**DEVELOPMENT OF A CUSTOMIZED WEBSITE FOR**

**BANA & BANA ARCHITECTS**

**Bana, Renz Kristoffer A.**

**Cotoner, Arthur John B.**

**Ellorda, Trisha May O.**

**Patricio, Franz Gerard R.**

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**Chapter 1**

**The Problem and its Setting**

**Introduction**

In recent studies, creating a Customized Website is a must, especially for professionals. This career of wisdom is a great help for every individual striving to have a better job. Customized websites can leverage the presence of someone online by catching the eyes of small and large companies that can hire professionals to achieve their dreams in life. Business-wise, start-ups use websites for advertising and showcasing their services to their target audience. In this matter, the researchers came up with a plan for BANA & BANA ARCHITECTS to develop a customized website for the company to highlight the company’s design and profession in building the desired structure of the client.

The following articles and studies support the claims and arguments of our research. First, Reuben Yonatan (2010) stated that An Online Portal refers to a web page (or website) that provides users an entryway to various information, tools, links, and more. Initially, these portals were referred to as links pages; however, these portals serve multiple purposes. Typically, online portals are designed to offer users an assortment of the most used types of information and services. Online portals have become open to personalization and customization, thus leading to different kinds of portals.

As studied by Johan Bini (2015) entitled Development of an Artist's Online Portfolio stated traditionally, artists and designers have used a physical portfolio to present their works for applications and interviews. The advantages and opportunities of the internet affect this area, so personal online portfolios are meant to reach a larger audience thanks to practically no duplication costs compared to traditional physical media.

Moreover, the website [first in architecture](http://www.firstinarchitecture.com/) published in October 2018 stated that before starting any design, your client would want to know whether construction on the site is viable. Carrying out an extensive site analysis will assess whether development is financially feasible and establish parameters to implement the best design that responds to the physical and environmental features of the site.

**Background of the Study**

The modernization that the world is witnessing today is possible due to technological advances in various fields. B & B Architects, formerly known as MC Architects, is an architectural firm founded in 2000 by two brothers, namely Arch. Christopher G. Bana and Arch. Michael G Bana, who collaborated with other architects in the past. This experience enables their young office to work on technically challenging and small to medium scale projects. In the past years, the company used traditional methods in reaching and finding their clients. In this case, the company gains fewer clients because of this traditional method of finding clients. The company relies on the referral of its previous clients and social media to acquire new clients. There are no proper formats in showcasing their design to the public because they post their design on social media. Lastly, the company has no standard answers yet for their client’s inquiries.

In order to solve these problems, the researchers propose to Develop a Customized and interactive architectural promotional website for Bana and Bana Architects. This is a Web-based platform that provides the business and customers with a single access point of information. The conducted research is not just to create a template for a portfolio website for a firm but rather to showcase the works and share the firm daily activities. As for the clients can communicate directly to the company to design for their homes, infrastructures, and interior.

**Table 1.** Matrix of Existing Similar Application Compared with Proposed Application

|  |  |
| --- | --- |
| **Other Architectural Website**  *(Existing Similar Application)* | **Bana and Bana Architectural Website**  *(Proposed Application)* |
| · Common Template Use  · Need a professional to update the content (project content).  · High-cost maintenance | · Have a Unique Design  · Inquiry Records  · Recommend Design Preference  · Walkthrough  · Manageable features  · Low-cost maintenance |

Table 1. shows the comparability of the existing similar websites with the proposed website. The existing similar website usually uses a ready-made template in which it cannot be edited. The existing website always needs a professional to update the content of the website. Some architectural firms commonly do not have an admin feature because the purpose of the admin feature is to update. Lastly, it is costly because most professionals develop websites that are custom made, and they also maintain the website. Also, they are the ones who will find the domain and hosting solution to publish the website. This proposed website is manageable because the admin, categories, and project features are easily managed.

While the proposed website Customized Website for Bana and Bana Architects. The proposed website will have a unique design according to the preference of the owner of the company (Bana & Bana Architects). The website will have an Inquiry Record; this will also serve as a Client List record in which all the prospective client details will be shown the records. Another feature of this website is that it can help the client decide what design preference they will require to design by the architects. Lastly, the walkthrough section shows a tour of a specific area of a project. Since the developers of this research are not yet professionals, it will not oblige to collect a professional fee.

The researcher’s goal is to maximize the company’s potential by improving its online presence. This study will help increase the visibility online; It will serve as a professional way of presenting the company’s projects and designs; It will also create a warmer environment for new clients. Therefore, the company can offer their services through an online portfolio where the purpose of this study is to have communication between the B&B and the clients.

**Objectives of the Study**

The General objective of this study is to Develop a customize and interactive architectural promotional website for the Bana and Bana Architect Firm.

Specifically, this study aims

1. To create a customize and interactive website with the following features:

a. A Virtual Walkthrough, featuring the architectural designs of the company (2D perspective pictures)

b. Filtration of the designs based on the client preference

c. Chatbot to answer questions about the design

e. Estimate Design Calculator

2. To develop the website using Visual Studio Code, XAMPP application, PHP, HTML, CSS, and JavaScript.

3. To test the functionality, portability, and response time of the website

4. Evaluate the acceptability of the project based on the ISO 25010

**Scope and Delimitations of the Study**

This study entitled Development of a Customized Website for the Bana and Bana Architects is designed based on the company’s preferences. This website will have its own design showcasing the architectural designs of the company by having a walkthrough. The client will be capable of filtering the designs they prefer. Lastly, this website will have its own chatbot that will answer the questions of the clients.

To build this project, it will use a visual studio application. Specifically, this website will be created using the HTML, CSS, PHP, and MY SQL as for the database of the website

It will be only a web-based system that can be accessed through web browsers. This study is only for the specific objectives stated in the objectives part. Moreover, the domain and web host used in this website will only be free.

**Significance of the Study**

The proposed Customized Website for Bana and Bana Architects mainly focuses on creating a website with additional special features. The study will benefit the following: Bana and Bana Architects, Developers, and Future Researchers.

*For the Bana and Bana Architects*

It will benefit the architects to effectively attract and find more clients using the proposed website and other special features.

*For Developers and Researchers*

This research will enhance the developer’s and researchers' programming skills, database management, and logical and critical thinking.

*For Future Researchers*

Future researchers can use this research project to acquire a basic understanding and develop a company’s customized website.

**Chapter 2**

**CONCEPTUAL FRAMEWORK**

This chapter presents the related literature and studies after the thorough search done by the researchers. This also includes the ideas, finished thesis, generalization or conclusions, and methodologies. Those included in this chapter helps in familiarizing information that is relevant and similar to the present study. And lastly, the definition of terms for better comprehension of the study.

**Review of Related Literature and Studies**

**Bana and Bana Architect Firm**

Based on the founders of Bana & Bana Architects, Bana & Bana Architects, formerly known as MC Architects, is a firm founded in 2000 by two brothers, Arch. Christopher G. Bana and Arch. Michael G. Bana, who previously worked with other architects. In July 2014, Arch. Christopher received his license and Arch. Michael received his license in August 2014. They were able to run their firm professionally with clients as a result of that as well. Their young office can work on technically demanding and small to medium-scale projects due to this experience. The company offers full-service design and construction, as well as arranging and planning interiors for new offices, both private and industrial, as well as remodels and point-of-interest reclamations. They've completed a variety of fast-track and design/build projects, as well as routinely scheduled and coordinated projects. In previous years, the business relied on conventional methods to contact and locate clients. Because of this traditional form of client acquisition, the company gains fewer clients in this situation. Since this is a small organization, everybody in every role can be versatile in their work.

**UAP**

Moreover, since 2015, Bana & Bana Architects has been a proud member of the United Architects of the Philippines. Being a member of the organization has several advantages for the business. Membership in the UAP provides access to a large pool of information that can help a business succeed in today's market and keeps it informed about current and important professional concerns impacting society.

Not to mention, with over 42,000 members, the United Architects of the Philippines is the Philippines' Integrated and Accredited Professional Organization of Architects (IAPOA). The Philippines Institute of Architects (PIA), the League of Philippine Architects (LPA), and the Association of Philippine Government Architects (APGA) established the United Architects of the Philippines (UAP) on December 12, 1974, with the noble vision of unifying the three (3) existing architectural associations at the time - the Philippines Institute of Architects (PIA), the League of Philippine Architects (LPA), and the Association of Philippine Government Architects (APGA) (APGA). The Professional Regulation Commission awarded the UAP Certificate No. 001, making it the first professional association to be accredited (PRC). The Philippine Professional Regulation Commission (PRC) is the government's central agency to license and regulate practitioners and occupations and Accredited Professional Organizations (APOs).

In addition, the UAP has over 44,000 members, accounting for 100 percent of all registered architects with the Professional Regulation Commission (PRC). As part of their contributions to the highest ideals of the architecture profession and the organization in service to society, the UAP invites all of its members to provide pro bono services. Any member of the UAP will promote and advance the organization's principles in terms of advocacy for sustainable design and practices, diversity, and elevating the status of the profession of architecture in the eyes of the public by participating in whatever format they want.

**Website Design and Management**

A well-designed website can help make a positive first impression on potential customers. (Expert commentator, 2020) It can also assist in nurturing leads and increasing conversions. But, most importantly, it improves the user experience and makes it easier for website users to access and navigate the site.

Similarly, the website's design can make or break the company they are trying to deliver. (Nillson, 2018) It has a significant impact on how the target audience perceives the market or organization, converting them into customers. As a result, creating a website design with an appealing user interface would result in a higher conversion rate, which will lead to increased sales and revenue. Business owners should use website design to create a user-friendly and engaging online environment where users can find valuable information at any time of day.

Furthermore, a business website serves as a space to show general information about your organization or an immediate stage for web-based business (Fabian, 2021). A business website is essential for engaging your audience, presenting your value proposition, increasing brand awareness, and driving sales.

Similarly, with that statement of Ambra (2018), a website for a service-based business aims to persuade website visitors to become customers of the service company. This is accomplished by placing the business in the target market as a dependable, trustworthy, and professional service provider. Before making any phone calls, visitors can pre-screen possible service providers by checking their websites. They are trying to find the best company that will fulfill their unique requirements during this phase. They want to know how experienced the company is, how good the work would be if the provider had a good reputation, and how long it has been in business. Visitors can be supported by presenting them with information and articles illustrating their expertise and a visual portfolio of the work, photographs, and customer testimonials.

Moreover, there are five basic elements of web design, each of which contributes to the overall user experience in its own way, as stated by Resource Techniques (2019). As a result, you must ensure that no single feature degrades the entire website. Here are the five elements of web design:

1. Content- 'Content is King,' as the saying goes. It is one of the key reasons people visit your website and plays a significant role in Search Engine Optimization (SEO). To make the website more ‘sticky,' you should put a lot of work into producing first-rate content, including images, relevant news/information, and high-resolution imagery.

2. Usability- The end user will never note good usability, but poor usability will stand out immediately. The website should be simple to use, intuitive to navigate, open, and mobile-friendly. The user should always know where they are on the website and navigate their way around with little effort. They should also be able to go to any page they want without going through the whole web.

3. Aesthetics- In today's world, creating a visually appealing website that works on all platforms is essential. They must, however, retain the brand image. The website should visually communicate with the audience and show who they are as a business. The website's visual appeal not only helps to raise brand awareness but also boosts credibility.

4. Visibility- The website’s success depends on the presence and exposure through digital marketing strategies such as SEO, social media, and email marketing. It's critical to know how to get found, the platforms to approach, and how to use the content.

5. Interaction- The website should engage the visitors, keep their attention, guide them through the various stages of the website, and eventually invite them to contact the visitor. The website isn't just for show; it's meant to help businesses generate leads, increase sales, and develop the company, so make sure it's engaging with visitors properly.

Moreover, In the Literature Review of [Renee Garett](https://www.firstinarchitecture.co.uk/architecture-site-analysis-guide-2/?term=Garett%20R%5BAuthor%5D&cauthor=true&cauthor_uid=27499833), MS, LCSW,1 [Jason Chiu](http://www.diva-portal.org/smash/get/diva2:325368/FULLTEXT01.pdf?term=Chiu%20J%5BAuthor%5D&cauthor=true&cauthor_uid=27499833), MS, [Ly Zhang](https://www.geeksforgeeks.org/advantages-and-disadvantages-of-php/?term=Zhang%20L%5BAuthor%5D&cauthor=true&cauthor_uid=27499833), and [Sean D. Young](https://www.ncbi.nlm.nih.gov/pubmed/?term=Young%20SD%5BAuthor%5D&cauthor=true&cauthor_uid=27499833), Ph.D., MS2, three which is the Website Design and User Engagement, Design has become a key component in engaging consumers of websites and mobile applications. A study was carried out to identify the specific elements used in the effective website and mobile application design. A literature review on the successful design was performed, and a shortlist of elements commonly used in the research was described. The reviewed literature's most frequently cited design elements were navigation, graphical representation, organization, content utility, function, simplicity, and readability. The researchers explore how these seven elements have been described and evaluated in previous studies. This study and the shortlist of design elements that resulted can be used to help designers and researchers operationalize best practices for encouraging and predicting user interaction.

