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DESIGN OF THE POPULATION INFORMATION SYSTEM IN THE VILLAGE OF PAJAJARAN

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ABSTRACT
Population or demography is the study of the dynamics of the human population. Demographics includes the size, structure and distribution of a population, and how the population changes over time as a result of births, deaths, migration, and aging. The current population system is still using the manual method, namely using the form provided by the Pajajaran Village, which is deemed less effective and efficient, therefore, there are often miscalculations of the number of residents when reporting to the Cicendo District, Bandung City. This study aims to analyze and design a population system. The design of this population information system uses PHP Native programming and MySQL Database Management System. With the existence of a web-based information system, it is hoped that it will facilitate the making of valid and not fictitious population reports.
Keywords : *System Information of Demography, Unified Modelling Languange, Web*

1. Introduction

One of the government organizations that is a part of the Regional Apparatus Work Unit, Cicendo District, Bandung City, is Pajajaran Village. The Apparatus Work Unit directs each Sub Unit to produce a population report at the Village level, which is then used as a population report at the District level to the Vertical Agency and above.

The Pajajaran Village to Cicendo District, Bandung City population reporting system has been manual up until this point, so the results of the reporting still need to be recalculated and go through re-checking in order for the reporting to be valid.

The authors designed and developed a population information system that is currently very needed by the Sub-Unit Agencies as a system that can facilitate the Pajajaran Village, Cicendo District, Bandung City. The authors did this based on the problems that have been described and taking into account the simplicity and reliability of the data offered by the population system((Hamzah et al., 2019; Ambiyar et al., 2019; Prifti, 2022; Dubois et al., 2022).

Unified Modeling Language (UML) modeling is used in this system's design, and it is implemented using PHP Native and the MySQL Database Management System. With the development of a population information system, it is hoped that data collection on residents will become simpler and more frequent. This includes data on the number of residents by gender, age, job, and RW(Li & Wang, 2022; Hamzah, et al., 2021; Moustakas & Robrade, 2022).

Data that has been transformed into a form that is more beneficial and meaningful to the recipient is called an information system. Information is created by processing raw data, which are facts or Figs in the form of measurements and observations of things or events. An information system is a process that converts data into information(Bizami et al., 2022; Perera & Abeysekera, 2022).

2. Literature Review

2.1 Understanding Information Systems

Jogiyanto said that "Information systems are a collection of people, facilities, technology, media, procedures, and controls that work to get critical communication lines that give an information basis for decision making" in 1999 ((Hamzah et al., 2022; Anthony Jnr, 2022; Setiawancc et al., 2022; Sabat, 2022).

2.2 Definition Demography

Philip M. Hauser and Dudley Ducan explains that " “Demography is the study of the size, territorial distribution and composition of population, changes there in and the components of such changes which maybe identified as natality, territorial movement (migration), and social mobility (change of states)” (Anderjovi et al., 2022; Alyahya et al., 2022).

2.3 Technology Utilization

The advancement of information technology at this time makes it easier for information to spread across many regions, even quickly reaching every corner of the globe. The availability of information technology today has aided the process of human life in carrying out daily activities by making it simple to obtain the most recent information that occurs in a given area. The same is true for the field of education. Development The world of education has been impacted by information technology, particularly in the learning process. According to Rosenberg (2001), there have been 5 (five) shifts in the learning process as a result of the increased use of technology, including the shift from classrooms to anywhere and anytime, from paper to "on line" or channels, and from training to appearance (Selfi & Akmal, 2021; Satyawan et al., 2021; Qiao et al., 2021; Fuady et al., 2021).

3. Research Methods

3.1 Data Collection Methods

The authors of this study employed several methods for gathering data, including :

a. Observation

in Pajajaran Village of population reports at the kelurahan and RW levels, with the goal of obtaining precise data and information in accordance with the current issues.

b. Interview

The Pajajaran Village was directly contacted by the author to provide the data and justifications required for this study.

