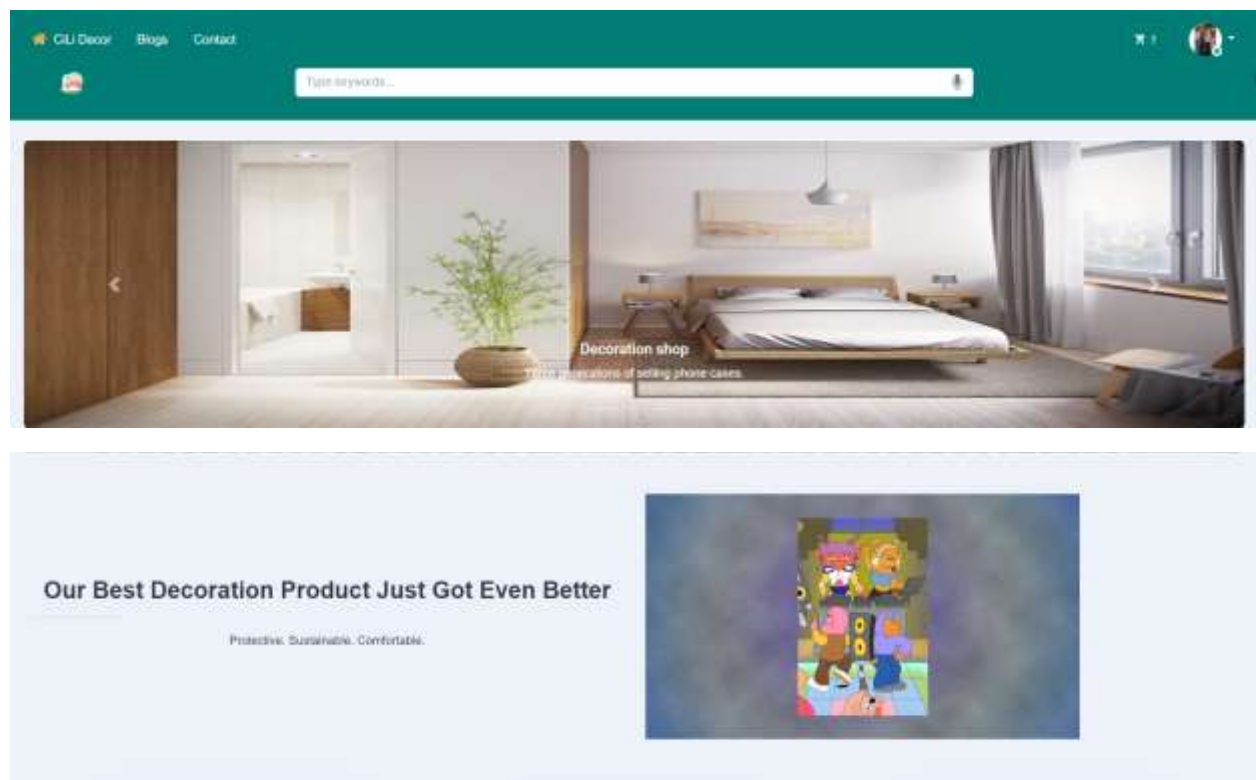
Confirm new password.

Information required! Please enter full information.

Change password Chat

Figure 80. Reset password

1.2.4. Home page



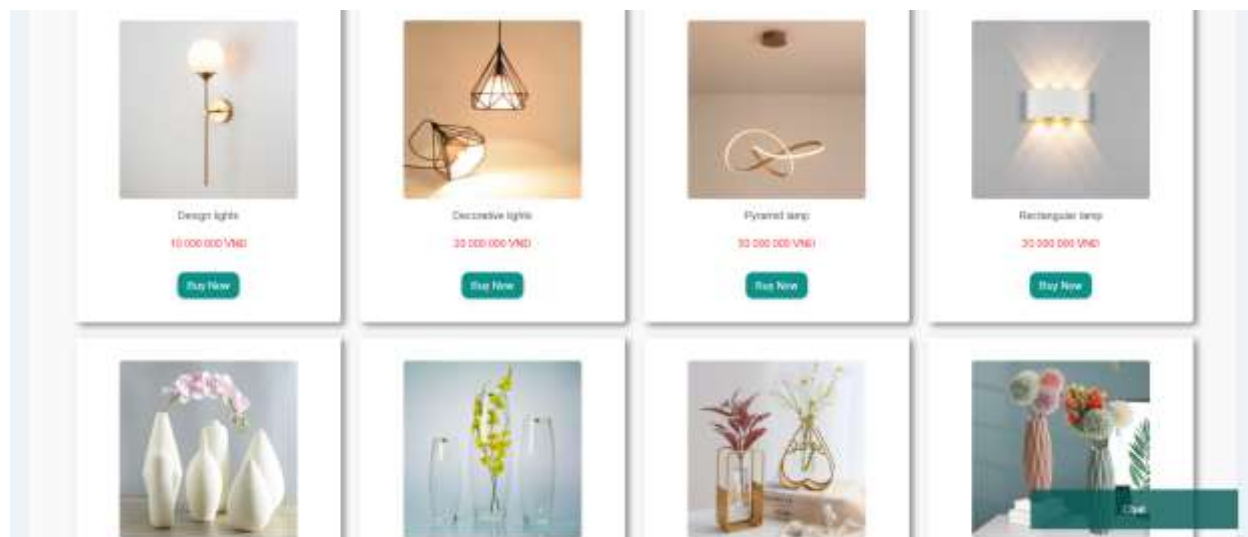
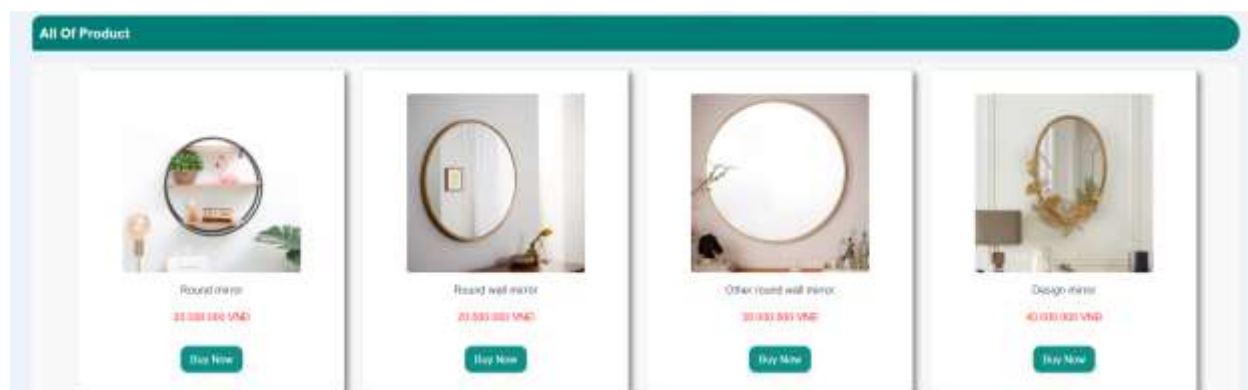
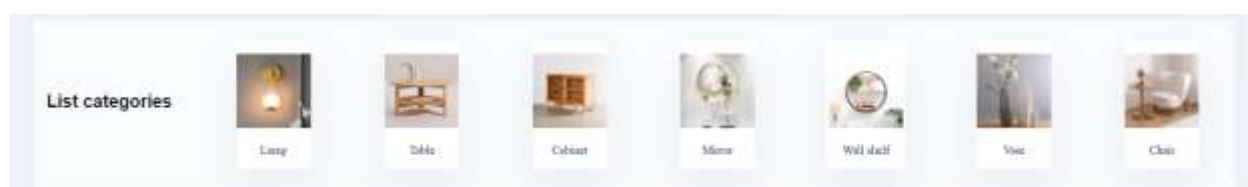
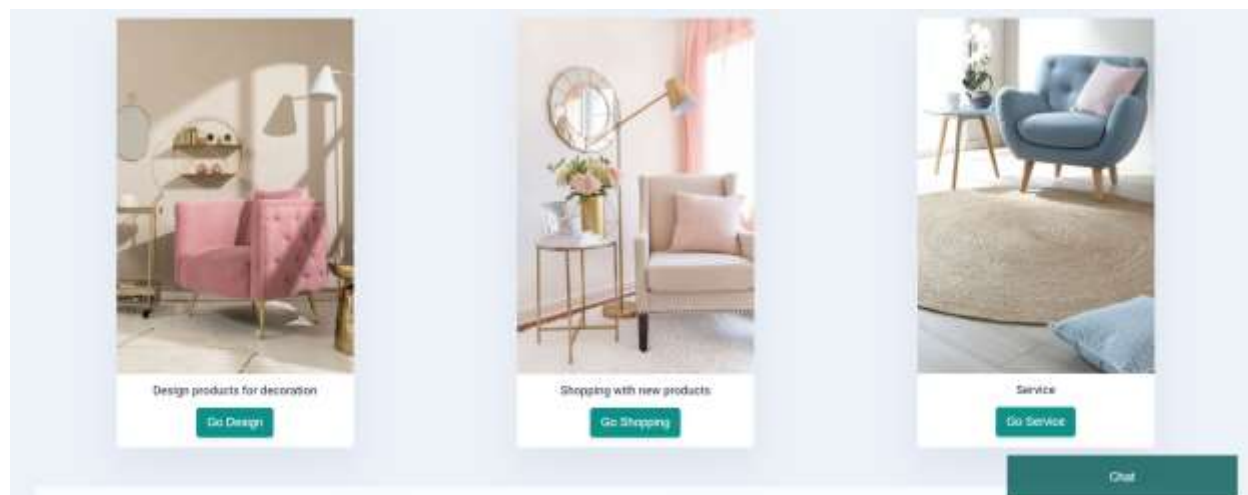