In particular, the homepage should be considered similar to the curb appeal of a house stated on the website of the daily egg. It is the first thing many visitors see when they open the website, so you want to impress them right away. A simple homepage design invites visitors to the site, informs them of what they should do next, and encourages them to explore it further. The developer can simplify a basic homepage design, but they don't want to start with a cluttered mess and prune it down later. Often begin with the fundamentals. In web design, homepage elements have particular purposes.

· Assisting the target audience in learning more about the business. The majority of the website users will visit the homepage. With that in mind, you must make an excellent first impression. The company's principles, unique selling proposition (USP), and intent should all be evident on your homepage. If they can effectively communicate this information, they will be more likely to attract potential customers.

· Improving the user experience on the website. Consumers come to the website with a specific goal in mind. It may be to look over your product line, read the blog posts, or see if they have a particular service. In any case, they will want to guide the customer to the correct page. The homepage design can make this transition more accessible, providing intuitive navigation and a sense of how the website flows.

· Accruing more conversions. The developer wants the website users to convert, but if they don't provide them with the right motivation and opportunity, they won't. Modifications will increase if you make this knowledge conveniently available on the homepage. Visitors who have a positive experience on your website are more likely to recall it in the future.

· Improving brand awareness. Enable the brand image and branding to shine through on every page to make the company memorable. This is particularly true when it comes to the design of the homepage, which acts as a portal to the rest of the website. The focus should be on the logo, tagline, and meaning.

To sum up, it wouldn't have to stick to a strict formula to build a good homepage. Create the perfect homepage template for a target audience, and make sure they showcase the distinctive attributes of the goods and services.

In addition, the article about the Best Architectural Website Designs (Nguyen, 2020) stated some criteria to consider when creating a great architectural website.

Here are some criteria to consider when creating a great architectural website:

· **Include some eye candy**; in the projects section of the website, make sure to provide high-quality, professional images of the architectural work to show prospective customers what they are capable of. Have drawings to demonstrate the essence of their ideas.

· **Publish regularly**, they must not only create a website for your business, but they must also maintain it by constantly updating it with new projects. If all of the projects on the website are obsolete, people would assume that they don't work anymore. Keep in mind that recent equals significant.

· **Be Human,** have editorial material and first-person narratives, so visitors to the website feel as if they're engaging with a real person rather than a faceless company. This will make it easier for potential customers to connect with and form stronger relationships with the business, resulting in higher new customer conversion rates.

· **Keep it clean**, to make it easy for tourists to browse through anything they have to give, make sure the website is clear and clean. It's important to have a well-organized workspace if they want people to notice the designs.

Nguyen also states some pages that must be included in an architectural firm website: Welcome Page, Home Page, Inquiry, Projects, Services, About, News, and Newsletter.

Additionally, Fabian (2021) discusses the steps in creating a business website; here are the important steps:

· First is to **Determine the primary purpose of your website**. The most important thing to mention on a website, whether it's a simple e-commerce site or a more complicated e-commerce site, is what the company does. The researcher’s website will discuss the company's profile and who the company's founders are.

· Next is to **build the website pages**; A good website is more than just a text-based link. Multiple pages dedicated to different aspects of the business should be developed, such as a detailed catalog of the products or services or a blog section for company updates. In terms of the overall website, make sure that each page relates to the site's primary goal, has a distinct emphasis, and has a call to action. As for the website of Bana and Bana Architecture Firm, the main pages that the client must see were: Portfolio Pages which contain the company details. Profile Page, which includes the details about the architects in the firm. Projects Page, which consists of the categories and the projects that the firm has made. FAQS Page, which contains the frequently asked questions by the client to the firm. And last is the Contact Us page, where the client can see the contact details and communicate with the firm.

Along with, Justin Zalewski, director of product design at innovation consultancy Studio Science, give a few basic pointers to help in creating content-rich, effective pages for the website:

· **Be clear about what your business does.** Using a single, short sentence to summarize what the organization does as a lead. Visitors should be able to understand what the organization does within seconds of landing on the homepage. Hundreds of poorly written pages may be outperformed by a few well-written pages.

· **Place strategic calls to action.** CTA buttons are more effective when they correspond to the tab's information. A "buy now" button makes sense on a product page, but a "contact us to learn more" button would be more appropriate on an "about us" page. A button may bring the reader to the available plans and pricing on a page listing customer feedback.

· **Avoid stock photos.** Using tacky stock photography is the quickest way to transform a good site into a bad one. If the customer is looking for images on the website, it's best to use a photo of the actual team or workplace.

· The Last Step stated by Fabian is to **Maintain your site**. Regularly update the website with blog posts about emerging industry trends, new products and deals, and company news to keep visitors coming back. As for the Bana and Bana Architectural Firm, the website that the researchers propose will easily be maintained with its user-friendly user interface in the admin features.

**Web Programming**

Based on the Your Dictionary website, Web-programming is writing the necessary source code to create a website. At the very least, it refers to writing the HTML pages. However, Web pages also contain JavaScript, and any website that provides access to databases or any processing for the user requires additional programs that run in the Web server. Web server processing is programmed in Java, PHP, Perl, and other languages.

Similar to the definition of Techopedia, Web programming encompasses all of the writing, markup, and code that goes into Web development, including Web content, client and server scripting, and network security. Web programming is distinct from traditional programming in that it necessitates a broad understanding of the application domain, client and server scripting, and database technologies. XML, HTML, JavaScript, Perl 5, and PHP are the most often used languages for Web programming.

Nevertheless, Web development primarily refers to the tasks that aid in building websites for internet hosting Pedamkar (2021). This process involves web design, web content development, client-side/server-side scripting, and network security configuration. Website development is another name for Web development. On the other hand, Programming is a collection of instructions for a computer to complete a task. To put it another way, programming is the set of sequential instructions that a computer follows to complete a task. The implementation of logic to support specified computing operations and capabilities is referred to as programming.

Furthermore, Pavetti (2021) stated the five best programming languages for web development for modern web design: HTML/CSS, PHP, Python, JavaScript, and Java.

Although other languages can be used for web development, these five are a fantastic place to start. Once developers have learned HTML/CSS, PHP, Python, JavaScript, and Java, they will be prepared to take on severe and sophisticated web development.

Moreover, to program, a website specialist was needed. Based on the website WebsiteSetup (2021), here are the following role should have in web development:

· **Frontend development**: The "frontend" refers to the "things" on a website that you see and interact with, such as menus, dropdowns, and so on.

· **Backend development**: Think of the "backend" as the part of the iceberg that is beneath the surface. The website would not be able to function without it. The backend is responsible for servers, apps, databases, and so forth.

· **Full-stack development**: Full-stack development is when backend and frontend development are combined.

WebsiteSetup (2021) also stated some steps and tips on how to become a web developer:

**1.** **Learn HTML, CSS, and JavaScript Fundamentals**

If you decide to construct websites for a living, these are the nuts and bolts of all website creation that you'll deal with daily.

· HTML dictates the structure.

· It will be attractive thanks to CSS.

· It will work thanks to JavaScript.

**2.** **Get to Know UI and UX**

· The fundamentals of user experience design are UI (User Interface) and UX (User Experience).

· Most coders aren't web designers; they work in two separate worlds.

It's nevertheless worth noting that understanding the foundations of user experience design will help you better comprehend how a website should function. This will keep users on the site longer, allowing them to locate what they're searching for and, as a result, spend more money there.

**3.** **Learn SQL and PHP**

· SQL is a database technology for storing data (see SQL cheat sheet). PHP is a scripting language for inserting and removing data from databases.

· Take the example of WordPress. It makes use of MySQL to store and manage data in a database table (blog posts, page content, comments, user information, and so on). PHP is responsible for making a WordPress website dynamic by interacting with these distinct aspects while effectively updating the database.

· Understanding how SQL and PHP interact will help you understand WordPress site development, which hundreds (if not thousands) of people search for on job and project boards all over the internet every day.

**4.** **Learn the Basics of SEO**

· Search Engine Optimization (SEO) is a term that refers to the process of optimizing a website for search engines. This is the process of boosting a website's search engine ranks, such as on Google. It's one of the most crucial abilities in the online world. Do you need to be an SEO guru now? Certainly not. However, one should master SEO fundamentals and keep it in mind while you build each website. It will give the website a lot better chance of success, and your web development customer will be much satisfied as a result.

**5.** **Make Sure Your Site is Responsive**

· The term "responsive" refers to how the elements of a website adjust to the size of the screen. This implies that your website will appear great on any platform, including laptops and mobile phones.

**Networking**

In an information system, networking, often known as computer networking, transfers and exchanges data between nodes through shared media Scarpati (2018). The network’s design, development, and use are all part of networking, as is the management, maintenance, and operation of the network infrastructure, software, and policies.

Likewise, with the definition of Britannica, A computer network is a collection of two or more computers linked together to exchange data electronically. A network system provides the critical purpose of developing a cohesive architecture that allows a range of equipment types to transfer information in a near-seamless manner, in addition to physically connecting computer and communication devices. The ISO Open Systems Interconnection (OSI) and IBM’s Systems Network Architecture are popular architectures (SNA).

Moreover, the state of networking technologies is constantly changing. Previously, computer networks consisted of a collection of comparable desktop computers connected by a tangle of cables. Computer networking has become a lot more adaptable in recent years. Inspired Techs stated some benefits of networking:

· **Computer networking can help your business grow**

For your business, a good computer networking solution might be highly advantageous. It allows you to keep all of your key company data in one place. This allows the network’s many computers to retrieve essential data from the central site. Furthermore, computer networking enables you to access data from other computers on the same network and edit it as needed.

**Cost-effective resource sharing**

* A good networking setup will reduce the amount of money you spend on hardware. How? By creating a computer network and sharing the hardware you already have.
* Assume your organization has several PCs that are not connected. Let’s use printers as an example of “hardware that you want employees to share.” Employees would be unable to print papers unless a separate printer was purchased for each computer. Purchasing additional printers for each of the disconnected machines costs money that could be better spent elsewhere.
* It makes life easier for company staff as well when you network all of company PCs and printers. They don’t have to plug in a USB drive, copy the files, and then repeat the process on a computer with a printer. They would just connect to the printer across the network.

· **Improving storage efficiency and volume**

* When users network all of your business computers, the way users store data will change. First and foremost, users obtain the total storage volume of all the computers in the network. To demonstrate this in layman’s terms, let’s do some simple math. Assume their company has 20 computers, each with a 2-terabyte drive. When these computers are linked together, users can say individuals now have 40 terabytes of combined storage.
* This is significant because multiple employees in many businesses use data. Assume you have some generic branding graphics files. These files may be used at different times by each of your 20 employees. You’d have to keep a copy of these files on each of the 20 computers if there wasn’t a network. With a network, you only need to save the file on one of the 20 computers or a central server. As a result, storage usage is reduced by 2000%.

· **Freedom to choose the best computer networking method**

* Creating a business network used to be much more difficult “back in the day.” Your network had to be limited to “compatible computers” and hardware. A good IT provider can now make all of your hardware work properly in a network. This means that different operating systems can run on different types of devices. Android tablets, Windows and Mac computers, and iOS tablets can provide all networks together.

· **Access flexibility**

* The beauty of modern networking is its adaptability. You can bring your tablet to a meeting and begin working on a document. Then you can go back to your office computer and pick up where you left off in the document. When your coworkers invite you to take a break, you can show them your document on your smartphone. All of this is possible if the document is stored on a centralized file server and your network has a wireless connection.

**Utilize a Centralized Database**

* Many additional benefits are available if you use a server-based centralized networking setup. Aside from the previously mentioned centralized file storage, users can also use centralized data entry and retrieval. In layman’s terms, this means that users would create a central database that all of their employees can access from any device.
* Assume their storefront employee is having a conversation with a customer about a problem. They can simply retrieve relevant customer data from that central database. They can also enter new information about that customer, such as a change in service or purchase of a product. Everything will be fine if that customer calls their customer service department 15 minutes later. Their customer service representative will be able to see the most up-to-date information from that database right away.

