Design And Build Front End of Difa Rooms Application Using Laravel to Improve Wheelchair User Accessibility at Loans in Bandung City With Spiral Method

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Abstract- Bandung is the capital city of West Java and one of the cities included in the Top 50 Smart City, to be precise at 28. Having a population of 2,510,103 in 2020 makes the city of Bandung one of the most populous and developed cities in Indonesia where information needs for all residents of the city of Bandung is very important. However, with a number of approximately 6.9% of the population of Bandung city being disabled, information on the need for people with disabilities is still very minimal when the City of Bandung has entered as a smart city. Therefore, the research team created a website-based solution called Difa Rooms which is expected to later be able to provide information avenues for people with disabilities, especially wheelchair users, to get information about places that are accessible to people with disabilities. In this study, it is still devoted to lodging in the city of Bandung. Thus, the real goal of a smart city will be achieved without any community feeling isolated.

Keywords- lodging, disabled, front-end, spiral, google lighthouse.

I. PRELIMINARY

The Law of the Republic of Indonesia Number 8 of 2016 Article 5 Paragraph 1 states that people with disabilities have several rights, including culture and tourism, accessibility, public services and obtaining information. Persons with disabilities need special attention so that they can get services and needs that are suitable for them. Then according to the Big Indonesian Dictionary, disability is defined as a condition (such as illness or injury) that damages or limits a person's mental and physical abilities or the state of being unable to do things in the usual way. Law Number 8 of 2016 Article 1 also provides an understanding of disability, disability is anyone who experiences physical, intellectual, mental, and/or sensory limitations for a long time who in interacting with the environment can experience obstacles and difficulties to participate fully and effectively with other citizens based on equal rights.

Disability is an intrinsic state of physical or psychological traits of an individual that cannot be released freely by the individual, and the individual will still have it even outside his current social context, which causes the individual to experience a decline in his abilities [1]. According to [2]people with disabilities, they are also classified as one of the vulnerable groups. Vulnerable groups are groups that most often receive discriminatory treatment and their rights are often not fulfilled. The author takes wheelchair users for this study who are people with disabilities and special needs. In addition to disability and special needs, there are other terms such as impairment and handicap which have the same meaning [3]. An example of one of the facilities that greatly facilitates wheelchair users in accessing the hotel is a ramp. Ramp is a circulation path that has a field with a certain slope, as an alternative for people who cannot use stairs [4].

Based on the above discussion where disability rights have been discussed in Law number 8 of 2016 Article 2 and the City of Bandung is included in the *Smart City* , this research is needed to find a solution. Researchers provide a solution, namely a *website application* that provides information about disability-friendly lodging. This *website* application will contain a number of information focused on helping people with disabilities when choosing a place to stay. This *website* application is focused on disabilities, especially those who use wheelchairs or walkers. The Difa Rooms application will be built with a *spiral methodology* , where there are several iterations to provide maximum research results. The choice of the *website* platform as the right platform because *the website* is an information platform that is very fast and easily accessible anywhere with an internet network. The Internet is an important platform for disseminating information to consumers [5].

website application called Difa Rooms, is an application based on *website technology* . This application was built based on the needs of people with disabilities to find out the details of services and accommodation facilities when they want to book. The Difa Rooms application will contain some basic information like a general lodging booking *website such as location, name, price, and general facilities.* In addition to this information, the Difa Rooms application will contain information that helps people with disabilities such as wheelchair access, wheelchair availability, wheelchair accessible bathroom space, and several helpful features for people with disabilities. The purpose of this application is to help people with disabilities find the right accommodation. Unlike other lodging booking applications, where previously

the lodging booking application did not provide *highlights* for people with disabilities.

This study aims to build a *front-end website* for Difa Rooms that is accessible and based on the results of UI/UX research. Then how to build *the front-end of the* Difa Rooms website using the Laravel framework and the *spiral* model method. This research is used to answer how the *front-end development of the* Difa Rooms website is accessible and based on UI/UX research.