Figure 81. Home page

This is the home screen that includes the functions that are displayed on the screen respectively, the home screen is applied the type of website that combines all the functions into one page so it is easy to do all the operations. on the same website.

1.2.5. Search

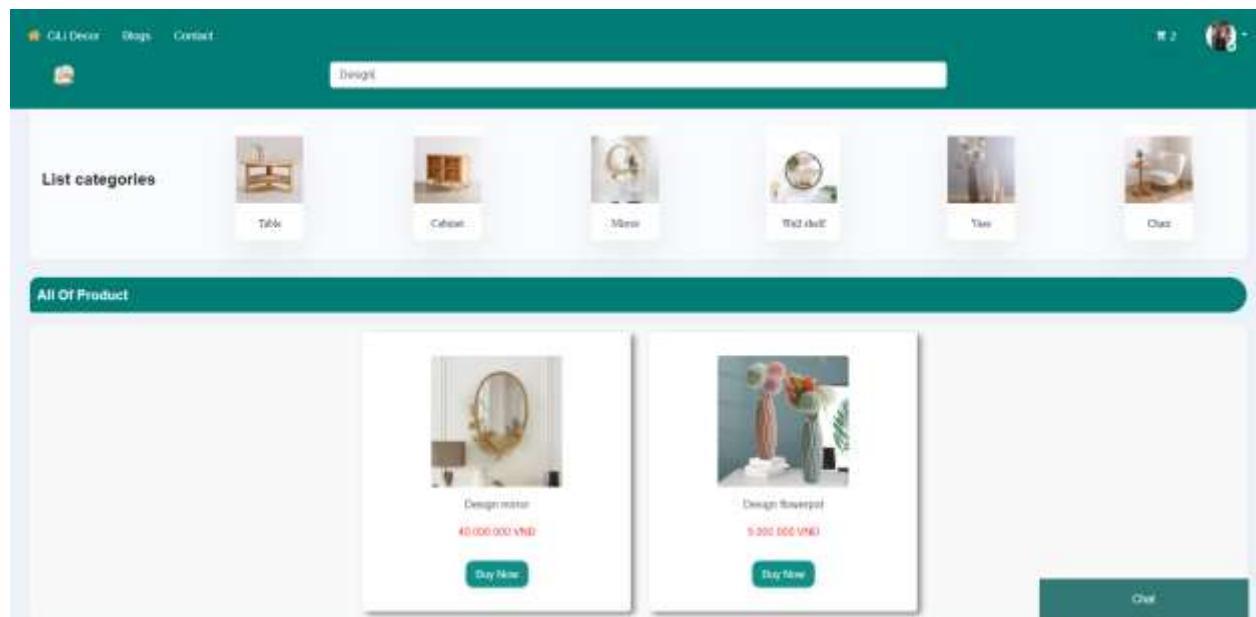


Figure 82. Search

On the home screen, customers can search for products

1.2.6. View detail product

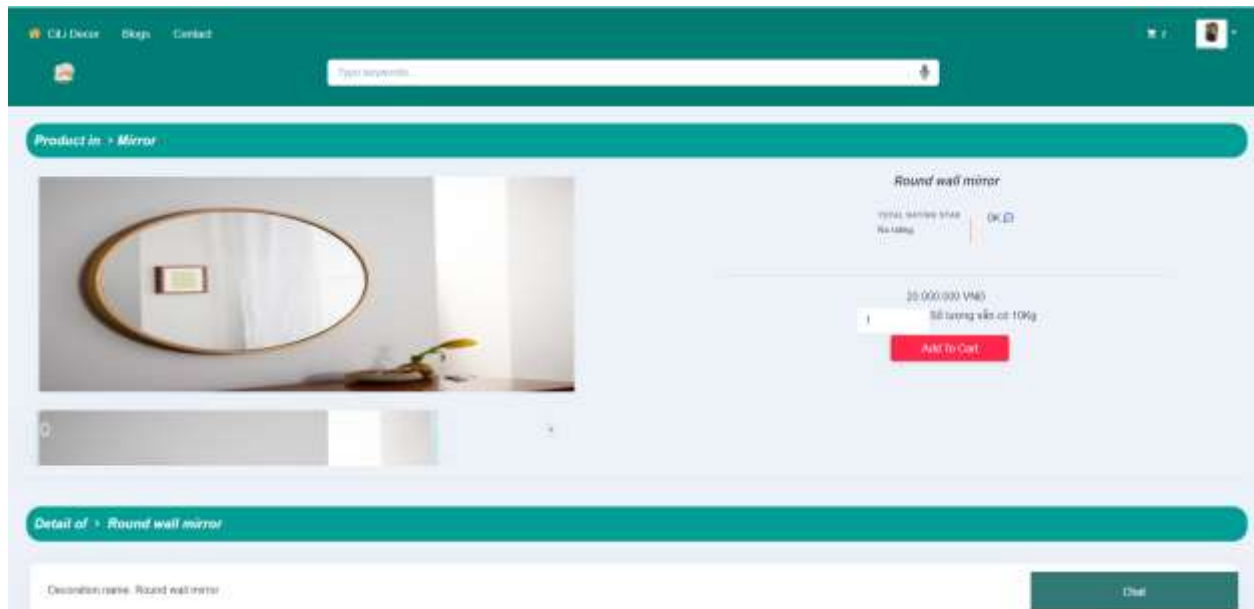


Figure 83. View detail product

Clicking on a product will display detailed information about that product as shown in the screenshot above. Then click add to cart, the product will be transferred to the customer's cart.

1.2.7. Shopping cart

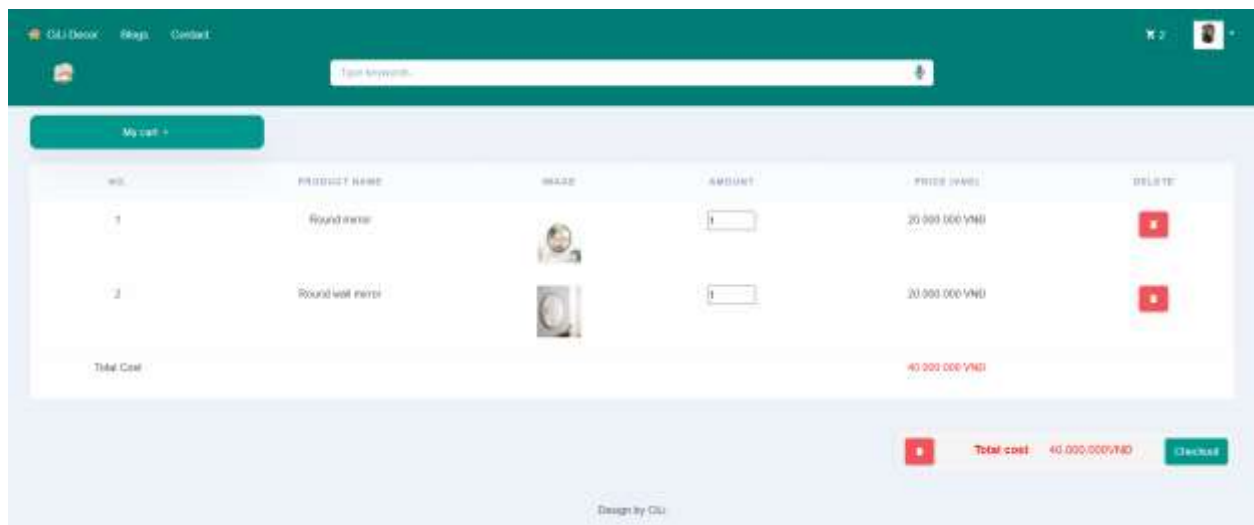


Figure 84. Shopping cart

In the customer's shopping cart, the customer can delete unnecessary products or if purchased, the customer can proceed to checkout by clicking the Checkout button on the screen.

1.2.8. Checkout

Checkout form
Below is form checkout of seafoods, please fill information below to order.

Billing address

First name: Last name:

Phone number:

Email (Optional):

City: District: Zip:

Address:

Address 2 (Optional):

Note (Optional):

☐ Shipping address is the same as my billing address
☐ Save this information for next time

Your cart

Round mirror	20,000,000 VND
Round wall mirror	20,000,000 VND
Total (VND)	40,000,000 VND

Figure 85. Checkout

Customers will enter all information in the fields in the checkout form to make online purchases and payments. In case the customer does not enter the information on the screen, the red message will be displayed.