**Systems Analysis and Design**

As specified in the study of Ramakrishnan (2012), Systems Analysis and Design (SAD) is a broad term for describing methodologies for developing a high-quality information system that combines Information Technology, people, and Data to support business requirements. The SAD technique is not only limited to IT systems and can be used to create just about anything, from a family house to the international space station. But there is no silver bullet in simplifying the development of computer systems. This principle is still true today. In other words, there is no single, simple technique that developers can use to ensure successful Information Technology (IT) projects. However, development methodologies can be followed, which will significantly assist an IT professional in developing and enhancing systems.

Furthermore, TutorialsPoint gives us two different meanings in which Systems Analysis and Systems design differ.

**Systems Analysis-** is a process of collecting and interpreting facts, identifying the problems, and decomposing a system into its components. System analysis is conducted to study a system or its parts to identify its objectives. It is a problem-solving technique that improves the system and ensures that all the system components work efficiently to accomplish their purpose.

**Systems Design-** is a process of planning a new business system or replacing an existing system by defining its components or modules to satisfy the specific requirements. Before planning, you need to thoroughly understand the old system and determine how computers can best be used to operate efficiently.

As mentioned Cyblance, the importance of Systems Analysis and Design are the following:

· First of all, it helps to design systems where subsystems may have conflicting objectives.

· Also, System analysis helps to achieve inter compatibility and unity of the subsystems

· It helps in the understanding of complex structures.

· Above all, System analysis gives an advantage of understanding and comparing the functions of the subsystems with the complete system.

Furthermore, According to Eminov (2019), An absolute importance. Systems analysis and design are the backbones of any system that you are trying to build or upgrade. It enables you to grasp the concepts and business ideas and transfer them into IT processes. Your IT systems analyst’s job is to gather information from your stakeholders, design a system based upon those requirements, and document and deliver and explain it to the development team.

As per Jawahar definition of a system suggests some characteristics that are present in all systems: organization (order), interaction, interdependence, integration, and a central objective.

· **Organization** implies structure and order. It is the arrangement of components that helps to achieve objectives. In the design of a business system, for example, the hierarchical relationships starting with the president on top and leading downward to the blue-collar workers represent the organization structure. Such an arrangement portrays a system–subsystem relationship, defines the authority structure, specifies the proper flow of communication, and formalizes the chain of command. Likewise, a computer system is designed around an input device, a central processing unit, an output device, and more storage units. When linked together, they work as a whole system for producing information.

· **Interaction** refers to how each component functions with other components of the system. For example, purchasing must interact with production, advertising with sales, and payroll with personnel in an organization. The central processing unit must interact with the input device to solve a problem in a computer system. In turn, the main memory holds programs and data that the arithmetic unit uses for computation. The interrelationship between these components enables the computer to perform.

· **Interdependence** means that parts of the organization or computer system depend on one another. They are coordinated and linked together according to a plan. One subsystem relies on the input of another subsystem for proper functioning: that is, the output of one subsystem is the required input for another subsystem. This interdependence is crucial in systems work.

· **Integration** refers to the holism of systems. Synthesis follows analysis to achieve the central objective of the organization. Integration is concerned with how a system is tied together. It is more than sharing a physical part or location. It means that features of the system work together within the system even though each part performs a unique function. Successful integration will typically produce a synergistic effect and more significant total impact than if each component works separately.

In most cases, systems analysts operate in a dynamic environment where change is a way of life. The environment may be a business firm, a business application, or a computer system. To reconstruct a system, the following key elements must be considered:

· A major objective of a system is to produce an **output** that has value to its user. Whatever the nature of the output (goods, services, or information), it must be in line with the expectations of the intended user. Inputs are the elements (material, human resources, and information) that enter the system for processing. Output is the outcome of processing. A system feeds on input to produce output in much the same way that a business brings in human, financial, and material resources to produce goods and services.

· The **processor** is the element of a system that involves the actual transformation of input into output. It is the operational component of a system. Processors may modify the input totally or partially, depending on the specifications of the output. This means that as the output specifications change, so does the processing. In some cases, input is also modified to enable the processor to handle the transformation.

· The **control** element guides the system. It is the decision–making subsystem that controls the pattern of activities governing input, processing, and output. In an organizational context, management as a decision–making body controls the inflow, handling, and outflow of activities that affect the welfare of the business. In a computer system, the operating system and accompanying software influence the behavior of the system. Output specifications determine what and how much input is needed to keep the system in balance.

· **Feedback** measures output against a standard in some form of cybernetic procedure that includes communication and control. The output information is fed back to the input and management (Controller) for deliberation. After the output is compared against performance standards, changes can result in the input or processing and, consequently, the output.

· The **environment** is the “supra system” within which an organization operates. It is the source of external elements that influence the system. It often determines how a system must function. For example, the organization’s environment, consisting of vendors, competitors, and others, may provide constraints and influence the business’s actual performance.

**Software Engineering**

In the article of European Leadership University, software engineering defines the process of understanding user demands and then designing, building, and testing end-user applications using software programming languages to meet those goals. It refers to the use of engineering concepts in the development of software. In contrast to simple programming, software engineering is utilized for more extensive and complicated software systems vital to businesses and organizations.

Moreover, the field of software engineering is extensive. It’s not only about computer programming; it’s about a lot more than that. It includes various occupations, such as business, graphic design, and video game production. Single software is required in every field of employment, not only in a specific field. Software engineering is of significant help and aid because software is built and embedded in machines to satisfy users’ needs from many professions.

Furthermore, Software Intelligence for Digital Leaders stated that software engineering studies and applies engineering principles to software creation, development, maintenance, and retirement. Software engineering covers a wide range of topics and performs a variety of tasks throughout the application lifecycle. Software engineers must be educated in good software engineering best practices, disciplined, and aware of how your firm develops software, the functions it will do, and how it will be maintained to be effective.

Apart from this, Javatpoint website indicated some of the reasons why software engineering is so important. These are:

· **Reduces complexity**: significant software is inherently complex and difficult to develop. Software engineering has a fantastic option for reducing project complexity. Software engineering breaks down large problems into smaller chunks. Then, one by one, begin to resolve each minor issue. All of these minor issues are resolved independently of one another.

· **To reduce software costs**: Software development takes a lot of time and effort, and software engineers are highly compensated professionals. To design software with a vast number of codes, a large number of people is necessary. However, in software engineering, programmers project everything and reduce everything that isn’t required. As a result, software production costs are reduced when compared to software that does not use the software engineering process.

· **To save time**: Anything that isn’t done by the project wastes time. And, if you’re building outstanding software, you might need to run a lot many scripts before you find the one that works. This is a time-consuming technique that can take a long time if it is not handled correctly. So, if you use the software engineering process to create your software, you will save a lot of time.

· **Managing large projects**: large projects take more than a few days to complete, and they necessitate a great deal of patience, planning, and administration. And it takes a lot of planning, guidance, testing, and maintenance to invest six to seven months of any organization. No one can claim to have given the assignment four months of his time, and the project is still in its early stages. Because the corporation has invested a significant amount of resources in the plan, it should be finished. As a result, the organization must use a software engineering strategy to complete a large project successfully.

· **Reliable software**: Software should be secure, which implies that if you deploy it, it should work for at least the time or subscription period specified. And if there are any faults in the program, the corporation is responsible for fixing them. Because software engineering includes testing and maintenance, there is no need to be concerned about its dependability.

· **Effectiveness:** If anything is made according to the criteria, it is effective. Companies are focusing their efforts on improving software standards. As a result of software engineering, software becomes more effective in the act.

Besides, The Software Engineering Code of Ethics emphasizes high-quality software development. They are dedicated to evaluating, defining, designing, building, testing, and maintaining beneficial and effective software for the organization or client.

Based on the study of Vats R. (2021), Software processes are a set of actions and processes that are necessary for specifying, designing, implementing, and testing software systems. Any software process model is an abstract representation and creativity of a process that may emphasize a similar process from a few different angles.

Furthermore, software processes, frameworks, and methodologies are abstractions that the company can use to carry out its day-to-day tasks. The organization’s adaptable frameworks can also alter and expand these processes to create a custom set of stages to meet the needs of individual software projects or groups. In a few circumstances, a “maintenance” or “sponsor” organization distributes an official set of the necessary documentation for explaining the software process regularly.

**Tools in Development**

**VS Code**

Visual Studio Code combines the simplicity of a source code editor with powerful developer tooling, like IntelliSense code completion and debugging (Microsoft, 2016). First and foremost, it is a proofreader that moves. The brilliantly frictionless alter construct troubleshoot cycle implies less time tinkering with your current circumstance and more time executing on the user’s thoughts. At its heart, Visual Studio Code includes a lightning-quick source code manager, ideal for everyday use. With help for many dialects, VS Code assists the user with being quickly gainful with grammar featuring section coordinating, auto-space, box-determination, scraps, and then some. Natural console alternate routes, simple customization, and local area contributed console alternate route mappings to explore the code easily.

Pedamkar (2021) discuss some unique features of visual studio code, as listed below:

· First, **Support for multiple programming languages**. It supports multiple programming languages. It effectively recognizes any flaw or cross-language reference; it’ll have the option to identify it without any problem.

· Second, **Cross-Platform Support**. Traditionally, editors used to support either Windows or Linux, or Mac Systems. In any case, Visual Studio Code is cross-platform. In this way, it can chip away at all three stages. Additionally, the code deals with every one of the three stages; else, the open-source and exclusive programming codes used to appear as something else.

· Lastly, **Commenting**. A common feature, but some of the languages do not support it. Commenting on the code assists the client with reviewing or track as indicated by the group needs.

As for Bana and Bana Architectural Firm Website, PHP is the chosen programming language and Windows System will be used as the platform support. The website’s code is full of comments to note and understand from start-up to the last process done inside the website.

In the Selection of tools and programming languages of WA Interview booker by Emilio Samano Hoftaniska, Jannecke Sundal Nyquist, Torstein Winjum, Microsoft’s Visual Studio Code was chosen. It was recommended to the group by Wide Assessment, and some of the group had prior experience with it. Visual Studio Code is a text editor with built-in debugging for programming and git commands for version control (Visual Studio Code, 2019). As for Bana and Bana Architectural Firm, the chosen text editor and IDE is Visual Studio Code.

**XAMPP**

XAMPP is an excellent integration package for the development components that almost every modern Web developer requires, regardless of the platform on which they work (Morgan, 2017). The "X" in XAMPP stands for "operating system," and the other letters stand for Apache, MySQL, PHP, and PERL. XAMPP Control Panel, on the other hand, is a management tool that allows you to monitor the actions of individual XAMPP components. (JavaTPoint, 2018).

On the other hand, Johari (2020) said, Xampp stands for Cross-platform(x), Apache(a), Maria DB(m), PHP(p), Pearl(p) which is a software distribution server that makes developer’s work easier for testing and deploying by creating a local webserver.

According to Joy Joel, a Laravel Developer (2020), on the question, Is XAMPP a decent choice for novices to test PHP improvement on a neighborhood machine in Quora, she addressed that XAMPP is one of the most usually utilized open-source PHP servers for facilitating applications locally. Using a prepackaged specialist plan like XAMPP, WAMP or MAMP will make things much more straightforward for a novice learning PHP, JavaScript, or other web headway lingo as you have successfully had the leg turn out achieved for them, and generally, the interfaces for managing the laborer stacks are for the most part great.

Furthermore, according to the Research paper of Punam Kumari and Rainu Nandal entitled, A Research Paper OnWebsite Development Optimization Using Xampp/PHP, stated in the research methodology that, they will try to use the Xampp tool for local hosting of the website. Through Xampp outlook can see easily by the developer and user and change the code as per requirement. Xampp is a free open-source cross-platform developed by Apache and consists of an HTTP server and interprets with the scripts written in PHP programming language. It is a simple, flexible, and lightweight tool that can make it very easy for developers to create a local web server for the website testing and development process.

In line with the existing studies from above, Bana and Bana Architectural Firm’s Website will be using XAMPP as a Server together with MySQL, PHP, and phpMyAdmin for backend and database. Besides, the researchers will get and display the necessary data to be retrieved coming from the database and will not get and post any unnecessary or sensitive information coming from the Architects and Clients. Thus, the form to be answered by the clients if they want to inquire will be simple and short, in other words, only basic and necessary information will be needed.

**MySQL**

MySQL is an Oracle-backed open-source relational database management system ([RDBMS](https://www.tutorialsteacher.com/jquery/what-is-jquery)) based on Structured Query Language (Moore, 2018). MySQL runs on practically all stages, including Linux, UNIX, and Windows. Despite the fact that it tends to be utilized in a wide scope of utilizations, MySQL is frequently connected with web applications and web-based distributing.