II. THEORITICAL REVIEW

A. Website Application Design

Front-end website development plays an important role in presenting website pages and assumes the responsibility of representing information on website pages, front-end development includes three elements, namely HTML, CSS, and JavaScript [6]. This research also uses PHP so that the website can connect to the database and then use the Laravel framework. The purpose of using frameworks is to make building web applications quicker and easier, most frameworks provide some kind of library which makes building easier [7].

Hypertext Markup Language (HTML) is a programming language used to display a web page, HTML is an open source language, meaning that it can be developed together globally and is not owned by anyone [8]. Researchers do not use HTML alone but are combined with PHP with the aim of making website application functions more dynamic. According to [9]HTML is the syntax used to format text documents on the web.

PHP is a recursive abbreviation for Hypertext Preprocessor is an open source scripting language that is well suited for web development and can be embedded into HTML [10]. HTML and PHP already look dynamic in terms of function, but the website needs a display so that information is more easily conveyed. Using CSS makes the website look more informative and helps users digest the information available on web pages.

Cascading Style Sheets (CSS) is intended so that website application makers can apply styles or designs to the website pages that are being created. CSS works by linking the Document Object Model (DOM), with the CSS script that we create. Using this integration we can quickly and easily organize any element that we use on a web page. [10]. The appearance of web pages that only use CSS still looks stiff, for that web pages are added with JavaScript to make them more dynamic. According to [9]CSS is a style sheet language used to describe the appearance and format of documents written in a markup language.

applications more dynamic by providing access to all elements in HTML, JavaScript provides a way for users to interact dynamically, such as providing validity when filling out email addresses. [10]Websites require javascript [11]. The main role of JavaScript is to make web applications interactive and dynamic using logic that is executed from the user's side.

Meanwhile, in terms of front-end development, the researcher uses a framework, namely Laravel. The laravel framework itself has a Model View Controller (MVC) pattern. Laravel is a PHP-based web application framework that is free to use, Laravel is used for developing web applications using the MVC pattern [12]. The MVC pattern

structure in laravel is a bit, in laravel there is a path that bridges between requests from the user and the controller. That way the controller does not immediately accept the request.

B. Lodging

Is a place that is rented to support the activities and needs of people who are traveling or just want to use the facilities provided by paying a predetermined rent [13]. Lodging can also be referred to as accommodation, accommodation is a place that functions as a temporary residence for people who are on a trip, where the person is required to be or stay away from home for more than 1 day. According to[14] lodging must provide necessities and meet minimum standards such as beds, rest areas, safety factors, shelter from cold or rain and heat, storage facilities for goods, to access to general household needs. It can be seen that the inn is not just a place to stay, but the inn must be decent and comfortable for the person who booked it.

Lodging has several types, including hotels, boutique hotels, resorts, cottages, villas, and others which are lodging providers. Maintaining the Integrity of Specifications

C. Disability

In Law Number 8 of 2016 Article 1 Paragraph 1 it is stated that persons with disabilities are anyone who experiences physical, intellectual, mental, and/or sensory limitations for a long time who in interacting with the environment can experience obstacles and difficulties to participate fully and effectively with citizens of other countries. According to [15], disability is characterized as the result of a complex relationship between an individual's health condition, personal factors, and external factors that represent the circumstances in which the individual lives. This means that people with disabilities have deficiencies both physically and in their daily activities, including in the use of facilities that force them to provide special facilities for them.

Law Number 8 of 2016 Article 4 Paragraph 1 states that there are several types of persons with disabilities, namely:
1. People with physical disabilities
2. People with intellectual disabilities
3. People with mental disabilities
4. Sensory disability

Then Law Number 8 of 2016 Article 16 mentions disability rights in culture and tourism, including:
1. Gain equality and opportunity to participate actively in arts and cultural activities.
2. Gaining Equal Opportunities to conduct tourism activities, conduct tourism businesses, become tourism workers, and/or play a role in the tourism development process.
3. Get easy access, treatment, and proper accommodation according to their needs as tourists.