3.2 System Development Method

The Waterfall method is used by the author to create this system. The waterfall method is used to methodically build a system development model from one stage to the next. The author employs the Waterfall methodology because it eliminates user input during system implementation, which can be challenging for the author during system development, by collecting and analyzing all necessary data and information prior to system design. Analyses, designs, coding, and testing are the first steps in the Waterfall model, which offers a sequential or sequential software lifeflow approach. Code, system testing, and maintenance are all proposed as being done in a systematic manner by this method. As depicted in Fig 1, this development model is sequential from start to finish; it is not possible to go back and repeat a stage(Hariani, et al., 2020).

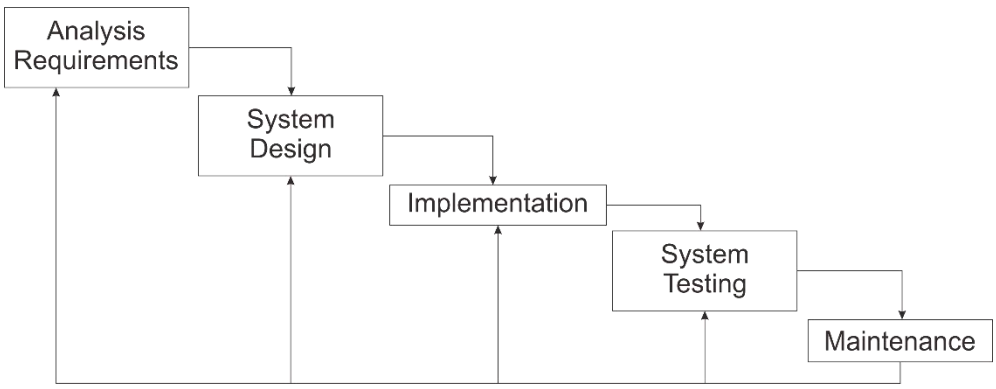

Fig 1. Waterfall Development Method

This model includes the following activities :

a. Analysis Requirements

To determine system requirements, such as the nature of the system to be built and the behavior of the system, an analysis stage is carried out.

b. System Design

The stage of system design comes next after needs analysis. Use case diagrams, activity diagrams, and class diagrams are used in the system design stage of the design process, with input, process, and output determined by the findings of observations and business requirements.

c. Implementation

At this time, the MySQL database and PHP Native have been used to design and implement the system.

d. System Testing

To determine whether the system was created according to plan or if there are still errors, the entire created system is tested.

e. Maintenance

At this point, the system is operating in the software's actual environment, and either system and software maintenance is being done.

4. Results and Discussions

One of the Bandung City Government Organizations is ajajaran Village, which is situated in the SKPD, Cicendo District, Bandung City. One of the reports that must be submitted to the Cicendo District as part of the administration of Pajajaran Village is the population report, which is still done manually. In Pajajaran Village's current population reporting system, several flaws or deficiencies have been discovered, including:

a. The reporting process still has to be delivered offline which is considered.
b. There is no information media for population reporting to local residents.
c. The population of Pajajaran Village is estimated using population data processing, which is deemed inefficient and frequently subject to human error.

The authors offer solutions to the issues raised as a result of their analysis of the current system and the population report in Pajajaran Village, including:

a. Creating a population information system using a database management system and the PHP Native programming language.
b. Creating a system to make Pajajaran Village's population reporting easier.
c. Creating a system that anyone with an internet connection can use at any time, from any location, and that also makes it easy for Pajajaran Village to process population data.
d. The author creates a system to address the issues that arise from the solutions that have been made.

4.1 UML Design

The Unified Modeling Language (UML), which is used to specify, visualize, build, and document all software system artifacts, is a graphical modeling language. When combined with the benefits of other object-oriented methods (Fushion, Shaler-Mellon, and Coad-Yourdom), which are also synthesized in UML, the UML model—which is a synthesis of three object-based analysis and design methods—offers a fairly effective strategy that has been applied in the software industry. In this instance, the author used the Unified Modeling Language (UML) to design the system.

a. Use Case Diagrams

The behavior of the information system that will be developed is modeled by a use case. Use cases are put into action by describing the kind of communication that takes place between a system's user and the system itself. Fig 2 below shows a diagram use case for the RW admin and kelurahan admin population application.