Rankin (2017) discuss the five essential steps to hardening your MySQL Database, the following steps are as follows:

· To start with first is to **Set Strong Passwords**. It is significant for all the information base clients to utilize solid passwords. This is huge whether the client can use extra MySQL access control to limit where a particular record can log in from, for instance, confining records thoroughly to localhost.

· Second to that is **Remove Anonymous Users**, unknown records are MySQL accounts that have neither a username nor a secret key.

· Importantly, Follow the **Principle of Least Privilege**. The rule of least advantage is a security rule that can be summarized this way: Only give a record the entrance it needs to do the work and that's it.

· Next is to **Enable TLS**, setting solid passwords possibly gets up until this point in case an aggressor can peruse the secret phrase or other touchy information as it ignores the organization.

· Finally, **Encrypt Database Secrets**. To ensure the information that is in the data set, the client needs to make the additional stride of encoding touchy fields before they store them.

Concerning Bana and Bana Architectural Firm, the type of secret word in add administrator page is covered up and encoded. In this way, the secret word won't ever be shown by utilizing the $\_GET variable for security purposes. In addition, the data set has followed the rule of least advantage by making Login Authentication wherein if the client has no record, he won't ever get to the Admin Panel for Access Control purposes. Additionally, just restricted individuals are special to get to everything, the designers and most particularly, the Architects. Be that as it may, the root client is at the first set as no secret word. Additionally, the TLS isn't yet empowered.

**Why MySQL?**

As per one contextual investigation in https://www.mysql.com/on why MySQL? Korea Investment and Securities use the expense productivity and execution of MySQL Enterprise Edition 8.0 to fabricate it’s inside informing stage. With the quality information obtained directly from MySQL trained professionals, KIS further developed headway viability which redesigned the overall chatbot organization quality. 24x7 permission to Oracle Premier Support considered more capable, proactive movement of KIS' MySQL database estate and an unrivaled point of convergence of its DBA bunch on fundamental tasks. “While creating our chatbot system with MySQL Enterprise Edition 8.0, we had the choice to conveniently gain the help we needed from Oracle Premier Support. The MySQL Support bunch has been a staggering help meaning to movement issues. We are by and by prepared to regulate databases even more proactively and beneficially", as indicated by Park Ho Young, IT Development Manager of Korea Investment and Securities Co., Ltd.

For the same reason why Line Corp enabled the business to run large-scale online events, such as live programs with superstars and celebrities, by demonstrating the required performance and scalability to process the increasing volume of the user query and access volume, thanks to the scalability of MySQL Enterprise Edition. By moving up to MySQL Enterprise Edition, we can resolve disappointment issues 10x quicker and complete information reinforcement in a couple of hours rather than days. The improved exhibition likewise permitted us to rapidly convey new administrations without extra advancement of new administration capacities and backing future development as per Kentaro Kitagawa, DB1 Team, Database Department, IT Service Center, LINE Corp.

As for Bana and Bana Architectural Firm, the chosen tools for the development environment are XAMPP, PHP, MySQL, and phpMyAdmin as they find it easy to install, understand and configure.

**Database Design**

In accordance with the database design of the dissertation by Xu Han (2017) entitled, Location-based educational web system design and implementation, to make the complicated relationships more clear, we use the ER diagram to build the tables.

Similarly, in the Abstract of the master’s Thesis by Matinolli (2016) entitled, Designing, implementing and evaluating a database for a software testing team, after studying different database management systems, MySQL was chosen for the database management system and a new database was designed, implemented and evaluated. It turned out that MySQL is still a relevant and successful database management system to meet the needs of a modern software testing team when optimization techniques such as indexing, and normalization are applied.

With respect to Bana and Bana Architectural Firm, the researchers are cautiously planning the right title, improvement climate, programming language, information base, and server. Since a database design plan is a must, the researchers invest such a lot of energy in planning the right progression of information by focusing on the graphs.

**HTML (Hypertext Markup Language)**

HTML represents Hypertext Markup Language. It permits the client to make and design areas, sections, headings, joins, and blockquotes for site pages and applications. All things being equal, it makes it conceivable to arrange and organize archives, comparably to Microsoft Word (Domantas, 2019). In like manner, as indicated by Ross Shannon HTML is a programming language that was made to consider the improvement of sites. It is very easy to comprehend, with a great many people having the option to get a handle on the basics in a solitary setting; and it is exceptionally valuable as far as what it assists clients with the building.

The web composition process for arranging, making, and refreshing sites. Web composition likewise incorporates data engineering, site structure, UI, route ergonomics, site format, colors, differentiations, text styles, and then some. As per Phillip Lindsey, in planning a site HTML is one of the main angles to be remembered. The HTML coding orders are a lot less difficult than those of JAVA, PHP, .net, and so forth.

What's more, as per Kolowich (2017), Markup dialects work similarly as clients did when you arranged those substance types, aside from they do it with code, explicitly HTML labels, which are otherwise called "components." The names of these labels are genuinely plain as day: header labels, section labels, picture labels, etc. Each kind of content on the page is "wrapped" in HTML labels, i.e., enclosed by them. Each site page is comprised of a bunch of HTML labels that recognize the various sorts of content on the page.

**CSS (Cascading Style Sheet)**

As indicated by Bradley (2020), Using CSS modularizes your sites similarly that developers have been modularizing programming code for years. Measured code in your site considers more prominent plan consistency and simpler support. It's an ideal opportunity to isolate the construction of HTML and the introduction of CSS. Likewise, Ankitha (2018) said that the look and feel of a page are taken care of by CSS. Clients can utilize CSS to change the shade of the text, the textual style type, the dispersing between passages, the size, and the design of segments, and that's just the beginning.

Moreover, according to Scalise (2019) To grasp the fundamentals of CSS, you must first grasp a clear understanding of modern HTML. The “box model” is used by web designers to set out websites. A Web page is made up of a collection of boxes, each of which contains a distinct feature. These boxes are nested, meaning they are one inside the other. A page’s header, for example, is a box that contains several smaller boxes that contain all of the elements that make up a header, such as a logo, navigation, social media buttons, shopping cart buttons, and so on. A developer assigns styles to the “header” box using CSS. Let’s pretend that the developer makes the text inside the header purple, Arial font, and fifteen points high in this case. The “cascading” aspect of cascading style sheets comes into play here. The font styles used in the header are carried over to all of the elements inside the header. Text-heavy elements like navigation, ties, and calls to action will all be purple, Arial, and fifteen points wide.

Essentially, as indicated by the restraint site, CSS is vital to the achievement of any web advancement project today. It offers different advantages that can straightforwardly affect the client experience on your site. Moreover, Sahil Mahapatra said, CSS selector, is the part of a CSS decision set that chooses the substance to be styled. What's more, as indicated by geeksforgeeks (2020) Most significant benefit of PHP is that it's open-source and liberated from cost. PHP put together applications that can run concerning any OS like UNIX, Linux, and windows, and so forth. The application can without much of a stretch be stacked which depends on PHP and is associated with the information base.

**PHP (PHP: Hypertext Preprocessor)**

PHP is a prearranging language that is for the most part utilized in "server-side" web improvement. To figure everything out, it's significant to initially get what a prearranging language is. Prearranging dialects are a subset of coding dialects used to computerize processes that in any case would be executed bit by bit in a site's code each time they happen (Morris, 2020). One more central issue as indicated by Computer Hope (2020) is a deciphered server-side prearranging language. It was made fully intent on creating intuitive site pages and website pages that fit well with information bases.

As indicated by the investigation of Tarun Nagar, PHP is additionally secure, dependable, and quick that has brought about web designers liking to work with PHP. Thus, it would very be advantageous for any endeavor to enlist a PHP designer than an overall web engineer. Moreover, he likewise referenced that PHP is a server-side prearranging language, which implies the customer just gets the result since the handling occurs in the server. These differentiations with dialects like JavaScript in, which the language is handled on the PC of the customer and the assets utilized are from the PC and not a server.

To emphasize, PHP can do a ton of things. As indicated by Ian Ray (2016) PHP is prepared to do and has cultivated, an incredible arrangement. The clients don't have the figures, however clearly PHP has run countless sites on the web throughout the most recent twenty years. PHP is the primary function of WordPress, Magento, Drupal, and the Zend framework, among others in any case, without getting excessively convoluted.

**Jquery**

jQuery is a publicly released JavaScript library that improves on creation and route of web applications. Also, jQuery consolidates JavaScript functionalities by controlling CSS properties to add impacts, for example, blur intricate details for site components. jQuery is a generally utilized JavaScript library and is upheld by a huge number of client-made modules (Gillis, 2020). Likewise, Christina Kopecky said jQuery is a little, open-source JavaScript library that permits to making of intelligent website pages with movements, special visualizations, and other progressed highlights. Also, as per Beth D'Amato (2018), It's a JavaScript library that has been around for more than 10 years, however, there's some contention on whether it's yet valuable in 2018, considering that advanced internet browsers might play out a portion of similar errands.

jQuery has been a great blessing to all web developers, both new and experienced. This is a JavaScript library that simplifies programming using JavaScript by providing simple and very easy-to-use condensed syntax. Using jQuery provides web designers with an excellent deal of power and flexibility. This web design technique simplifies and standardizes the interactions between JavaScript code and HTML elements.

According to Tutorials teacher (2017) Jquery is not difficult to learn since it upholds a similar JavaScript coding style Write less, accomplish more: jQuery accompanies many elements that assist engineers with accomplishing more by composing less and more lucid code. It has brilliant API documentation it gives superb API documentation on the web. Cross-program similarity: jQuery offers brilliant cross-program similarity without the requirement for extra code.

According to Sujain Thomas here are a few benefits of this important technique.

**1.** **Highly extensible**

The essential jQuery library has been made to be kept tight and engaged and this disposes of all trivial highlights. Nonetheless, there is a module system that is accessible to make it simple for engineers to broaden jQuery. Developers can utilize official jQuery modules and a large number of other outsider modules; this implies that your business site will just download the essential elements that it needs.

**2.** **Pages load faster**

- Google and other web search tools use page stacking time as a significant element that influences site improvement. Along these lines, web designers should guarantee that their code is light and as brief as could be expected. jQuery records are regularly put away independently from the site pages.

**3.** **Beautiful and clean**

- Syntax structure jQuery utilizes spotless, basic, and amazing punctuation that makes it simple to choose the DOM components on the site page. When creating sites, you should figure out how to isolate your content from your page show code. Because of how jQuery is made, it is simple for you to snare components and even join code to site pages that resemble CSS.

**REVIEW OF RELATED STUDIES**

A professional portfolio is a compilation of work and other documents that, in theory, give prospective employers a complete picture of a job candidate’s abilities. (Loretto, 2020) Making a website for Bana and Bana Architects Firm to serve as their professional portfolio online will boost the client gaining. A study by Anabel Galan Manas entitled Professional portfolio in translator training: professional competence development and assessment. In this study, the need for effective competence assessment tools has arisen due to current European Higher Education Area demands for university degree programs to concentrate on competence growth. As a solution, A professional portfolio is one of the resources that teachers can use to determine their students’ professional competencies; students can also use it to find work after graduation. As a result of this study, Students have difficulty describing their professional profile, according to the findings; however, the professional portfolio appears to have a range of advantages, as it assists students in identifying their general competencies, setting potential goals, and becoming familiar with market prices and taxation.

Similarly, In the study conducted entitled Using a Portfolio Approach to Navigate Academia, building such a profile can be achieved in conjunction with colleagues and for the client as part of creating and communicating a professional identity. Young shares how academics curate and handle the evidence they need to promote professional growth and career advancement, better express their accomplishments, and influence, and recognize development gaps. [(Hartnell-Young](https://www.emerald.com/insight/search?q=Elizabeth%20Hartnell-Young) 2021)

Moreover, In the study of Hernández, Jiménez, and Martín (2009) in their study entitled, Key website factors in e-business strategy, that the design of a quality website, as part of e-business strategy, has become a key element for success in the online market. This study aims to analyze the main factors that must be considered when designing a commercial website, concentrating on the Aceros de Hispania company and its business model. Thus, the results obtained provide several lessons which should be borne in mind when designing a commercial e-strategy. Firstly, it can be observed that Internet popularity and search engine positioning facilitate entry to practically inaccessible markets. Secondly, navigability makes users feel comfortable and secure when browsing it, which increases the probability of a transaction being completed. Finally, the information provided on the website must be accurate, informative, updated, and relevant to customers’ requirements.

Meanwhile, the proposed study aims to promote and feature the projects and design of the architects by creating a Customized Website for B&B Company. It is more on the maximization of the company's potential by improving its online presence. To make the system possible, the researchers first analyze the main factors they should prioritize regarding the website’s design. In addition, the researchers created a thorough study about the B&B Company's business model.