[Index page](#)

Checkout form

Below is form checkout of seafoodweb please fill information below to order.

Billing address

First name

Last name

Please provide information!

Phone number

phone number

Please provide your phone number!

Email (Optional)

xxx@xxxxxx.com

Please provide email!

City

Province / City

Please select a province!

District

Township / District

Please select a district!

Zip

Please provide a zipCode!

Your cart

Round shrimp

Round shrimp

30.000.000 VND

Round meat shrimp

Round meat shrimp

30.000.000 VND

Total (VND)

40.000.000 VND

Please input

Continue

Address

Address

1234 Main St

Please provide an address!

Address 2 (Optional)

Apartement or suite

Name (Optional)

Apartement or suite

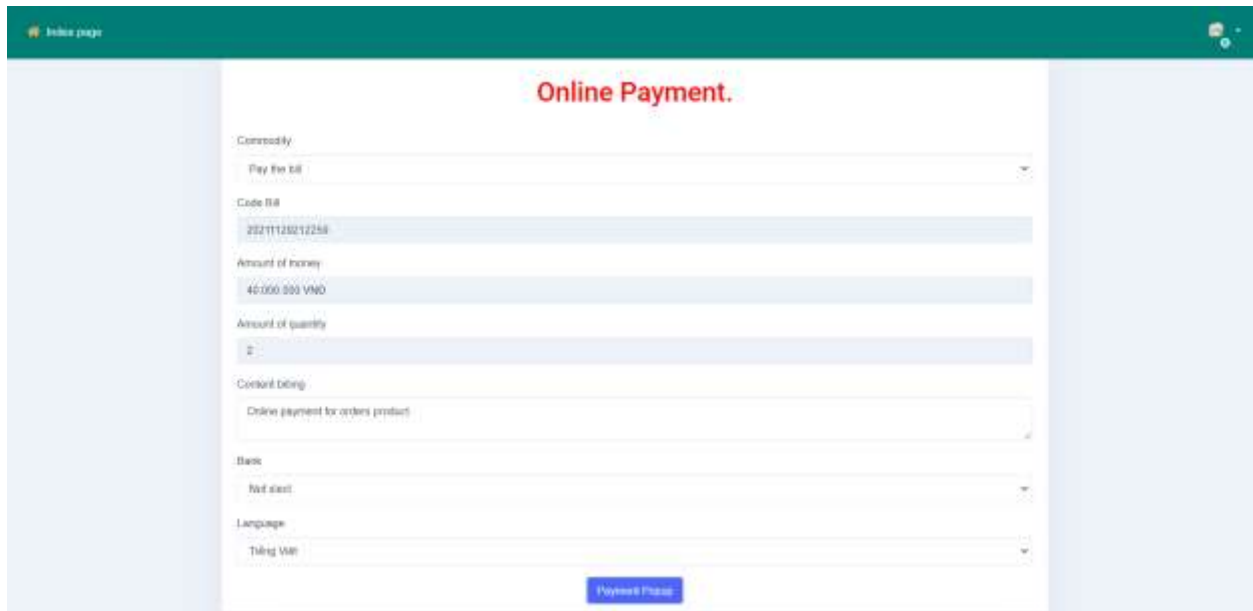
☐ Shipping address is the same as my billing address
 ☐ Save this information for next time

Continue to checkout

Online payment

Figure 86. Validate Checkout

1.2.9. Online payment



The screenshot shows a web form titled "Online Payment." with a green header bar. The form contains several input fields: "Commodity" with a dropdown menu showing "Pay the bill"; "Code Bill" with the value "20211120212258"; "Amount of money" with "40.000.000 VND"; "Amount of quantity" with "2"; "Content Billing" with "Online payment for orders product"; "Bank" with a dropdown menu showing "Net bank"; and "Language" with a dropdown menu showing "Tiếng Việt". A blue "Payment Photo" button is located at the bottom right of the form.