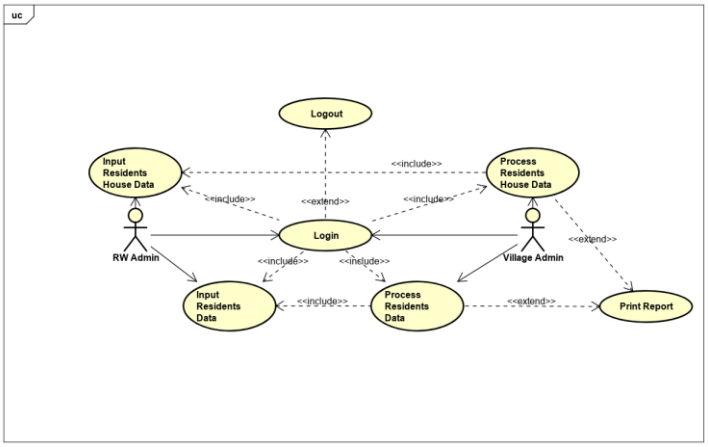

Fig 2. Use Case Diagram of Population Information System

b. Activity Diagram

Activity diagrams can also describe parallel processes that may occur in multiple executions. They describe the different flows of activities in the system that is being designed, how each flow begins, decisions that may occur, and how they end. The use case is developed using an activity flow diagram. A flow or activity could be a group of system-contained menus. Fig 3's flow depicts activity diagrams for the Population Information System.

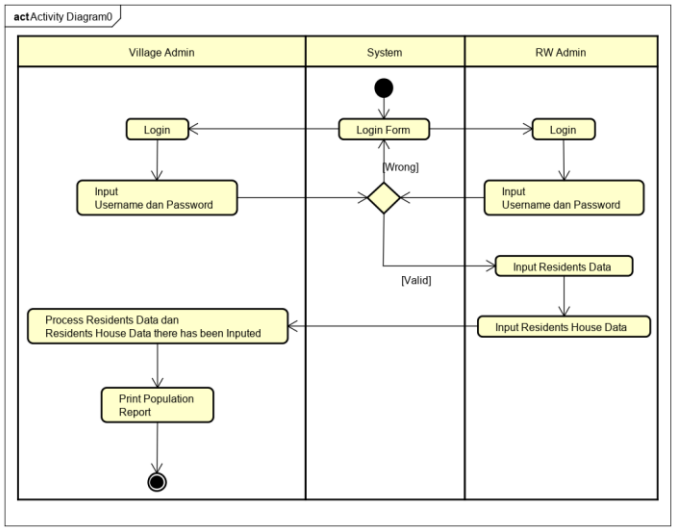

Fig 3. Activity Diagram of Population Information System

c. Class Diagram

Is a relationship between classes and a thorough description of each class in a system's design model. It also demonstrates the laws and duties of the entities that control the system's behavior. A class diagram in UML is a visual representation of a system's structure and description that displays classes, their attributes, methods, and connections to other classes. Chart of Classes Public Health Information System

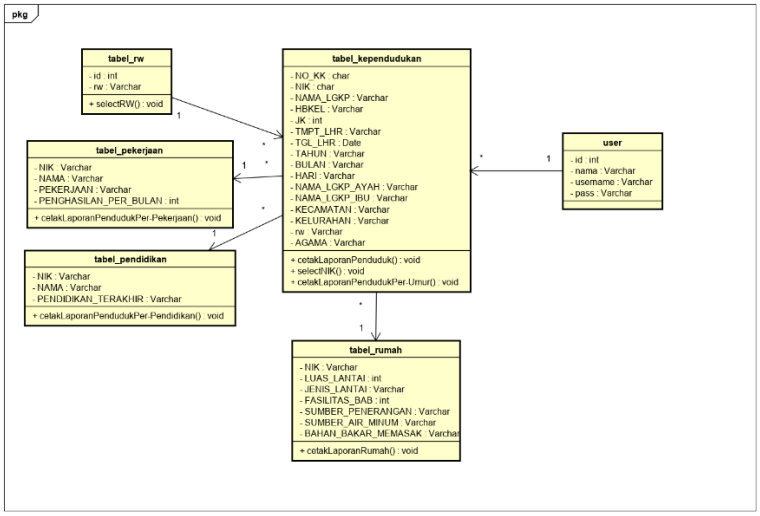

Fig 4. Class Diagram of Population Information System

4.2 System Planning

A new system is created and designed through the process of design. This system's design gives the user an overview of the system that will be presented to them and acts as a prelude to the implementation process. The Pajajaran Village Population Information System is constructed as follows:

a. Input

Design The following is a description of the input design for the population information system in Table 1:

Table 1 - Input Design of Population Information System

No	Input Name	Source	Frequency	Attribute
1	Residents Data	RW Admin, Village Admin	Input, Save, Clear, Delete, Close Data	NO_KK NIK NAMA_LGKP HBKEL JK TMPT_LHR TGL_LHR TAHUN BULAN HARI NAMA_LGKP_AYAH NAMA_LGKP_IBU KECAMATAN KELURAHAN rw AGAMA PEKERJAAN
2	Residents House Data	RW Admin, Village Admin	Input, Save, Clear, Delete, Close Data	NIK LUAS_LANTAI JENIS_LANTAI JENIS_DINDING FASILITAS_BAB SUMBER_PENERANGAN SUMBER_AIR_MINUM BAHAN_BAKAR_MEMASAK

b. Output

Design The following is Table 2's presentation of the Population Information System's output design:

Table 2 - Output Design of Population Information System

No	Output Name	Source	Frequency	Attribute
1	Population Report	Village Admin	On Needed	RW LAKI-LAKI PEREMPUAN TOTAL
2	Job Criteria Population Report	Village Admin	On Needed	RW JENIS_PEKERJAAN LAKI-LAKI PEREMPUAN TOTAL
3	Age Criteria Population Report	Village Admin	On Needed	RW 0-4 5-9 10-14 15-19 20-24 25-29 30-34 35-39 40-44 45-49 50-54 55-60 60> TOTAL

c. Functional Design

Table 3 presents the functional layout of the population information system as follows:

Table 3 – Functional Layout

No	Functional Name	Source	Frequency	Attribute
1	Login	Village Admin, RW Admin	Input, Save	Username Password Nama Kelurahan
2	Profile Edit	Village Admin	Input, Save	Email Alamat Maps Logo Kelurahan

4.3 Device Requirements Design

a. Hardware

As an information system, the Population Information System needs hardware (hardware) with specifications that must match the requirements to run the application so that it operates correctly. The suggested specifications are as follows:

Table 4 - Specifications Hardware

Hardware	Specifications Example
Processor	Intel Pentium 4 Processor 2.80 Ghz
RAM	2 Gb or Higher
Harddisk	120 Gb or Higher
Display Card/VGA	2 Gb or Higher

b. Software

All commands used to process information are considered software. Software may take the form of a program or process. The hardware that has been developed won't be useful or perform well without software. The following is the design of the software requirements (Software) for a population information system:

Table 5 - Specifications Software

Software	Specifications Example
Operating System	Microsoft Windows 7 Or Higher
Programming Language	PHP

Database Management System	MySQL
Web Server	XAMPP

4.4 System Display

a. Main Dislay

Users other than the Kelurahan Admin and RW Admin can check the Population data of Pajajaran Village as shown in Fig 5 by using the Main Display, which is made as follows.

Fig 5. Main Display of Population Information System

According to the Main Display's criteria for gender, education, occupation, age group, religion, and the Pillars of Citizenship, the population is shown.

b. Login Form

As shown in Fig 6, a login form is made to confirm that a user has been granted access to the Pajajaran Village's Population Information System Application.

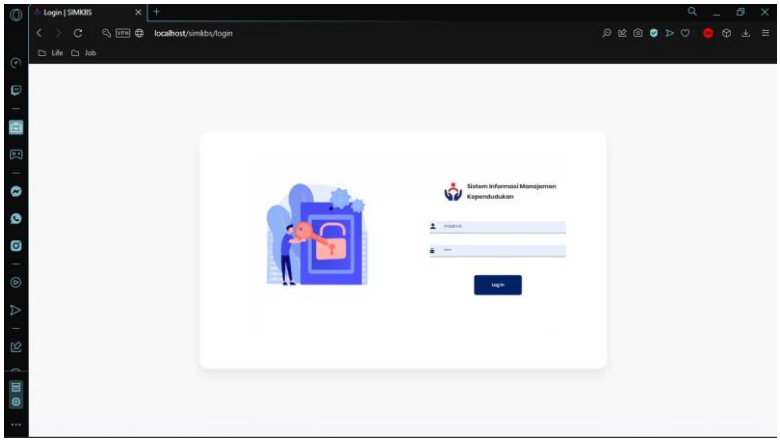

Fig 6. Login Form

The username and password created in the MySQL database management system are entered into the login form. To obtain the username and password for the RW Admin account, the RW Admin must speak with Village Admin.