Furthermore, a similar problem scenario by Bana and Bana Architect firm and the Citramedja from the study of Gigih Gumelar (2020) entitled Website Sebagai Media Portfolio Jasa Dokumentasi. Like Bana and Bana, Citramedja uses social media sites for its media portfolios, but specific platforms have content laws, posing the risk of content deletion or the likelihood of a platform that controls the government, posing the risk of the platform being removed by the government. And another similar with this study was the issue to be addressed, according to the researcher, is how to create a website that serves as a research forum for a more personal media portfolio while leaving supervisors free to upload whatever content they want.

Apart from this, the stated structure in the article Structured Data, Rich Snippets & SEO The Importance for an eCommerce Website (Smith, 2021) likewise in B&B Architects in the matter of there are high priority factors that influences the result of the project knowing that these factors can facilitate the whole process if promoting the business/ business website. The two major purposes that B&B adapted are to [1] Understand what a web page is all about and [2] to generate the expanded result. Taking this into account, it becomes clear and easy to understand what type of platform and content they have got. There are numerous sorts of rich bits that can be coded into the HTML of a website page.

With everything considered, the extra data going with the depiction assist clients with perceiving what is the issue here. This is only one feature in the developing semantic web or collective development to empower sharing and deciphering of data.

Equally important in the structure was the content. Based on another article by Smith entitled SEO: Content Writing; as stated in article chapter 1, the initial step to building great content is to pick a point dependent on research. This significance they don't compose content to “have more substance”; you compose substance to respond to a typical looked through question, issue or profoundly looked through interest.

As for the article in chapter 2, These days there are measurements on everything and individuals love seeing them. Counting details inside content makes it seriously captivating and valid, however, it makes it WAY more probable that somebody will connect to it as a kind of perspective. This makes the article of blog entries a shared benefit. All in all, how would they incorporate details? Embed them into the substance or settle on measurement decision-outs. In the event that they are gotten down on, more individuals will see them, and more individuals will connect to the page. Through the plan, there are numerous approaches to get down on these.

Similar to the B&B Architect website is that the idea of good content is what educates the audience about them and their products, it is what convinces them. B&B has a Portfolio and services to tell people what they can do for them and go into as much detail as they need to. People can look through the B&B portfolio to see the works instead of being told about them. As they say, A picture means/worth a thousand words.

Not to mention, the B&B website offers a highlight which gains credibility with your audience. That credibility makes it easier to persuade them to make a purchase or contract service from them. Clients always look for updated events, promotions, and achievements; therefore, B&B architects have an activity to make clients updated. This intention was similar to the article entitled SEO: Six Things Google Loves (Barr,2021) which stated some criteria for gaining credibility with the audience. First is the Freshness; it is a good thought to add something new to the site consistently. Whether it's another item, another website page, or another article, giving something new to Google will keep it glad and substance. Next is the *URLs*, A website page with the URL bean-pack chairs.html will get a vastly improved situation in the internet searcher rankings for the pursuit term "bean sack seats" contrasted with a page with the URL page1.html. Then the Speed, Google loves to complete things rapidly. Albeit this is certainly not a specific quality that they search for in an accomplice, it is a deciding variable in choosing where to put the site's posting contrasted with another place for a similar pursuit term. Lastly, the Quality Links, Trust is vital in any relationship, and having excellent connections highlighting your site will impart this trust and harden the remaining on the web.

Furthermore, Hend S. Al-Khalifa and Regina A. Garcia conducted a study titled Website Design Based on Cultures: An Investigation of Saudis, Filipinos, and Indians Government Websites' Attributes, the purpose of which was to investigate the user interface design of top government websites in the Kingdom of Saudi Arabia (KSA) in comparison to top government websites in the Philippines and India. The study can be used as guidelines to improve the user interface of a website in a specific culture and allow web designers to base their websites on the cultural background of the target website users.

Conversely, on the other hand, different websites have their distinct design based on their purpose and intended audience. For the study, the purpose of this website was to promote a country's culture, and the target users were countrymen. The Bana and Bana Architect website, on the other hand, serves to promote their products, designs, and services. Their website's target audience is people looking for an excellent firm to design their homes.

With the use of these related research, it will support the making of a good quality website for Bana and Bana Architects Firm. This research also serves as proof and evidence that making a website was a good solution for gaining a client for Bana and Bana Architect Firm.

Besides as mentioned above, an interactive website is a website that communicates and allows for interaction with users. And by interaction, we don’t just mean allowing users to “click” and “scroll.” Offering users amusing, collaborative, and engaging content is the essential objective of an interactive website. By putting these kinds of unique characteristics for Bana & Bana Architects website, it will engage users to dive in and experience a whole new experience through this website. A study by Jenny Polyxeni entitled Truly interactive websites: an eye-tracking approach suggests that when designing a website for a new brand, online marketers should consider that the first objective of the visitors is to search for information regarding the product. The results of this research can help businesses employ the appropriate web features to design truly interactive web pages and, therefore, increase their marketing edge.

This study supports Liu and Shrum (2002) suggestion that the rush to employ interactive elements into the marketing context should be mediated or tempered by fully understanding both; what interactivity can do well and, most importantly, what it cannot do. Before adopting the latest technological advances, firms need to take into consideration first their advantages and limitations.

Future eye-tracking research in other forms of advertising messages and different types of products would shed more light on the website design. Additional research that examines low involvement products would provide helpful insight to online marketers. The assessment of the facial expresses could also help academics and practitioners to answer unresolved questions regarding users’ emotions. Finally, further investigation into the interactive elements' cognitive process would provide insights into cognitive psychology in the online environment.

According to Bandong (2019), Whiplash is a health and economic burden worldwide. Contributing to this burden are poor guideline adherence and variable management by health care professionals (HCPs). Web-based tools that facilitate clinical pathways of care are an innovative solution to improve governance. The study aimed to develop, implement, and evaluate a Web-based tool to support whiplash management following a robust process.

The result will be the development process delivered an interactive, user-friendly, and acceptable website, *My Whiplash Navigator*, tailored to the needs of HCPs. The most effective implementation strategies were classroom education for students (81% uptake, 175/215) and educational meetings for primary HCPs (43% uptake, 47/110). Popular pages visited included *advice and exercises* and *risk assessment*. Most HCPs agreed that their knowledge about risk management (79/97, 81%) and activities (85/97, 88%) improved. The specialists’ most common management decision was *shared care*, an improvement from a previous cohort. Areas to strengthen were navigation and access to outcome measures.

Likewise, Bana and Bana Architects will highlight various designs to increase conversions to entertain visitors with interactive features that will keep them hooked. If these features were used correctly, it will surely attract more clients and engage them to visit the website, which will lead to the interest of the clients in all the firm's services. The following are the interactive features for improving client experience and sales.

· Including **forms** on web pages can be a valuable part of an online retailer’s digital marketing plan. Depending on the questions you ask, you can find out a lot about your site visitors, as well as their attitude towards your website, your brand, or your products.

· In the old days of the internet, there was much less visual content, simply because the smaller bandwidths and slower connections couldn’t support it properly. Now that connection speeds have improved, we can take advantage of powerful visual and interactive content. Videos are a great way of grabbing your users’ attention. 96% of people choose to turn to videos to learn more about a product or a service. It’s a convenient way to promote what you’re selling or to present how it works simply.

· Of course, consumers can always contact you via social media, but if you’re selling stuff on your website, you don’t want to risk your visitors leaving it for just a second—and then getting completely distracted as soon as they tap the Facebook icon Having a live chat feature is an excellent way to keep your customers on your website.

· With content filtering, the clients can select all the necessary features they want for the structures they want to be built.

With the use of these related research, it will support the making of a good quality website for Bana and Bana Architects Firm. This research also serves as proof and evidence that making a website was a good solution for increased user engagement.

Apart from this, since the proposed website needs to be interactive, a good filter must be implemented to organize the designs and products of the Bana and Bana Architects. A similar study entitled Research on collaborative filtering based on user interest in the higher vocational e-commerce website development by Gong (2021) has the same goal with their filter implementation. Based on the study to boost user satisfaction and online conversion rates, E-commerce Recommender Systems recommend useful and engaging products to customers. They usually employ statistical methods to suggest explicit or implicit user input like ratings, purchase records, or clickstream data. Collaborative filtering is one of the most extensively utilized methodologies in recommender systems. On the other hand, traditional collaborative filtering algorithms compute users' similarities in product dimensions without accounting for neighboring users' effects. The sole sort of customer input discussed in this paper is openly stated user requirements. The new collaborative filtering mechanism is based on the transmission of user interests. This method calculates customer similarities in the dimension of interests and considers the transmission of interests between different consumers. This method can deal with both cold start and data-sparse problems, as well as having high forecast precision.

As for the Bana and Bana Architects website, the filter implementation will also be collaborative filtering. This filter will serve as an interactive way for the client to the website. This will help the clients of the Bana and Bana Architects to decide and find the design or product they want to avail themselves of on the website.

Furthermore, communicating with customers through live chat interfaces has become an increasingly popular means to provide real-time customer service. As part of the study, chatbots are one of the website's relevant features wherein the staff and owner of a company communicate with the client to provide assistance and obtain information. Abu Shawar (2007) stated that chatbots could imitate human communication and entertain users, although they are not designed exclusively for this purpose. They can be used in educational, information retrieval, business, and e-commerce applications. Since the proposed website is all about promoting an architectural firm, people who browse on it may have many questions, especially when they are interested in the works and designs, through the use of a chatbot that interacted with via text or voice and replies as if it were a rational entity that understands one or more human languages using Natural Language Processing (NLP).

In addition, it is also indicated that chatbots appear to have a lot of potential for providing consumers with fast and convenient services tailored to their specific needs. Productivity is the most common motivator for chatbot users, with amusement, social aspects, and novelty interaction rounding out the list.

A study entitled Chatbots – An Interactive Technology for Personalized Communication, Transactions and Services stated that thousands of firms are developing, testing, and providing chatbots for mobile cellphones today. Chatbots can potentially supplement or even replace traditional information, communication, and sales channels such as newsletters, websites, sales desks, and hotlines in the future. Chatbots can save time for business owners to accommodate one-by-one people who send messages with the same concern.

In addition, based on the study of Español, Fronda, Villarica, and Intal, “SHOP BUDDY: Enhanced Automated Chatbot for Any E-commerce Website with Data Analytics Functionalities,” the study aims to design a chatbot that will be able to handle customer engagement while also able to present collected data from these interactions into valuable data analytics. It shows that the study focuses on providing customer service by using chatbots as an interactive tool to the customers. Also, the study discusses e-commerce platforms such as Shopee, Zalora, and Lazada as their field to conduct a chatbot. Meaning, the chatbot can generate messages if the customers have questions regarding the product or complain about the shop's services or the product itself.

Likewise, the proposed study mainly focuses on answering the customers/clients using chatbots but not purely artificial intelligence. Automated messages generated by the chatbot are not always accurate when answering the questions of the clients. Therefore, as the client requests for a real person to interact with them, it is advantageous to be more accurate in terms of their concerns. In this study, the chatbot can generate messages if the client has a question regarding an architect’s design. Both studies aim to provide and deliver the best answers to the questions of the customers/clients by using a chatbot.

**Evaluation System**

The quality model is the cornerstone of a product quality evaluation system. The quality model determines which quality characteristics will be considered when evaluating the properties of a software product. The quality of a system is the degree to which the system satisfies its various stakeholders' stated and implied needs and thus provides value. Those stakeholders’ needs (functionality, performance, security, maintainability, etc.) are precisely what is represented in the quality model, which categorizes the product quality into characteristics and sub-characteristics.

The following are the software product quality to be tested:

· Functionality- This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions. This characteristic is composed of the following sub-characteristics: Functional completeness, Functional correctness, and Functional appropriateness

· Usability- Degree to which specified users can use a product or system to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use. This characteristic is composed of the following sub-characteristics: Appropriateness recognizability, Learnability, Operability, User error protection, User interface aesthetics, and Accessibility.

· Reliability- Degree to which a system, product, or component performs specified functions under specified conditions for a specified period. This characteristic is composed of the following sub-characteristics: Maturity, Availability, Fault Tolerance, and Recoverability.

· Security- Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization. This characteristic is composed of the following sub-characteristics: Confidentiality, Integrity, Non-repudiation, Accountability, and Authenticity.

The Bana & Bana Architect firm website will test according to the ISO 25010 standard. The first test will be for the functionality; the researchers will test the completeness of the features and whether it is fully functional. Usability: The researcher will let the client test whether the website is easy to use and assess its design. Reliability, the researcher will try whether the website will be accessible to any gadget or device browsers. And last is the Response time, how long it takes for the webserver to connect and send data packets to an end-user browser.