Then in the same Law in Article 18 it is stated that the right of disability in accessibility is to get accessibility to take advantage of public facilities and get proper accommodation as a form of accessibility for individuals.

D. Spiral Model

FIGURE 1
(*SPIRAL* MODEL METHODOLOGY)

In response to the weaknesses and failures of the waterfall model, many new development cycles were developed that added some form of iteration to the software development process. One is the spiral model, starting with a small set of requirements and going through each development stage (except Installation and Maintenance) for the set of requirements. Based on user feedback from the initial iteration, the development team adds functionality for additional requirements in an ever-increasing "spiral" until the application is ready for the Installation and Maintenance phase [16]. Meanwhile, according to [17], the spiral model is a software development cycle that combines design elements and prototypes gradually in order to combine the advantages of top-down and bottom-up concepts in application development. The spiral model cycle stage starts from the planning stage.

The planning stage aims to understand the requirements given by the user. According to [17]this phase includes understanding the system requirements by conducting ongoing communication between the customer and the system analyst. After the planning is complete, proceed to the next stage, namely risk analysis.

Risk analysis will produce a prototype that is made based on risk identification which produces a solution or feature that is needed or will be made at a later stage. After getting a prototype or a clear description of the needs, it will proceed to the next stage, namely the development stage or the manufacturing stage.

At the manufacturing stage according to [17]this stage is the stage where the application is made and after it is made software testing will be carried out. The next stage is the evaluation stage.

The evaluation stage is the stage where an assessment of the application that has been made is assessed whether this application is appropriate or there are deficiencies. This stage allows the user to evaluate the development results before the project proceeds to the next spiral or loop [17]. Every time the application is made and entered into the evaluation stage, the application is still called a prototype. The iteration will be completed when the evaluation states the application is feasible to be implemented in the requested environment.

E. Software Testing

Software testing is a procedure for executing a program or system with the intent to find errors, software testing is an important activity of the software development life cycle (SDLC) (Nidhra, 2012). Meanwhile, according to [18]software testing is a software evaluation process with the aim of finding bugs or errors in the software. Testing is carried out to ensure that the software performs its intended instructions correctly, accesses, achieves, and maintains the quality of the software, and thereby verifies that the software is fit for use.

In this study using Google Lighthouse, which is an automate tool for testing used on a website. This test using Google Lighthouse will give results that are divided into four categories, namely performance, accessibility, best practice, SEO (Search Engine Optimization) on a website. Where this test is carried out on every page of the website. This test can be done through an extension of a browser [19]. In this study, testing the Difa Rooms website will be carried out through the google chrome browser extension. Doing testing using google lighthouse will get the test categories needed on this website, which are much more specific, namely accessibility testing from the Difa Rooms website.
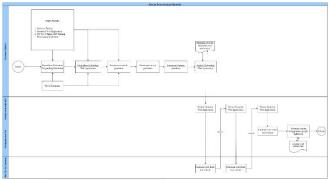
III.　　METHOD

FIGURE 2
(TROUBLESHOOTING METHOD)

The first phase of this systematics is determine object where all the foundation of the research is obtained in this phase. There are several activities in this phase to find the basis of research, this phase is also the first step of the iteration that occurs. Requirements analysis is the first step in starting the second iteration. Obtaining research materials using the results of the questionnaire, after obtaining the results, needs identification will be carried out so that a needs analysis result for the Difa Rooms website application will be obtained.

The second phase identify and resolve risk because this research does not use risk analysis activities, in this phase it has website display design activities based on analysis. Where this phase contains 3 activities according to the iteration that occurs.

The third phase of this systematics, namely Development and Test, contains important things from research, namely code writing or application development based on the display design and the results of the needs analysis. This phase also contains testing activities for the Difa Rooms website page, the tests carried out are automate tests using google lighthouse. Where in this test is the final result of research on

the Difa Rooms website. This test is very important because it assesses that Difa Rooms website users are people with disabilities.