Figure 87. Online payment

This is an online payment form for customers who want to pay online before receiving goods. After clicking on the payment button, the screen will change to the following:



The screenshot shows a screen titled "Chọn Phương thức thanh toán" (Select Payment Method). It features three options, each with a logo and a dropdown arrow: "Thẻ ATM và tài khoản ngân hàng" (ATM card and bank account) with a blue card icon; "Thẻ thanh toán quốc tế" (International payment card) with Visa and Mastercard logos; and "Ví điện tử VNPay" (VNPay e-wallet) with the VNPay logo. A grey "QUAY LẠI" (Go Back) button is at the bottom.

Figure 88. Select a payment method

CÔNG THANH TOÁN
VNPAY-QR

Quý khách vui lòng không tắt trình duyệt cho đến khi nhận được kết quả giao dịch trên website. Xin cảm ơn!

Thanh toán qua Ngân hàng NCB
 Thanh toán hóa đơn
1.200.840 VND

Số thẻ

MM/YY

Ngày phát hành

Tên chủ thẻ (không dấu)

Điều kiện sử dụng dịch vụ [?](#)

XÁC THỰC

Hoặc

Figure 89. Payment via VNPAY

After choosing the payment method is VNPAY, customers need to enter personal information in the fields to enter information and enter the OTP code to proceed with online payment.

Thanh toán qua Ngân hàng NCB
 Thanh toán hóa đơn
1.200.840 VND

Số thẻ

07/15

Ngày phát hành

NGUYEN VAN A

Điều kiện sử dụng dịch vụ [?](#)

XÁC THỰC

Hoặc

HỦY

Phát triển bởi VNPAY © 2021

Figure 90. Payment via VNPAY

CÔNG THANH TOÁN
VNPay-QR

Quý khách vui lòng không tắt trình duyệt cho đến khi nhận được kết quả giao dịch trên website. Xin cảm ơn!

Xác thực OTP

OTP đã được gửi về số điện thoại đăng ký. Quý khách vui lòng nhập OTP để tiếp tục thực hiện GD

OTP: 123456

NCB

THANH TOÁN

Hoặc

HỦY

Phát triển bởi VNPay © 2021

secure VNPay

Figure 91. Enter OTP

After successfully entering the OTP code, the customer has made a successful payment and the system will return the results and payment information on the website.

Index page

Order Information

Code orders: 20211129172407

Amount of money: 1,200,840 VND

Content billing: Online payment for orders product

Response code (vnps_ResponseCode): 00

Transaction Code At VNPay: 13642451

Bank code: NCB

Payment time: 20211129232641

Kết quả: Order successfully

Quay lại

Figure 92. Successful payment results

1.2.10. View / Edit profile

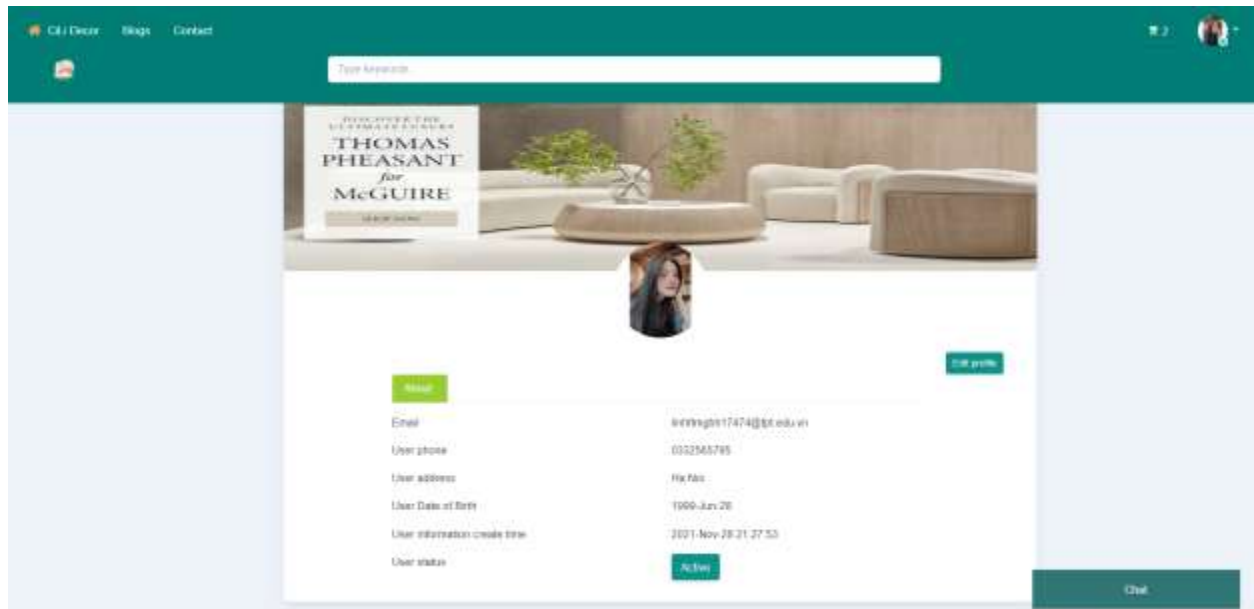


Figure 93. View profile

This is the screen to view information of customers who have registered for an account. There is a function to correct information if the customer needs to correct it.