The response time of the website will be tested using the Dotcom-Tool. Dotcom-Tools' website speed test allows users to test their web pages for free from up to three global locations, including behind China's Great Firewall, to ensure your website can be accessed by users in China. After completing a test, users can drill down into robust performance reports and waterfall chart analysis. Users can also choose which browser they want to test with. This test is compatible with Chrome, Firefox, Edge, and mobile browsers such as Android, iPhone, and iPad.

Testing the efficiency and response time of a website or web server has several key performance indicators are used to assess web server performance (KPIs).

* Is there a valid response from the webserver? A properly functioning web server should return a code of 200. Response codes such as 401, 404, and 503 may indicate a server problem. Individuals within your organization may not be seeing server error responses, but users outside of your network may be. In these cases, users are unlikely to report these issues, and the problem may go unnoticed for an extended period, potentially affecting the bottom line.
* Do all of the page's or application form's elements produce valid responses? Even if a page loads properly, individual elements called by the page may fail to load due to a variety of factors such as third-party hosts, CDNs, network latency, and DNS resolution issues.
* What is the website's response time? How long does it take for the user to be able to interact with the page? Long time to interactive (TTI) can annoy users and give the impression that your website is unresponsive. This is especially true for mobile devices, where users may notice longer load times.
* What is the total time it takes for the entire page to load? How long does it take to load all of the content specified in the HTML of the given page completely? There could be third-party elements on your page that are causing it to load more slowly than necessary.

A response time of fewer than 0.1 seconds provides users with an "instant" response with no interruption. A one-second response time is generally considered the maximum acceptable limit, as users are unlikely to notice a delay. Anything more than one second is problematic, and a user will typically abandon the website or application after five or six seconds. It's critical for your troubleshooting to help you avoid a situation in which functionality enters the red zone.

The additional web tool that researchers will use is the WSC. W3C standards define an Open Web Platform for application development that has the unprecedented potential to enable developers to build rich interactive experiences, powered by vast data stores, that are available on any device. The user can use W3C standards to validate their code using W3C validation tools such as HTML validator and CSS validator. Moreover, W3C's primary activity is to develop protocols and guidelines that ensure long-term growth for the Web thus W3C's standards define key parts of what makes the World Wide Web work.

· Should automate test execution? If possible, yes. Automated test runs are less prone to operator errors and more likely to report the same results when run on similar configurations at different times. Automation is relatively easy when the browser can be used as the driving force. In addition, if automation is impractical because it would require the construction of a test harness or framework code that runs on a variety of different platforms, you should at least provide sufficient metadata and documentation to enable others to construct a test harness or framework. However, some tests such as those requiring human visual confirmation, are inherently difficult or impossible to automate completely. In these circumstances, the process of running the tests should still be routinized as much as possible.

· Why Validate a Site on W3C? W3C validation is the process of checking a website's code to determine if it follows the formatting standards. If you fail to validate your website's pages based on W3C standards, your website will most likely suffer from errors or poor traffic owing to poor formatting and readability. There are seven benefits when you validate your website on W3C. First is it helps improve rankings in search engines, search engines check the HTML or XHTML code of your website when searching because if there is an error on your web page code, robots will stop searching your whole website's content. Second is validation helps teach best practices, having a standards-compliant code is the best practice for web design and develops your skill to create an error-free code and make relatively few validation errors. Third is improved website user experience, validation improves usability and functionality because your users are less likely to run into errors when displayed on browsers compared to non-validated websites. Fourth is to make website browsers friendly, websites that are not validated may display correctly in one browser but not in other browsers and may also display formatting problems when used in certain browsers. Fifth is multiple device accessibility, if you want your website to be visited by as many users as possible, accessibility should be a big factor. Sixth is validation help for easy coding and maintenance, websites or web pages that validate using W3C website validation have code formatted efficiently and are easy to edit, and it helps website owners to create a new page or another new website with similar formatting. Lastly, validation as a debugging tool, an invalid code that may display fine in one document may show-stopping errors in another because of the encompassing code.

**Conceptual Model of the Study**

The Input-Process-Output diagram was used to show the conceptual model of the study as depicted in Figure 1.

|  |  |  |
| --- | --- | --- |
| **INPUT** | **PROCESS** | **OUTPUT** |
| **Knowledge Requirement**  Business Website Definition and Components  Building and Designing a Website   * Tools for Developing Web Applications * Knowledge in Web Programming * Evaluation System   **Software Requirements**   * PHP * XAMP Server (Apache, MySQL, and PHP Library) * Client-Side Scripting Languages (HTML, CSS, Javascript, Jquery) * Browsers (Google Chrome, Firefox, Internet Explorer) * Windows 10 * Adobe Photoshop CS   **Hardware Requirements**   * Minimum RAM 4GB * Minimum Hard drive storage 250GB to 500GB of space * Processor minimum of Intel i5/ AMD Ryzen 5 | Analyze  Design  Create  Test/Debug  Evaluation | **Customize Website for Bana & Bana Architect Firm** |

***Input****.* block consists of knowledge requirements, software requirements, and hardware requirement needed to develop the Customized Website for Bana & Bana Architects. Under the knowledge requirements, the following concepts were needed to establish the foundation of the study. These includes analyzing the context or meaning and components of business websites; the process for building and developing a website; the tools for developing web application which includes web authoring tools, server-side scripting, database server, and text editor; and the evaluation system or ISO 9126 software quality metrics which were the criteria used to evaluate the acceptability of the Portal.

***Process***. The “Process” block includes the following activities: analyze, design, construct, and test/debug. These activities were undertaken to develop the customized website for Bana & Bana Architects.

***Analyze.*** During this phase, the researcher analyzed the background of the problem. Series of interviews with the head architect from Bana & Bana were likewise interviewed to identify problems or opportunities that may be resolved through development of a Portal. The output for this phase were the set of identified requirements specifically achieved through data flow diagrams of the existing scenarios at Bana & Bana Architects and data models or relationships of data that will be captured by the system.

***Design.*** The activities in this phase included formulation of online processing requirements and user process flows for the developed website. The design of the website is based on the preference of the head architect of B&B. The specific characteristics or user requirements that must be established for the system were ruled out. Since the client wanted to control the website itself, it has an admin interface in which it has menu and navigation feature.

***Construct.*** The actual coding or programming of the modules using VsCode, and Adobe Photoshop were conducted in this phase. Bootstrap User Interface (UI) framework was used to build the modules or interface of the Portal. The physical mapping of the database structure was also accomplished in this phase. The outputs of this phase were the modules of the Portal.

***Test/Debug.*** Based on the constructed modules of the website and existing database configuration, several test cases were conducted to identify errors or bugs in the processing with specific attention on accurateness of information maintained on the website. After ensuring that all modules and features were functional, the website was subjected to an evaluation.

***Output***

The “Output” block shows the developed Customized website for Bana & Bana Architects which was a web-based application. The output of the study was subjected to “Evaluation” to determine its acceptability.

**Chapter 3**

**Methodology**

In this chapter, the researchers explain the following: Project Design, System Design, Database Design, Project Development, Operation and Testing Procedure, and the Evaluation Procedure. Also, the Evaluation sheet can be seen in the last part of the chapter.

**Project Design**

The study is to develop a customized website for Bana & Bana Architects. The study uses several modeling tools to analyze the scope of the system and formulate requirements for the system to maximize the company’s potential by improving its online presence.

As shown in Figure 4, the scope of the system is represented using a Context Diagram. The diagram illustrates the external entities that will use the Website Portfolio, as well as the inputs and outputs that will flow in and out of the system for the users.

Users such as the administrator and Client are expected to communicate with the Website Portfolio from the outside.

Based on system requirements, the following are the features of the system designed for the Client. First is the view home page, this is the first thing the client will see. Second is the view portfolio page, this page is vital in gaining the Client's trust by introducing BNB Architectural Firm's Background, Vision, Mission, Values, and Specialization. Third is the view profile Page, this is where the client will know who the people behind BNB Architectural Firm are. Fourth is the view projects page, where the client will be served different projects with walkthroughs by yours truly, BNB Architectural Firm. Fifth is Chatbot, this is the part where the system can serve the client at all times which is convenient for the clients. Sixth is to create an inquiry on the selected project, with this feature, the client can create an inquiry regarding the selected project.

Diagram

Description automatically generated  
 Based on system requirements, the following are the features of the System designed for administrators. First is the view administrator’s dashboard, which shows quantitative data of main modules. The second is add, and delete an administrator, this is where the administrator can add and delete other administrators, and also the activity logs. The third is add, update, and delete a category, this is where the administrator can add, update, and delete categories. Fourth is add, update, and delete a project, this is where the administrator can add, update, and delete projects. Fifth is to add, update, and delete a FAQ, this is where the administrator can add, update, and delete FAQs. Sixth is the view inquiry list, this is where the administrator can view all the inquiries of the clients. Lastly is the edit profile, this is the part where the active administrator can update his profile and change his password.

***Figure 2.*** Context Diagram

As for the context diagram of BNB Architectural Firm Website's DFD, two actors are acting as entities participating inside the system. One is the Architects of the Firm or the administrator, and the other one is the Client. Next is Level 0 which is the general process of the system. The first thing that is happening when the Architects save their Company Information, Profile, and Portfolio. Then the system sends the credentials of the clients together with the message or the inquiry to the architect. In the same manner, the system sends the inputs of the Architect Entity to the Clients. On the other hand, the client entity sends their credentials together with the message or the inquiry to the system and the system sends it to the Firm's direct e-mail.

The first process that is happening is when the administrator entity types in the required URL that is exclusive only for the administrator, then the administrator will log in using his credentials. After logging in, managing the seven modules is the first step, namely, Manage administrator, Manage Category, Manage Projects, Manage Chatbot,  Manage Inquiry List, View Activity Logs, and Manage Profile administrator. After managing the module, the contents are automatically saved in the data store, then it is displayed in the client module as formatted in the managing module.

For the Level 1 DFD of the client, this includes the Dashboard of the Website which is the Homepage where the client can navigate to view the different pages namely, Portfolio, Profile, Projects, FAQs, and Contact Us. With the following processes one to five, the client has the most identical actions which are to select, view, and send for inquiries.

After the client sends an inquiry, the credential of the client is stored in the database then the stored credentials are collected and viewed in the administrator module which is in the Inquiry List. On the other hand, the message of the client is sent to the official Gmail account of Bana and Bana Architects where the firm can directly reply to the client.

**Database Design**

The scope of information maintained in the Customized Website for Bana & Bana Architects is illustrated by using the Entity-Relationship Diagram (ERD). The ERD shows 10 primary unique entities consisting of bnbUser, bnbAdmin, bnbClient, bnbProject, bnbCategory, bnbContact, bnbProjInq, bnbProjImg, bnbFAQ, bnbAdminLog.

For the ER Diagram. All-in-all, The researchers have ten tables, namely, bnbUser, bnbAdmin, bnbClient, bnbProject, bnbCategory, bnbContact, bnbProjInq, bnbProjImg, bnbFAQ, bnbAdminLog . In the bnbUser, this is where the developers store the users first name, middle name, last name, and will be given a role if he’s an admin or a client. For the bnbAdmin, this is where the developers store the administrator or architect's user ID, username, password, display picture name, and token for creating a new password. For the bnbClient, the system will automatically detect the user as a client if he inquires, only then the system will save the user's necessary information as a client to the bnbClient table like contact number, email, and address.  For the bnbProject, this is where the projects of the Architects are stored, together with the table bnbProjImg, for storing multiple images of the projects. For the bnbCategory, this is meant for storing the category of the projects. Next is bnbFAQ, this is where the client’s most frequent questions were stored and covered with the best answers coming from the Architects itself, thus, bnbFAQ is essential in the creation of chatbot. Next is bnbAdminLog, this is where the developers store every successful action made by the administrator. Lastly, two of the most important tables are bnbContact and bnbProjInq. These two are both inquiries, the only difference is that if the client wants to inquire about his desired project or model, it will be stored to bnbProjInq table, and if the client

Graphical user interface

Description automatically generated

***Figure 3****.* Entity Relation Diagram

The external actors or entities that exist outside of the system will be defined in the Use Case and their specific interactions with the system. The users are the client and admin. They can access the following modules as illustrated in *Figure 8.* Specifically, the client can view the following pages: Homepage, Portfolio (About Us, Roadmap, and Specialization), Profile Page, Project Page, and the client can interact with chatbot and access the Contact Us page to send an inquiry to the admin. For the admin, they can access the following pages: Manage Admin, Manage, Category, Manage Project, Manage Chatbot, Inquiry List, Profile Settings.