c. Admin Main View

Administrator Main View The administrator has successfully logged in on the Login Form section, as seen in this display.

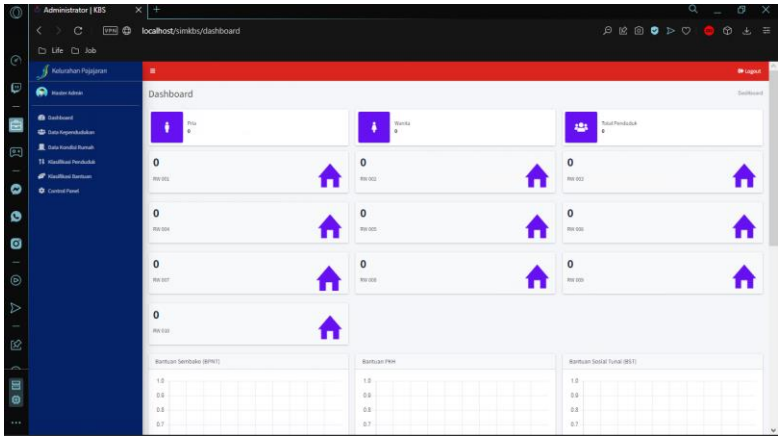

Fig 7. Admin Main View

The number of residents by gender at the Pajajaran and Per-RW levels is shown on the Admin Main Display.

d. How to Enter Population Data

If an administrator wants to add population data after entering the Admin Main View, they should choose the Population Data menu from the Navigation Menu, as shown in Fig 8 below.

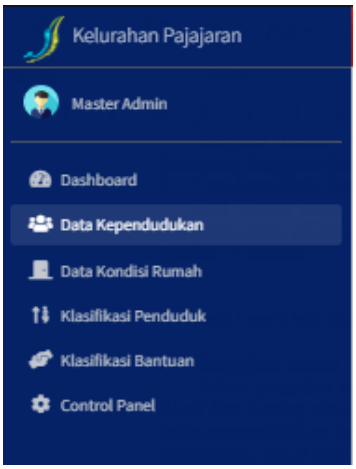

Fig 8. Navigation Menu

Next, the Population Data Display will appear, then there is a Population Data Add button which is at the far left of the Population Data Display, click the button

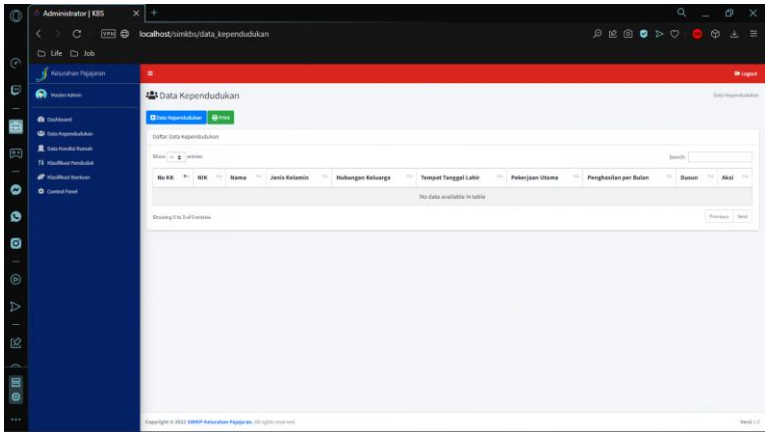

Fig 9. Population Data Display

The Population Data Input Display will then appear; simply complete the form on it in accordance with the instructions provided there, as shown in Fig 10.