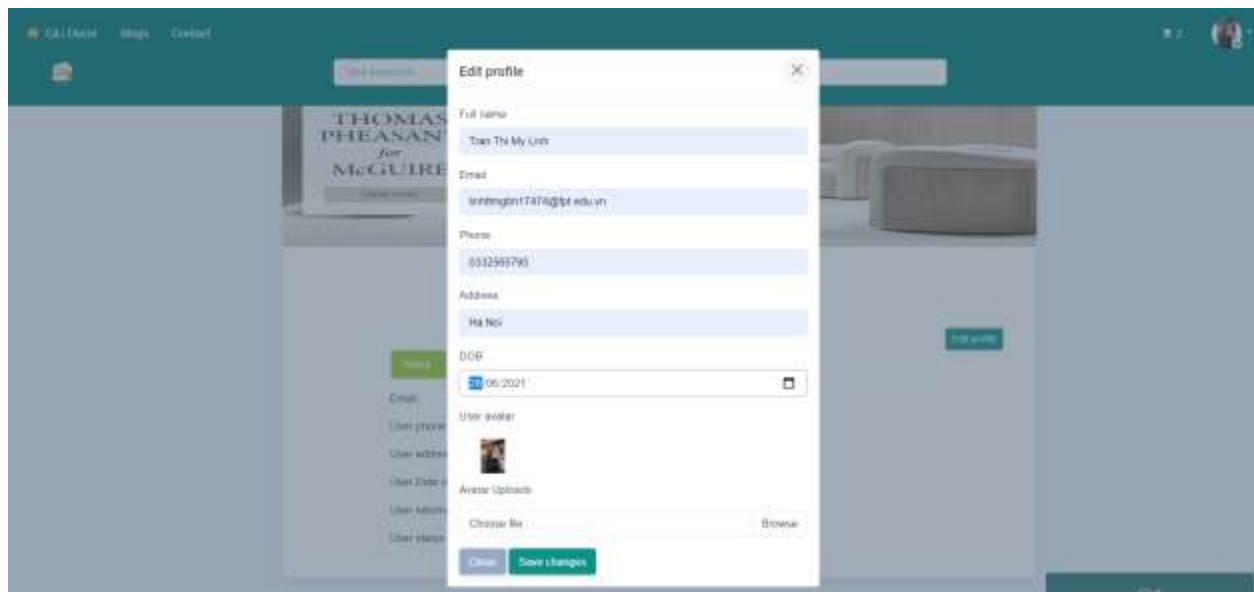


Figure 94. Edit profile

1.2.11. Blogs

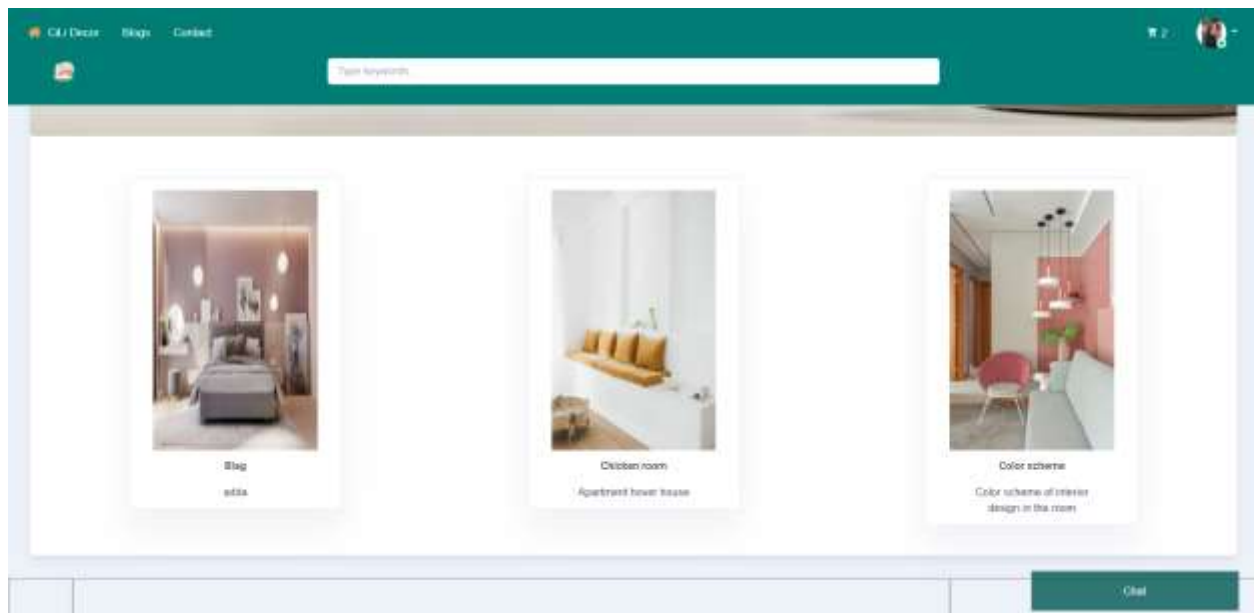


Figure 95. Blogs

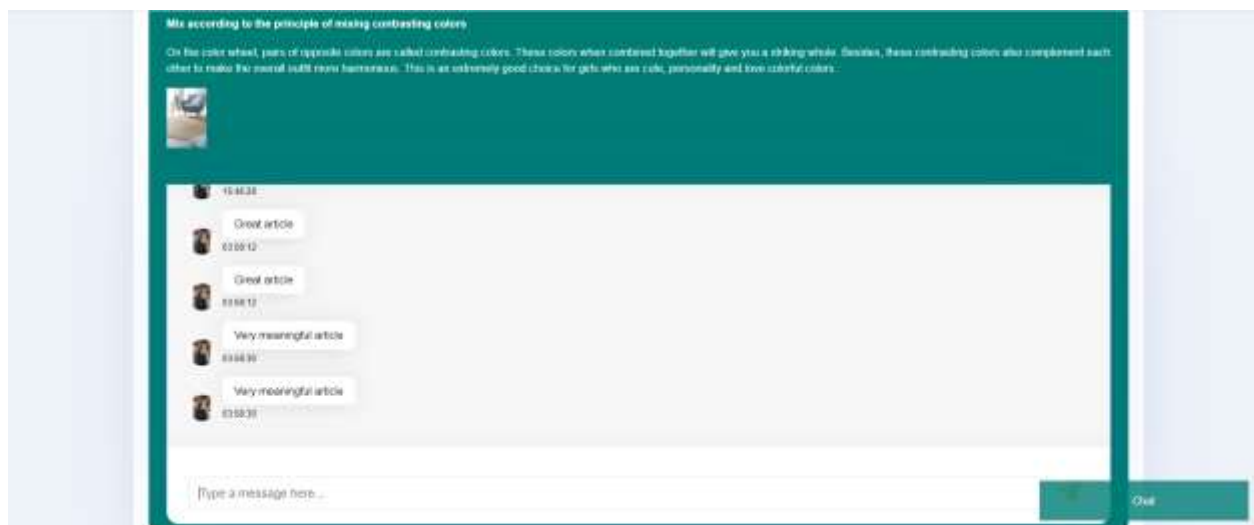


Figure 96. Comment Blogs

This is the blog of CiLi Decor website, customers can view the articles in the blogs and can comment under each of them.