Diagram, schematic

Description automatically generated

***Figure 4.*** *Universal Modelling Language*

**Wireframe Models**

Wireframe Models are sketches that can be made for initial analysis, but they also assist in the exploration of a detailed architecture through which the software can be precisely defined and refined. Illustration below are the wireframe models of the proposed customized website.

Graphical user interface, website

Description automatically generated

***Figure 5.*** Client’s Module

As seen in Figure 9, The Client’s Module is the first screen of B&B Architects for clients. On the top left corner, it shows only the logo of the company and the name of it. On the other side, the client can choose Home, Portfolio, Profile, Projects, and Contact Us of the company on the navigation bar. Below that, the homepage that will display the chatbot icon wherein the client can use to interact with the website. Moreover, the client can also click the Our Portfolio button on the left bottom that will redirect to the portfolio of the company.

Portfolio Module contains everything about the company including mission and vision, detailed information about the history of it, sample works

Profile Module contains information about the owners’ personal background that includes basic information, and a short story of their career and a motivational quote for aspiring architects.

Projects contain services offered by the company and the client can choose a wide variety of architectural designs based on the client's interests. In addition, the system is designed to give the client an option if he wants to inquire about the project.

Lastly, Contact Us contains contact details of the company including contact numbers and office address thus the client can send an inquiry to the firm’s gmail account .

A picture containing graphical user interface

Description automatically generated

***Figure 6****.* Admin’s Module

The Admin’s Module illustrates the first screen of the website for Admin. On the top corner, it is also the same in Client’s Module wherein it displays the logo and name of the company. Figure 10 acts as the homepage of the website where Admin can manage profiles, categories, projects, inquiries of clients, and FAQs section.

**Administrator Modules**

|  |  |
| --- | --- |
| ***Manage administrator*** | After the login the user can access the *Manage administrator* module wherein, they can add and delete an administrator. |
| ***Goal in Context:*** | Users can access the *Manage administrator* module |
| **Pre-Condition:** | Users are on the *Manage administrator* module |
| **Success End Condition:** | Users can add and delete an administrator |
| **Failed End Condition:** | Users can’t add and delete an administrator |
| **Primary Actor:** | User |
| **Trigger Event:** | Users click the administrator in the header |
| **Description:** | *Step 1:* User clicks the *Manage administrator* module  *Step 2:* Clicks the add administrator button  *Step 3:* Input the needed information of the administrator |

|  |  |
| --- | --- |
| ***Manage Category*** | The *Manage Category* module is available in the header. The user can add, update and delete a category. |
| ***Goal in Context:*** | Users can access the *Manage Category* module |
| **Pre-Condition:** | Users are on the *Manage Category* module |
| **Success End Condition:** | Users can add, update and delete a category |
| **Failed End Condition:** | Users can’t add, update, and delete a category |
| **Primary Actor:** | User |
| **Trigger Event:** | Users click the category in the header |
| **Description:** | *Step 1:* User clicks the *Manage Category* module  *Step 2:* Clicks the add category button  *Step 3:* Input the needed information of the category  *Step 4:* Clicks the update category button  *Step 5:* Input the needed information to be updated  *Step 6:* Clicks the delete category button |

|  |  |
| --- | --- |
| **Manage Project** | The Manage Project module is available in the header. The user can add, update, and delete a project. |
| ***Goal in Context:*** | Users can access the Manage Project module |
| **Pre-Condition:** | Users are on the Manage Project module |
| **Success End Condition:** | Users can add, update and delete a project |
| **Failed End Condition:** | Users can’t add, update, and delete a project |
| **Primary Actor:** | User |
| **Trigger Event:** | Users click the project in the header |
| **Description:** | Step 1: User clicks the Manage Project module  Step 2: Clicks the add project button  *Step 3:* Input the needed information of the project  *Step 4:* Clicks the update project button  *Step 5:* Input the needed information to be updated  *Step 6:* Clicks the delete project button |

|  |  |
| --- | --- |
| ***Manage FAQs*** | The *Manage FAQs* module is available in the header. The user can add, update and delete a FAQ |
| ***Goal in Context:*** | Users can access the *Manage FAQs* module |
| **Pre-Condition:** | Users are on the *Manage FAQ module* |
| **Success End Condition:** | Users can add, update and delete a FAQ |
| **Failed End Condition:** | Users can’t add, update, and delete a FAQ |
| **Primary Actor:** | Users |
| **Trigger Event:** | Users click the FAQ in the header |
| **Description:** | *Step 1:* User clicks the *Manage FAQs* module  *Step 2:* Clicks the add FAQ button  *Step 3:* Input the needed information of the FAQ  *Step 4:* Clicks the update FAQ button  *Step 5:* Input the needed information to be updated  *Step 6:* Clicks the delete FAQ button |

|  |  |
| --- | --- |
| ***Inquiry*** | The *Inquiry* module is available in the header. The user can view all the data in the inquiry list such as the name, contact number, e-mail, and address. |
| ***Goal in Context:*** | Users can access the *Inquiry* module |
| **Pre-Condition:** | Users are on the *Inquiry* module |
| **Success End Condition:** | Users can view the inquiry list |
| **Failed End Condition:** | Users can’t view the inquiry list |
| **Primary Actor:** | User |
| **Trigger Event:** | Users click the Inquiry List in the header |
| **Description:** | *Step 1:* User clicks the *Inquiry* module  *Step 2:* Views the actual Inquiry List with all the data |

**Diagram, schematic

Description automatically generated**

***Figure 7****.* Flowchart for Admin

In accessing the website, it requires a browser. When the admin opens a browser, it requires the URL of the B&B Architects website and it will display the login portal wherein the administrator will input the credentials and verify into the database. If the verification was successful, it will go directly to the dashboard of the administrator.

         In the dashboard, it will display the homepage of the website wherein the administrator can choose home, administrator, categories, projects, inquiry list, FAQs for chatbot, and Profile Admin from the header. If the admin chose home, it will simply display the homepage. If the user chose admin, it will display all the accounts for admin and manage it. Next, if the categories are chosen by the admin, it will display the categories and be able to modify them. Also in projects, the admin can add, edit, delete, and update the projects on the website. In the inquiry list, the admin can view the messages/responses of clients/users from the Contact Us section. The Chatbot are similar to categories and projects wherein the admin can modify the details of it, under it is the basic responses of the bot, FAQs and it can be modified. Lastly, the admin can also view their profile and can add, delete, and update the user's personal information.

Once the admin has nothing to do with the web page, the account will logout and redirect to the login page.

**Diagram

Description automatically generated**

***Figure 8.***  Flowchart for Client

           Once the user visits the website, it will be directed to the homepage. The user can choose in the header section which includes the home, portfolio, profile, projects, and Contact Us. If the user chose home, it will simply display the homepage of the website. If the portfolio has been chosen, it will display brief information about the company including the history, who the architects are, and their specializations. Next is if the user chooses the Projects section, it will display all of the company projects to offer and can filter sample designs based on their preference. The user can also interact with the website by using the chatbot icon that can choose a list of FAQs or if the user wants to do price estimation. The client/user can also send a message through the Contact Us section if they want an appointment to discuss further about the services and more.

Graphical user interface, application, Teams

Description automatically generated

***Figure 9****.* Hierarchy Chart for Client Modules

At the top of Figure 11 is the main control module for Client which is the Web Portal. This will require the client to put the web link in the web address area to have access. Once it is done, it will go directly to the homepage of the website.

The client will be able to view the Portfolio of the company which contains the company information, company roadmap, and project categories. The client can also view the Profile which contains the personal background of the architects. Projects of the company may be viewed also by the client that contains finished projects in residential, condo interior, and roofing services. The client can also interact with the website by choosing the chatbot if they have questions and concerns. The client may also choose the A screenshot of a computer

Description automatically generated with medium confidenceContact Us section if they are not satisfied with the answers in chatbot.

***Figure 10****.*   Hierarchy Chart for Admin Modules

At the top of Figure 12 is the main control module for Admin which is the Web Portal. After accessing the website, it will go directly to the login page and put the credentials of the admin. Once the verification is done, it will display the dashboard for admin that contains admin, categories, admin profile, chatbot, inquiry list, and projects.

In the Admin section, the admin can manage accounts by adding and disabling accounts for admin. Moreover, the admin can also view the activity logs of it. In the categories section, the admin can view categories and also manage it by adding, updating, and deleting categories. The admin can also manage their profile if they want to change their username or password.

In chatbot, the admin can manage for both responses and FAQs by adding, updating, and deleting it for client’s interaction. In addition, the admin can also manage the cost pricing for the house plan by also adding, updating, and deleting it. The admin may also do price calculation on the website.

In the Inquiry list, these are the inquiries added by clients that are not in the FAQs to be answered by the admin. Lastly, the admin can also manage the projects by adding, updating, and deleting it.

**Project Development**

The website was developed following the standard waterfall model approach shown in figure 1. The model consisted of 6 phases of development, namely: requirements, design, development, testing, and evaluation.

Diagram

Description automatically generated  
***Figure 11****.* The Project Development Flow

**Requirement Analysis**

To assess the system’s demand, identify the problem, and offer a potential remedy. Meet with the clients and collect all necessary information, requirements, and data. After the data has been gathered, conduct an analysis and determine the project’s feasibility. For the Bana and Bana Architect, the main problem of the company as they still use traditional methods in acquiring clients. To solve this problem, the researchers propose to develop a customized website for Bana and Bana Architects.

**System Design**

During this phase, all of the client's requirements will be used to determine the top-level design, which will comprise all of the system's modules. The next step is the detailed design, which begins when the system modules have been identified. Each module's logic, data structure, and algorithm design are all part of this process.

**Development Phase**

This is often referred to as the coding stage. During this stage, the system is still being developed. The system's script will be written by the developers. After the hardware and databases have been configured and installed, the coding process may begin. In this Implementation Phase, the developers will also employ the acquired requirements and established design.

**Testing**

Throughout this phase, testing will be carried out to confirm the system's quality. This phase will be broken down into six steps: create a test plan, create a test script, functional testing, integration testing, performance testing, and security testing

**Evaluation**

This phase determines if the system fits the requirements and objectives set forth at the start. The deployment and training of system end users are the goals of the evaluation phase of the systems development life cycle.

**Operating and Testing Procedure**

The following are the operating and testing procedures undertaken to check the system’s performance.

**Operating Procedure**

The following procedure will be used in operating the developing website.

1. Install the XAMPP web server on the computer.

2. Configure the XAMPP settings.

3. Put the code files in the htdocs in a folder on XAMPP in the local drive.

4. Access the website by opening any web browser such as Firefox, Google Chrome, or Internet Explorer.

5. Enter the website’s server address in the browser’s address bar. For purposes of testing and operation, the website was configured at http://bnb-web/index.php.

6. Navigate the Client Module of the website and try to access all the features of this module.

7. Enter the address of the Administrator Module at http://centex/admin/index.php

8. Input an existing administrator account, navigate the module, and try to access all the features of the administrator module.

The following tables show the testing done on the modules to check if the desired function was achieved.

**Testing Procedure**

**Functionality Testing.** The system's functionality will be tested to ensure that it works properly. The system's operation and performance are by the organization's structures and processes.

business.

The evaluator executes the following steps for the creation of the system:

1.     Create test cases for the functionality of each system module.

2.     Test cases will be performed

3.     The test results will be recorded

4.     Unwanted functionality and failed test cases will be investigated, and defects will be fixed.

5.     Failed test cases will be re-run to check that the quality of the test cases has improved.

There will be a collection of inputs, execution preconditions, and expected outcomes for each test case. results. The test case form will be used (see Table 1)

**Table 1.**

*Test Case Form*

|  |  |
| --- | --- |
| **Test Suite ID** |  |
| **Test Case ID** |  |
| **Test Case Summary** |  |
| **Related Requirement** |  |
| **Prerequisites** |  |
| **Test Procedure** |  |
| **Test Data** |  |
| **Expected Results** |  |
| **Actual Results** |  |
| **Status** |  |
| **Remarks** |  |
| **Created by** |  |
| **Date of Creation** |  |
| **Executed by** |  |
| **Date of Execution** |  |
| **Test Environment** |  |

The table contains data as follows:

1.  The Test Suite ID indicates which this test case belongs

2.  The ID of the test case.

3.  The summary of the test case.

4.  The requirement this test case relates to.

5.  Any prerequisites or preconditions must be met before executing the test.

6.  Step-by-step procedure to complete the test.

7.  The test data will be used while conducting the test.

8.  The expected result of the test.

9.  The actual result of the test. To be filled after executing the actual test.

10.  Indicate Pass or Fail. Otherwise, ‘Not Executed’ if the testing is not performed and ‘Blocked’ if the testing is blocked.