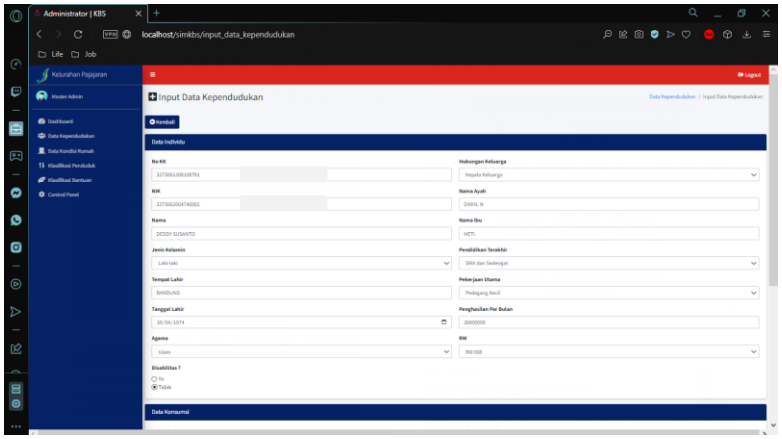

Fig 10. Population Data Input Process

A pop-up box stating that the data has been inputted will appear after you enter the data into the available columns and click the Save Data button. Clicking ok will return the display to the Population Data Display with the system additions we made, as shown in Fig 11 as follows.

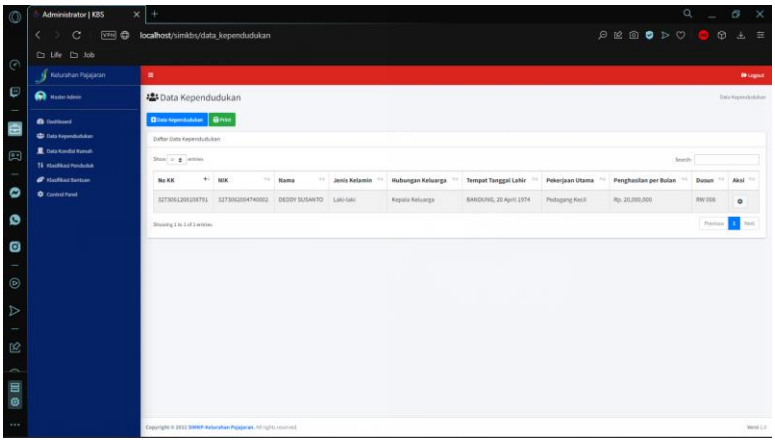

Fig 11. Display of Population Data That Has Added Data

The addition of population data is finished if the data have been entered.

e. How to Enter Residents' House Data

After entering the information for the resident, the administrator can enter the information for the resident's home by selecting the Home Condition Data button from the Navigation Menu. Then, as shown in Fig 12, the House Condition Data Display will appear. Click the button to add House Condition Data, which is located at the far left of the display.

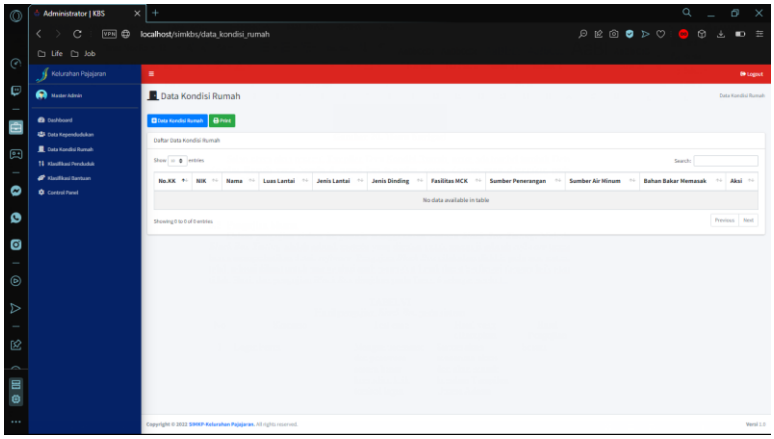

Fig 12. Display of House Condition Data.

The House Condition Data Input Display will then appear. Click Family Head Data and then select the Family Head Data to enter the House Condition Data. Then, complete the remaining forms, including those for floor area, floor type, wall type, drinking water source, cooking fuel, restroom facilities, and lighting source. Finally, click Save Data to continue the input process, as shown in Fig 13.