The fourth or final phase of this systematic is the Plan The Next Iteration phase, which is the phase where the determination for the next iteration is based on the results of a temporary design for analysis so as to produce proposals for the next iteration.

IV.   RESULTS AND DISCUSSION

The discussion about making a website that has been designed will be discussed at the implementation stage. While the testing phase will discuss the verification of the results of the Difarooms website which is verified using Google Lighthouse. The section below is the result of the *front-end development of the* Difa Rooms website.

FIGURE 3
(DISPLAY WEBSITE DIFA ROOMS HOME PAGE)

The home page shown in the image above is the start page of the Difa Rooms website.
Next, enter the most important part of the Difa Rooms *website , which is the hotel page*. The hotel page contains information that people with disabilities can use so they can find accommodations that provide information on accessibility facilities. The picture below shows a hotel page consisting of an index and hotel details.
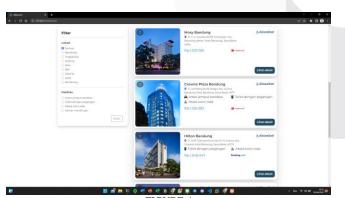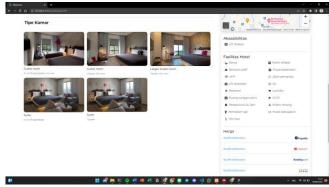

FIGURE 4
(HOTEL PAGE VIEW)

FIGURE 5
(HOTEL PAGE DETAILS VIEW)

To see how accessible the Difa Rooms *website* is, researchers use an automatic audit tool to see the accessibility value of the Difa Rooms *website* . Using Google Lighthouse, the Difa Rooms *website* was tested to see accessibility results. Below is a table of test results for all pages of the Difa Rooms *website* .

TABLE 1
(TABLE OF DIFA ROOMS *WEBSITE TEST RESULTS*)

No.	Page	Score		
		Performance	Accessibility	Best Practice
1.	Home page	78	98	67
2.	Destinations	87	98	75
3.	Destination details	72	98	67
4.	hotel	59	96	58
5.	Hotel details	67	96	58
6.	Forum	95	98	75
7.	Forum details	95	98	75
8.	My favorite hotel	97	98	75
9.	My forum	96	96	75
10.	Manage hotel	93	97	83
11.	Manage forum	94	97	83

This test using Google Lighthouse has several assessments which are categorized into three categories. The rating categories from Google Lighthouse are described in the table below.

TABLE 2
(CATEGORY OF ASSESSMENT RESULTS)

No.	Score	Explanation
1.	0 to 49	*Poor*
2.	50 to 89	*Needs Improvement*
3.	90 to 100	*good*

By looking at the results of testing the difarooms website using google lighthouse, it can be seen that the purpose of this website has been achieved. Where the value of the accessibility of the Difarooms website is included in the " *good* " category based on google lighthouse. However, in several existing test categories, there is still a " *need improvement" value category,* especially in the *best practice category.*

V. CONCLUSION

This research has the result of a website Difa Rooms that provides information on lodging that provides facilities for people with disabilities. The provision of this information is located in all parts of the website which are exclusive to people with disabilities. The display on the Difa Rooms website is also made based on the research results of interviews conducted as well as the features provided. In the process of implementing the front-end development of the Difa Rooms website using the spiral model method, it is very helpful for development in a group form where the UI/UX design becomes a separate study so that when changes occur, the front-end creation can easily add new iterations so that it remains in line with other research developments. what happens to the development team.

This study conducted a front-end test on the Difa Rooms website using google lighthouse where this test really proved the accessibility value of the Difa Rooms website. The accessibility value of the Difa Rooms website is very important considering that the users of this website are people with disabilities. The results of the tests carried out have shown that the value of the test results is above 90 on all web pages for the accessible category. The value of 90 obtained in the website accessible category is included in the "good" category. Seeing these results, this research can be judged to have gone well in accordance with the expectations that were built at the beginning of this research.

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