11.  Comments on the test case.

12.  The name of the author of the test case.

13.  The name of the person who executed the test case.

14.  The date of execution of the test case.

15.  The environment, either Hardware, Software, or Network I where the test was executed.

**Table 2**. *Test Case Execution Summary*

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Execution** | **Expected Results** | **Actual Results**  **Cycle 1        Cycle 2** | |
| No. of TC Executed |  |  |  |
| Result of TC  Successful  Failed | 100%  0% |  |  |
| No. of TC Not Executed | 0% |  |  |

**Reliability Testing.** This test will be carried out to ensure that the system works properly. effectively and complete the assigned tasks within the allotted time frame the system's reliability will be confirmed through live testing. It is necessary to take the following steps:

1. The technology is installed in the chosen store.

2. Will ask the system's potential end-users, such as the Administrator, and client, to evaluate the system's functionality for a set period.

3. Will seek a report from the end-user if any issues arise throughout the testing.

4. Will compile all of the end-user feedback and tabulate it.

**Response Time Testing**. This test will determine the total time it takes to establish DNS, perform the TCP handshake, negotiate an SSL handshake (for HTTPS), and download the server's whole HTML output is calculated. However, it does not include retrieving graphics and other resources stored within the HTML page.

1. In the search field, type the website's URL. Choose the proper type of server from the dropdown menu: HTTP or HTTPS, then the Request Type. GET and POST is two different types of requests. In general, the researchers should use the default GET setting.

2. The researchers can include login information to check login response time, GET or POST parameters you want to look over, and header name and value you want to test.

3. Once the researchers enter all of the required and optional information, double-check that everything is correct before clicking "START TEST" to begin the various testing processes.

4. The researchers get a full analysis of numerous key performance indicators, often known as KPIs, once they finish.

***Table 3. Manage Admin Module Testing Procedure***

|  |  |  |
| --- | --- | --- |
| **System’s Module** | **Steps Undertaken** | **Expected Results** |
| *Manage Admin* | 1. Test to click each button (add and delete) if it’s fully functional. 2. Test to add an admin. 3. Test to delete an admin. 4. Test to view if all admin details are present in the database. | · All buttons are functional  -        Add  -        Delete  · Viewed all the admin details in the database |

         The table shows all the steps undertaken during the testing in the manage admin module. It also anticipates the expected results from the test.

***Table 4. Manage Category Module Testing Procedure***

|  |  |  |
| --- | --- | --- |
| **System’s Module** | **Steps Undertaken** | **Expected Results** |
| *Manage Category* | 1. Test to click each button (add and delete) if it’s fully functional. 2. Test to add an category. 3. Test to delete an category. 4. Test to view if all category details are present in the database. | · All buttons are functional  -        Add  -        Delete  · Viewed all the category details in the database |

The table shows all the steps undertaken during the testing in the manage category module. It also anticipates the expected results from the test.

***Table 5. Manage Project Module Testing Procedure***

|  |  |  |
| --- | --- | --- |
| **System’s Module** | **Steps Undertaken** | **Expected Results** |
| *Manage Projects* | 1. Test to click each button (add and delete) if it’s fully functional. 2. Test to add an project. 3. Test to delete an project. 4. Test to view if all project details are present in the database. | · All buttons are functional  -        Add  -        Delete  - Update  · Viewed all the project details in the database |

The table shows all the steps undertaken during the testing in the manage project module. It also anticipates the expected results from the test.

***Table 6. Manage FAQs Module Testing Procedure***

|  |  |  |
| --- | --- | --- |
| **System’s Module** | **Steps Undertaken** | **Expected Results** |
| *Manage FAQs* | 1. Test to click each button (add, update and delete) if it’s fully functional.   2. Test to add a FAQ.  3. Test to update a FAQ.  4.     Test to delete a FAQ.  5.      Test to view if all FAQs are present in the database. | ·   All buttons are functional  -        Add  -        Update  -        Delete  ·   Viewed all the FAQs in the database |

The table shows all the steps undertaken during the testing in the manage FAQs module. It also anticipates the expected results from the test.

***Table 7. Inquiry Module Testing Procedure***

***Table 7. Inquiry Module Testing Procedure***

|  |  |  |
| --- | --- | --- |
| **System’s Module** | **Steps Undertaken** | **Expected Results** |
| *Inquiry* | 1. To see if the *contact us* module ends data to the inquiry 2. Test to display all client details in the inquiry list | * Successfully sends data to the module * Displays all client details in the list |

The table shows all the steps undertaken during the testing in the inquiry module. It also anticipates the expected results from the test.

**Evaluation Procedure**

The ISO 25010 software quality metrics were used to adapt the assessment instrument to assess the Portal's functionality, usability, and reliability.

         The following procedure was followed to evaluate the functionality, usability, and reliability of the developed Customized Website Portfolio:

1. Invited ten randomly selected respondents and the company’s two owners to critique and evaluate the website portfolio.

2. Demonstrated how the developed system worked to the respondents and explained all the following features that highlight the website in general.

3. The respondents will now browse the website’s client-side, highlighting the following features: Homepage. Portfolio, Profile, Projects, FAQs, and Contact Us page. Our client, the owners of the company, will evaluate the admin side of the website and all its features.

4. After the demonstration, there will be a separate questionnaire for the respondents and the company owners.

5. The finished questionnaires will be processed, and the data will be tabulated in MS excel to determine the ratings.

6. The Likert Scale was used to interpret the adjectival ratings for the mean ratings (see Table 1).

Table 1.

*Likert’s scale.*

|  |  |  |
| --- | --- | --- |
| Scale | Adjectival Rating | Range |
| 4 | Highly Acceptable | 3.4 – 4.0 |
| 3 | Very Acceptable | 2.6 – 3.3 |
| 2 | Acceptable | 1.8 – 2.5 |
| 1 | Not Acceptable | 1.0 – 1.7 |

**APPENDIX A**

**EVALUATION SHEET**

**Technological University of the Philippines**

**College of Science**

**Mathematics Department**

Name(Optional):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Occupation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_\_\_\_\_\_

Direction: Please encircle the appropriate number of your rating to evaluate the project entitled “Developing a Customized Portfolio Website for Bana & Bana Architects” using the scale below:

4 – Highly Acceptable        3 – Very Acceptable   2 – Acceptable        1 – Not Acceptable

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A.**    **Efficiency** |  |  |  |  |
| 1. The system can execute the request promptly. (time behavior) | **4** | **3** | **2** | **1** |
| 1. The system uses resources efficiently and appropriately (resource utilization) | **4** | **3** | **2** | **1** |
| **B.**    **Maintainability** |  |  |  |  |
| 1. Can identify the source of failure when an error is encountered. (analyzability) | **4** | **3** | **2** | **1** |
| 1. The system can easily be modified for expansion and correction. (changeability) | **4** | **3** | **2** | **1** |
| **C.**    **Portability** |  |  |  |  |
| 1. The system can run in different operating environments. (adaptability) | **4** | **3** | **2** | **1** |
| 1. The system can be easily installed (installability) | **4** | **3** | **2** | **1** |
| **D.**    **Functionality** |  |  |  |  |
| 1.     The ability to be appropriate or fitted to the intended functionality. (suitability) | **4** | **3** | **2** | **1** |
| 2.     The system's features are entirely functional. (accuracy) | **4** | **3** | **2** | **1** |
| 3.     Data security and defense from malicious attacks. (security) | **4** | **3** | **2** | **1** |
| **E.**    **Reliability** |  |  |  |  |
| 1. The completeness of the system. (maturity) | **4** | **3** | **2** | **1** |
| 1. Does not terminate despite errors or bugs encountered. (fault tolerance) | **4** | **3** | **2** | **1** |
| **F.**     **Usability** |  |  |  |  |
| 1. Instructions on the display and user interfaces are simple to understand. (understandability) | **4** | **3** | **2** | **1** |
| 1. Capability of the system to teach the user how to use it. (learnability) | **4** | **3** | **2** | **1** |
| 1. The system is easy to operate (operability) | **4** | **3** | **2** | **1** |

Comments/Suggestions:

**Operational Definition of Terms**

The following terms are defined to better understand the study:

**Apache Server** - A web server application that delivers content such as HTML pages, multimedia, and CSS Style sheets over the internet. Apache is a community-developed web application published by the Apache Software Foundation.

**Artificial Intelligence** - a computer software that simulates human-to-human communication, particularly over the internet.

**Backend Development** - Think of the "backend" as the part of the iceberg that is beneath the surface. The website would not be able to function without it. The backend is responsible for servers, apps, databases, and so forth.

**Beautification** - The action or process of improving the appearance of a person or place.

**Chatbot** - a computer software that simulates human-to-human communication, particularly over the internet.

**Configuration** - In computing, configuration is the arrangement or set-up of the hardware and software that make up a computer system.

**Cross-Platform** - In computing, Cross-Platform means able to be used on different types of computers or with different software packages.

**Debugging** - In computer programming and software development, debugging is the process of finding and resolving bugs or defects or problems that prevent correct operation within computer programs, software, or systems.

**Data-Flow Diagram** - A popular way to visualize the major steps and data involved in software-system processes.

**Downturn** - a general slowdown in economic activity over a sustained period of time.

**Dichotomous** - A closed question where there can be only two answers, commonly 'yes' or 'no'.

**DOM**- is a programming API for HTML and XML documents. It defines the logical structure of documents and the way a document is accessed and manipulated.

**Database**- is a repository of information managed by a database engine which ensures integrity of data and fast access to the data. To users, the information in a database can be accessed by using Structured Query Language (SQL) a database language common to most databases.

**Entity Relationship Diagram** - Also known as ERD, ER Diagram or ER model, is a type of structural diagram for use in database design.

**Encrypt** - Convert information or data into a cipher or code, especially to prevent unauthorized access.

**Flowchart** - A diagrammatic representation of an algorithm, a step-by-step approach to solving a task.

**Full**-**Stack Development -** Full-stack development is when backend and frontend development are combined.

**Frontend Development** - The "frontend" refers to the "things" on a website that you see and interact with, such as menus, dropdowns, and so on.

**Geolocated** - Identify the geographical location of (a person or device) by means of digital information processed via the internet.

**Guise** - a customary way of speaking or behaving.

**HIPO** - Hierarchical Input Process Output Model is a systems analysis design aid and documentation technique from the 1970s, used for representing the modules of a system as a hierarchy and for documenting each module.

**Innovation** - a process that involves multiple activities to uncover new ways to do things. It should not be confused with creation since this can be defined as the act of making, inventing, or producing something.

**IDE** - Integrated Development Environment is software for building applications that combines common developer tools into a single graphical user interface or GUI.

**Infiltration** - the action of entering or gaining access to an organization or place surreptitiously, especially in order to acquire secret information or cause damage.

**Interceding** - to act or interpose in behalf of someone in difficulty or trouble, as by pleading or petition

**JSON** - JavaScript Object Notation is an open standard file format, and data interchange format, that uses human readable text to store and transmit data objects consisting of attribute value pairs and array data types or any other serializable value.

**Organizational Chart** - A diagram that shows the structure of an organization and the relationships and relative ranks of its parts and positions/jobs.

**Penetrable** - possible to understand; understandable.

**Prestigious** - inspiring respect and admiration; having high status.

**Proximity** - the quality or state of being proximate; closeness.

**Plugins**- also called add-on or extension, computer software that adds new functions to a host program without altering the host program itself. Widely used in digital audio, video, and Web browsing, plug-ins enable programmers to update a host program while keeping the user within the program's environment.

**Phenomenal** - Very remarkable.

**Retrieve** - Data retrieval means obtaining data from a database management system such as ODBMS. In this case, it is considered that data is represented in a structured way, and there is no ambiguity in data.

**Responsive** - The term "responsive" refers to how the elements of a website adjust to the size of the screen. This implies that your website will appear great on any platform, including a laptop and a mobile phone.

**Relational Database Management System** - A database management system (DBMS) that incorporates the relational-data model, normally including a Structured Query Language (SQL) application programming interface.

**Subsidies** - a sum of money granted by the government or a public body to assist an industry or business so that the price of a commodity or service may remain low or competitive.

**Syntax**- refers to the rules that define the structure of a language. Syntax in computer programming means the rules that control the structure of the symbols, punctuation, and words of a programming language

**Socialism** - a political and economic theory of social organization which advocates that the means of production, distribution, and exchange should be owned or regulated by the community.

**Software** - the programs and other operating information used by a computer.

**Transferees** - a person to whom a conveyance is made.

**TLS** - Transport Layer Security is the successor protocol to SSL. TLS is an improved version of SSL. It works in much the same way as the SSL, using encryption to protect the transfer of data and information.

**UML** - Unified Modeling Language is a general-purpose, developmental, modeling language in the field of software engineering that is intended to provide a standard way to visualize the design of a system.

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