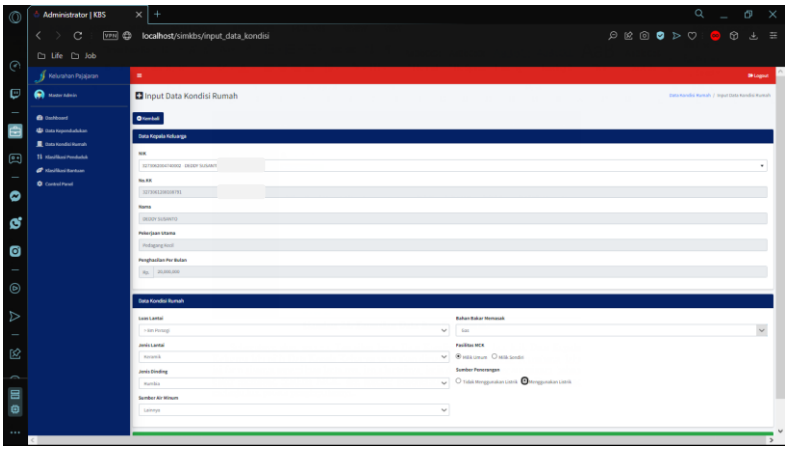

Fig 13. Display of House Condition Data Input and the Input Process

When the data input process is finished, as shown in Fig 14, a pop-up box will appear that says Data Saved Successfully. Click OK to continue the input process, then display house condition data with the data that has been entered.

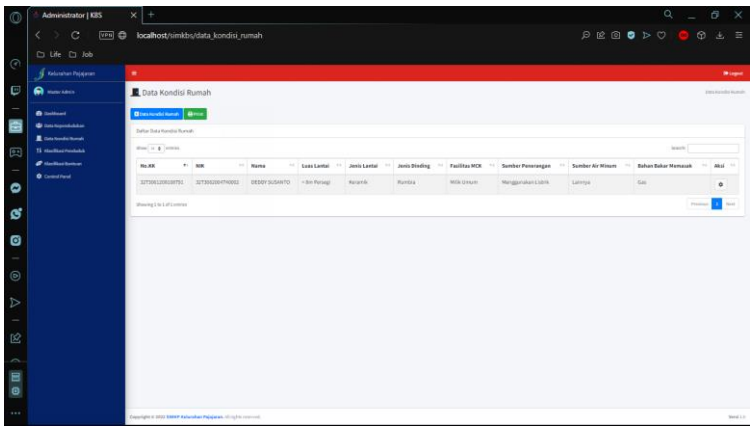

Fig 14. Data Display of House Conditions that have been Inputted Data

4.5 System Testing

The author employs "Black Box Testing" to test this system. The Black Box Testing approach is a way to test software without having to focus on the software itself. After the system has been built, testing Black Box is done to determine whether the software can run effectively or not. Table 6 displays the test Black Box results as follows:

Table 6 - Result Of Black Box Testing on System

No	Scenario	Test case	Expected	Results Test Results
1	Login Form	Fill in the username and password correctly then click the login button	The system will receive access and will enter the Main Admin Display	According
2	Add Population Data	Fill in No KK, NIK, Nama Lengkap, Hubungan Keluarga, Jenis Kelamin, Tempat Lahir, Tanggal, Lahir, Nama Lengkap Ayah Kandung, Nama Lengkap Ibu Kandung, Rukun Warga, dan Agama.	The system will receive data that has been filled in and entered into the database	According
3	Add House Condition Data	Fill in NIK, Nama Lengkap, Luas Lantai, Jenis Lantai, Jenis Dinding, Fasilitas MCK, Sumber Penerangan	The system will receive the data that has been filled in and entered into the database	According
4	Print Population Report	Clicking Print Report according to the required report criteria	The system will create a form which will be created automatically.	In accordance

5. Conclusion

The creation of this system's design is the first step in getting ready for the design process and giving the user an overview of the information system. The overall goal of the proposed system is to give users a comprehensive understanding of the system that has been developed. It also serves as a resource to show users that all designs can assist in problem-solving without concern for human error.

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