1.2.12. Chat

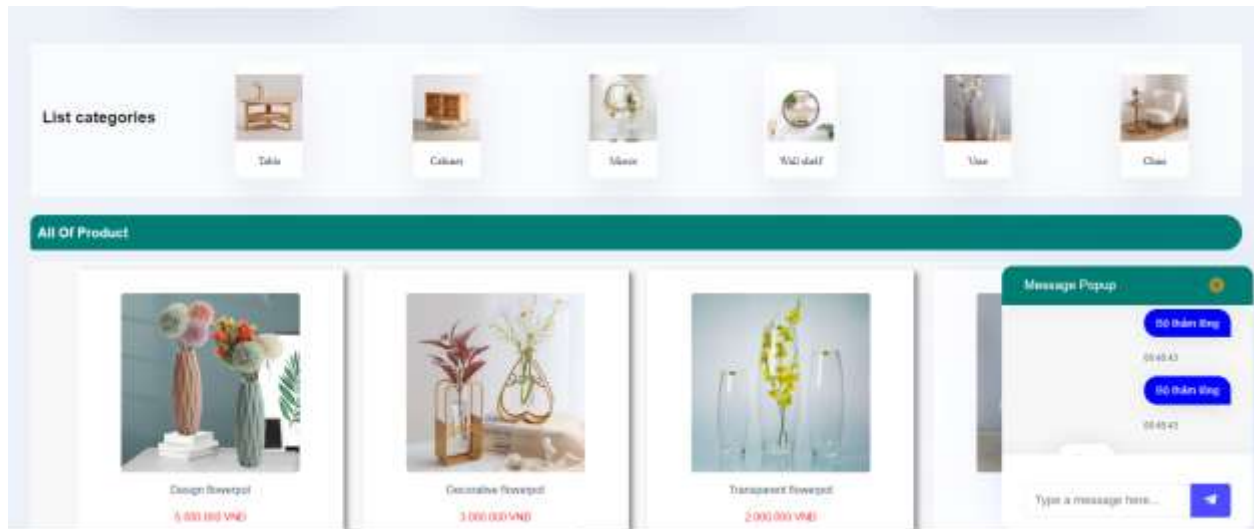


Figure 97. Chat

When customers need to exchange information about products or about shipping orders, customers can directly message the website for the fastest support.

1.2.13. Design



Figure 98. Design

This is a space design screen with available furniture, customers can custom design according to their needs

1. Testing Design

The project of building and developing a sales website CiLi Decor is applying Agile software development methods, so testing always goes hand in hand with writing code to repack each small part then complete the project. Below is the presentation of the testing procedures:

1.1. Test plan

All the contents of software testing, detailing all test plans are built and developed into an overall document, the Test plan, also known as the test product of the project. In test plan includes main components like: Test strategy, references, test artifacts, test approach, features failed, test Deliverable, estimates, schedule, responsibility, approaches. All the content in the test plan, the features that need to be tested, the risks encountered during the testing process are responsible for the software testing member.

1.1.1. Test strategy

Test type

The CiLi Decor furniture sales website project will be tested through 2 phases: unit testing and manual testing. These two phases are interconnected.

The unit testing phase is the testing process in the code development process, the programmer will always check in the code to detect errors first, then push to the manual testing phase.

Manual testing phase is the stage of performing tests like the user, testing the processes to fully meet the user's requirements, then testing thoroughly according to the test case to make sure there are no errors, and Finally, test the project on behalf of the end user.

Scope of testing

Test all features according to user stories about CiLi Decor furniture sales website project, purchasing features, blog viewing, chat, admin management.

Sprint 1:

As a User, I can view the site's overview page

As a User, I can register an account to login to the website

As a User, I can login/logout to website after account registration

As an Admin, I can login/logout to the system

As an Admin, I can manage product catalog

As an Admin, I can manage all products by category

Sprint 2:

As a User, I can create a new password when the password or to secure information

As a User, I can view all the products of the website catalog

As a User, I can select products and add to cart

As a User, I can manage my shopping cart

As a User, I can make purchases

As a User, I can pay when receiving goods or pay online

As an Admin, I can manage information of customers who have purchased products

Sprint 3:

As a User, I can view my account details

As a User, I can view details (color, size, ...) of all products of the website

As a User, I can design their own room

As a User, I can see the posts the website uploads

As a User, I can chat with the system

As an Admin, I can manage blog posts

As an Admin, I can manage the conversation between the client and the system

Sprint 4:

As a User, I can view website without registration and login

As a User, I can view website contact information

As a User, I can comment under each blog post

As an Admin, I can manage post categories on blogs

As an Admin, I can maintain the system

Risk and Issues

Some of the risks during test execution are shown in the following table:

Risk

The member performing the test is also a programmer, so the experience in testing is still weak

Not well prepared for test cases

Improvement

Spend time researching requirements and do full testing of requirements when testing

Read literature on theory to develop test cases

Test Logistics

Testing will occur when :

- Requirement is clear
- Software is available for testing
- Test executor ready to test
- Test environment is built

1.1.2. References

- Product Backlog of the system
- Sprint backlog of the system
- Test Case , Test logs

1.1.3. Test artifacts

CiLi Decor Furniture Sales Website System

1.1.4. Test approach

System developer will do manual testing to test the project

1.1.5. Features failed

Total to test	Total to test	Fixed	Not yet
1	10	10	0
2	6	6	0
3	6	6	0
4	6	6	0

Table 3. Features failed

1.1.6. Test Deliverable

Test deliverables included some parts such as :

Before testing part :

- Test plan as a test document
- Testcase of the system

During test :

- Testlogs
- Retest
- Verify bugs

After testing

- Test report
- Test result

1.1.7. Estimates

Estimates total time for testing is :

Estimates starting date:

- Sprint 1 : 15/02/2021
- Sprint 2 : 01/03/2021
- Sprint 3: 16/03/2021
- Sprint 4 : 31/03/2021

Estimates ending date :

- Sprint 1 : 28/02/2021
- Sprint 2 : 16/03/2021
- Sprint 3: 29/03/2021
- Sprint 4 : 05/04/2021

Estimate personnel for testing : Tran Thi My Linh

1.1.8. Schedule

In this table will show detail about testing schedule, based on this can estimated time for each task and manage all of tasks must be done. The following table below:

<i>Sprint</i>	<i>Task</i>	<i>Estimation hours</i>
Sprint 1	Writing tescase	5hours
	Testing a login/logout/ change p password	1 hours

	Testing for Admin's role	3 hours
	Retest	3 hours
Sprint 2	Writing testcase	5 hours
	Testing for student's role : view list of submission , submit and edit article	2 hours
	Testing for Marketing Manager's role : list of submission, view submission detail and give comments	2 hours
	Retest	3 hours
Sprint 3	Writing Testcase	7 hours
	Testing for student's role : view/edit profile and read comments	2 hours
	Testing for Marketing Coordinator's role : view/edit profile and grade contribution's student.	2 hours
	Testing for Marketing Manager's role : view/ edit profile, view dashboard and view list of submission	3 hours
	Testing for Guest's role : view accepted submission	1 hours
	Retest	4 hours
Sprint 4	Writing test case	3 hours
	Test chat function	1 hours
	Testing for Marketing Manager role's : view submission details and download file	2 hours
	Testing for Marketing Coordinator's role : receive email	1 hours

Table 4. Testing schedule

1.1.9. Responsibility

Tran Thi My Linh (Product Owner / Tester)

1.1.10. Approachs

I have built test plan then follow the plan, write test cases and test on the software.

1.2. Testcase and Testlogs

Writing test cases before testing is very important because testers will avoid missing test cases, avoid serious errors, and improve software quality.

Some of the values that the testcase brings to the software system are:

- Ensure the requirements of the project
- Improve product quality
- Meet end-user requirements
- Test cases can be reused in other projects
- Reduce costs incurred such as software maintenance and support

The structure of the testcase:

No	The structure	Description
1	Testcase ID	Define the number of cases needed for testing
2	Function	Devide function of the system so that can create exacly Testcase based on function
3	Test data	Prepared data to test
4	Test steps	Describe test steps of the system
5	Expected result	Expected results from the test steps
6	Result	It would be Pass/Fail/Pending based on result of expected result step
7	Comments	Note some information problems will implementation test . It could be screen shot, video...

Table 5. The structure of the testcase

1.2.1. Testcase of Sprint 1

Testcase ID	Function	Test data	Test steps	Expected result	Result
S1	Check the homepage as a whole	No data	1.Log in to the system 2.Overview of the home page	The home page has all the necessary functions such as search, product display, chat dialog. The page colors must be uniform, the buttons are even, consistent, the font is reasonable.	All requirements have been met
S2	Log in	Username: user123 Password: 123456	1.Access to the login screen 2.Enter username and password 3.Check access to the system	Access the system successfully as a customer	All requirements have been met

S3	Register	Fill in all required information	1.Access to the registration screen 2. Fill in all required information in all required fields 3.Click register	Account registration is successful and the screen changes to the login screen	All requirements have been met
S4	Log out	Perform logout	1.Accessed to the website system 2.Perform logout	Log out successfully and must log back in to access the system	All requirements have been met
S5	Add category	Fill in all required information	1.Log in to the system with admin account 2.Go to menu manage category 3.Click the button add new category 4. Fill in all the fields that need to be added 5.Click save	Newly added successfully and displays the newly added category on the list screen.	All requirements have been met
S6	Edit category	Edit category name	1.Log in to the system with admin account 2.Go to menu manage category 3.Click the edit category button 4.Enter the information to correct 5.Click save	Edit is successful and display the new category with the corrected information on the list screen.	All requirements have been met
S7	Delete category	Perform delete	1.Log in to the system with admin account	Delete is successful and not displayed on the list screen.	All requirements have been met

			2.Go to menu manage category 3.Click on delete category . button 4.Display delete confirmation form 5.Click save		
S8	Add products	Fill in all required information	1.Log in to the system with admin account 2.Go to menu manage products 3.Click the button add new products 4. Fill in all the fields that need to be added 5.Click save	Newly added successfully and displays the newly added products on the list screen.	All requirements have been met
S9	Edit product	Edit product name	1.Log in to the system with admin account 2.Go to menu manage products 3.Click the edit products button 4.Enter the information to correct 5.Click save	Edit is successful and display the new products with the corrected information on the list screen.	All requirements have been met
S10	Delete product	Perform delete	1.Log in to the system with admin account 2.Go to menu manage products	Delete is successful and not displayed on the list screen.	All requirements have been met

			3.Click on delete products. button 4.Display delete confirmation form 5.Click save		
--	--	--	--	--	--

Table 6. Testcase of Sprint 1

1.2.2. Testcase of Sprint 2

Testcase ID	Function	Test data	Test steps	Expected result	Result
S11	Create a new password	Change password "123456" to "customer01"	1. Access the website and click the change password button 2.Show password change form 3. Change password "123456" to "customer01"	Change password successfully and login with new password	All requirements have been met
S12	Select products and add to cart	Select any product to add to cart	1.Visit the website 2.Select 1 product to cart	The product selected to the cart is in the shopping cart list	All requirements have been met
S13	Remove product from cart	Remove any 1 product from the cart	1.Visit the website 2.Add to cart 3.Delete any product from cart	The product removed from the cart is not in the list of products in the cart	All requirements have been met
S14	Pay online	Pay online	1.Visit the website 2.Select 1 product in cart to checkout 3.Choose a payment method	Successful online payment	All requirements have been met

			4.Enter information 5.Payment		
S15	Edit customer information	Edit customer phone number	1.Access the system as admin 2.Go to manage order 3.Edit customer phone number	Successfully fixed phone number	All requirements have been met
S16	Delete customer information	Delete any 1 customer	1.Access the system as admin 2.Go to manage order 3.Delete any customer	Deleted customers do not show up in the order list	All requirements have been met

Table 7. Testcase of Sprint 2

1.2.3. Testcase of Sprint 3

Testcase ID	Function	Test data	Test steps	Expected result	Result
S17	View / edit profiles	Edit email profile	1.Visit the website 2.Select a product to view details	Edit email successfully, email after editing is saved in profile	All requirements have been met
S18	View detail product	View product details	1.Visit the website 2.Select profile 3.Edit profile	Show product details and can add to cart	All requirements have been met
S19	Design space	Experience design	1.Visit the website 2.Go to Design 3.Implement the design	Stable design	All requirements have been met
S20	Add blogs	More blogs "Color"	1.Visit the website 2.Select manage blogs 3.Implement new blogs	Add blogs successfully and show the record on the list	All requirements have been met
S21	Edit blogs	Change to "Decor"	1.Visit the website	Edit successfully	All requirements

			2.Select manage blogs 3.Implement blogs	and display the edited content on the list or in the detail form	have been met
S22	View the message	View messages from any customer	1.Visit the website 2.Select manage message 3.Perform message viewing	View messages and possibly send messages to customers.	All requirements have been met

Table 8. Testcase of Sprint 3

1.2.4. Testcase of Sprint 4

Testcase ID	Function	Test data	Test steps	Expected result	Result
S23	Do not login and view product details	View any product details	Do not login and view product details	View any product details but not add to cart.	All requirements have been met
S24	Do not login and add products to cart	View and add products to cart	Do not login and add products to cart	You can see the products, but when you click add to cart, you will need to log in	All requirements have been met
S25	Comment under each post	Comment "Good" under the post	1.Visit the website as a customer 2.Select blogs 3.Comment any 1 post	Comment was successful and show "Good" comment under commented post	All requirements have been met
S26	Add posts	Add post "Decorative arts"	1.Access the website as admin	Successfully added new and	All requirements

			2.Select manage post 3.Make a new post	displayed "Decorative arts" post in admin list	have been met
S27	Edit post	Edit "Decorative" post	1.Access the website as admin 2.Select manage post 3.Perform post editing	Successfully edited and displayed "Decorative arts" post in admin list	All requirements have been met
S28	Delete post	Delete the post "Decorative arts"	1.Access the website as admin 2.Select manage post 3.Perform post deletion	Deleted successfully and doesn't show up in the list	All requirements have been met

Table 9. Testcase of Sprint 4

VIII. Overall evaluation of the project

1. Summary what have been done

In general, all functional and non-functional requirements of the CiLi Decor furniture sales website have been completed without major errors and are assessed as stable. As follows:

1.1. About the function of the website

Website speed (Response speed, notifications, page transitions,...): Currently, the response speed of the website is stable and without any errors, the website's features are being implemented about 2s. However, the developer is trying to improve the response time even more so that when there are many customers using it at the same time, it will avoid long loading cases.

Minimize errors about 404 (Page Not Found): This is an error when performing software testing that does not occur, so it is evaluated quite well in terms of linking and operating in the system.

Make sure the website works on different browsers (Safari, coccoc, google,...): CiLi Decor website has high flexibility because it can be accessed on many different browsers and ensures quality quantity. Also can work on many different devices.

All functions work properly: Although all websites cannot avoid minor errors, in general, website functions are working normally and all errors are now fixed. in the testing phase.

Database is updated quickly: When data needs to be updated, programmers have used MySQL to update quickly, moreover can easily download the database and perform backups when needed , that's very easy.

The integration of google when logging in with a google account: The programmer has used the API to get performance data on the website, so the integration does not affect the CiLi Decor website.

1.2. About the non-function of the website

Customers without an account cannot perform operations on the website: All customers have the right to access the website to search and view products, but when customers want to add products to their cart or To perform other operations, you need to log in to the website.

The website has implemented information security by applying security methods: Applying security methods to the website is not enough to ensure that the website is completely secure, so the programmer The site is working on improving this to make it more complete in the future.

1.3. About the interface of the website

Website consistency: Developers have applied consistency when designing the website's interface, especially the use of dominant colors, on a #007D75 color background with white text on all screens. and all buttons on the website. In addition, the use of descriptive words for buttons and pages are all monosyllabic, avoiding user misunderstandings, font size and font are all agreed with each other, thus contributing to improving interaction between users. user and system.

Notice and guide users to solve problems quickly: The website has used methods of customer navigation when looking at the screen, especially on the forms that need to enter data, there are icons to guide users. When users enter incorrectly, there are instructions to notify you that you need to re-enter, enter incorrectly or enter in a certain form.

The ability to display system status: On the CiLi Decor website, the system status is clearly displayed to help users easily get the results after manipulation. for example, when a customer logs in to the system, the system will notify the customer that the login is successful or the customer has entered the wrong password, wrong username, ... depending on the user's use case.

2. Lessons learnt

After implementing the CiLi Decor furniture sales website, I have drawn the following lessons from experience:

Firstly, nowadays, to develop such a sales website, there are many coding languages that make it possible for me to build and develop faster than the traditional methods that I am using, For example: languages react native, angular,... Secondly, after completing the website, helped me know how to build and develop a project from the early stages, review, select technology, choose development methods software, defining requirements, testing, evaluating and drawing from such experience also gives me a lot of important knowledge to develop myself as well as other skills. Thirdly, it helped me learn more lessons about how to allocate time to each job, prioritize different jobs, especially applying agile methods, which made me understand better. on the method of implementation and implementation to be able to make future projects more successful. In the end, this project helped me realize a lot of my own weaknesses and shortcomings in all areas, for example in terms of time allocation in the project, shortcomings in the planning process. process, using the optimal code is not high, when performing the test, there are still many surprises. However, in this project, I always have my mentor beside me, although I only have a little time to talk, he always talks with me very meticulously and gives me the most timely solutions, My friends also help me a lot, everyone contributes to help me perfect the website in the best way.

3. Problems and solutions

The first problem when building and developing a website selling furniture CiLi Decor is the security of the website, so when deploying, it is inevitable that hackers will attack. The solution is

to implement security methods such as JSON Web Token or User Access Token to improve this weakness.

The second problem is that the application of voice search in the CiLi Decor website is not really optimal because of many problems and possible errors. The solution is to apply the "Elasticsearch" integration to make the voice search function more complete and intelligent.

The third problem is the chat function, now there are many websites that integrate chat and AI, but currently, the CiLi Decor website is still applying the manual chat function. Therefore, the solution given to the website is to integrate AI to automatically answer customers with common questions, saving time as well as being more professional, saving costs on personnel.

Those are the current problems and solutions of the furniture sales website CiLi Decor, in addition, the developer is always working on different problems to make the website perfect.

4. Future works

In the future, the developer of the CiLi Decor sales website hopes to be able to further develop the features in the website, namely:

First, implement and develop the function of analyzing website data with charts, so that administrators can easily evaluate revenue, number of products, number of customers, compare customers , regions, best-selling products, helping administrators not spend too much time collecting and synthesizing according to current manual methods.

Second, improve the security of the website. Apply security methods like JSON Web Token or User Access Token to improve website security.

Third, expand and develop the chatbox feature. From there, the administrator will not have to wait for customer messages and reply to messages one by one, but instead a chatbox robot will do it, applying AI will help the function to automatically reply to messages. User's basic questions at the same time with the fastest time, help users have more sympathy for the website and easily solve problems quickly, especially this is a sales website, so this function helps. very important part contributing to increase the business revenue of the website.

Fourth, improve the blogs function with the function of users uploading articles and photos to the system's blogs and having the control of the administrator, contributing to enriching the website's blogs and contributing to information exchange. and experience with more customers.

Above are all the issues and functions that CiLi Decor website developers want to develop in the future.

5. Self evaluation

5.1. Self evaluation about technologies

Currently, I am in the direction of software testing and data analysis, so in the process of learning about coding subjects, I have been guided a lot and deeply in programming languages by teachers. However, I didn't choose to specialize in them, so when working on this project, I didn't really understand in depth about coding languages especially back-end languages. With the help of the final project instructor, I have basically completed the functionality of the project.

In the process of using languages to code software, I have a stronger point in interface design when applying HTML, CSS and Bootstrap languages. The back end language is PHP, so I have a large team and endless resources so when I have any problem I can solve it quickly and easily.

5.2. Self evaluation about methodology

Using the Agile Scrum software development method has brought the project of building and developing a website selling furniture CiLi Decor many strengths as well as some weaknesses as follows:

In terms of strengths, using Agile method has helped the project to build a sales website in a short time with collecting project requirements and building into user stories, product backlog, followed by analysis. divide it into small sprints and execute all processes (interface design, code, testing and completion) at the same time with each user story. In addition, after each sprint is a summary of the time to complete that sprint to adjust from the next sprints accordingly and after each sprint there will be a daily meeting to outline the work in the next sprint and review. completed jobs. So the project has an available thread for faster execution and development.

In terms of weaknesses, agile methods are often applied when a group of developers work on a project with specific roles such as product owner, scrum master, tester developer,... However, in this project this time. , I take the role of everything in agile and my final project mentor is the reviewer after each of my sprints, so I haven't really fully applied the agile software development methodology to the project and work. holding all roles leads to overloading while working.

IX. Conclusion

The CiLi Decor furniture sales website project was built and developed on schedule, all technology and software development methods were applied very effectively and brought good results. The functional and non-functional requirements are fully implemented and the interface is developed relatively suitable for users. In which, the CiLi Decor furniture sales website project includes typical functions that are to purchase products, chat with the system, refer to the articles that the administrator collects and upload to the system. Besides, there are also many issues that need to be improved in the future to contribute to a more complete project in the future.

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XI. Project plan

In this project, I have not changed this plan

