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Geographic Information System of Building Auction Mapping of Bank Rakyat Indonesia Inc. Bontang Branch Office

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Abstract—Bank Rakyat Indonesia Inc. is one of the largest state-owned banks (BUMN) in Indonesia which has a mission to serve micro, small and medium enterprises to improve the community's economy. To develop the business world so that economic growth can be maintained, a large amount of funds is needed to meet the needs in the form of credit facilities. At the time of credit, if the debtor is unable to pay off the debts to the bank, the bank as the creditor will conduct an auction process for the Debtor Guarantee. From this research, a webGIS is presented with the data used is data taken by collecting building data at auction through interviews, collecting data coordinates and distributing questionnaires, from 35 respondents a score of 70.21 was obtained where the Adjective Rating was in a good position with acceptable level of acceptance. The purpose of this study is to determine the location of the auction house building and make it easier for users to know the place in detail.

Keywords—Geographic Information System, Building Auction, BRI KC Bontang, Leaflet, BRI Auction

I. INTRODUCTION

Bank Rakyat Indonesia Inc. (Tbk) is one of the conventional BUMN banking which was founded in 1895 by Raden Arya Wiryaatmaja which has a mission to serve micro, small and medium enterprises to improve the community's economy. BRI is the bank with the largest percentage as a distributor of KUR funds from the government. To develop the business world so that economic growth can be maintained, large enough funds are needed to meet the needs in the form of credit facilities (Imanjoko, 2017).

To provide assurance will return credit from debtor customers, the bank asks for a guarantee or special collateral. Guarantee or Collateral is property belonging to the debtor which will be tied as collateral in the event of inability of debtor customers to settle the debt in accordance with credit agreement. The guarantee can be in the form of physical collateral such as land and houses (Suwandono, 2017).At the time of credit, if on the way it turns out that the debtor is in default, namely the debtor is unable to pay off the debts to the bank concerned, the bank will conduct an auction process for the Debtor Guarantee (Yustiana, 2020).

Due to the lack of public knowledge of the information on the auction of the building, a webGIS is presented which is functioned to make it easier for the public or bank customers to obtain information related to the building being auctioned.

II. LITERATUR REVIEW

Mulawarman University conducted a research entitled Application of Geographic Information System for Mapping Mosques in Samarinda WEB-Based. This application was created to see the distribution of mosques in the city of Samarinda. According to Maharani (2017) the benefits of this application can provide convenience for the public as users in receiving information about mosques in Samarinda.

Students from STMIK Budi Darma have also conducted research, namely Alkhalidy (2020) entitled Geographic Information System for Mapping of Drug Abuse Areas Using the SOM (Self-Organizing Map) Method. The purpose of this study was to determine the mapping system of drug abuse areas in the Southeast Aceh region, so that the Southeast Aceh BNK in conducting counseling could be right on target.

Students from STMIK Sinar Nusantara have conducted a research entitled Geographic Information System for Mapping of Credit Building Assets at Bank Rakyat Indonesia Inc. using Fuzzy Subtractive Clustering. In this thesis Imanjoko (2017) uses the Fuzzy Subtractive Clustering method with the stages of analysis, system design, coding/construction, testing and implementation. In the analysis stage, data collection was obtained from interviews, observations and literature studies. While the source of data obtained in the form of primary data and secondary data. The program used is the Google Map API and the database uses MySQL. At the testing stage, the Black Box method is used, and implementation is done by looking at the success of

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Customer Service and Mantri in using the geographic information system on desktop devices.

Astika (2017) from AMIK Dian Cipta Cendikia Bandar Lampung conducted a study entitled Geographic Information System for Mapping the Location of Bank Rakyat Indonesia (BRI) in Bandar Lampung. This application was created to provide geographic information containing information on the location of the nearest work unit so that consumers can easily find the location of work units in certain locations, where not all consumers know the location of the service unit.

Students from the University of 17 August 1945, Surabaya, have also conducted research, namely Rahmawan (2017) entitled Design of Geographic Information Systems for Historic Buildings in Mojokerto City Based on WEB. This application was created to help facilitate prospective users in finding information about historical buildings in the city of Mojokerto.

A. Geographic Information System

Geographic Information System (GIS) is a system designed to capture, store, manipulate, analyze, organize and display all types of geographic and data (Irwansyah, 2013).

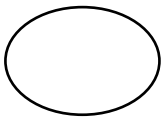
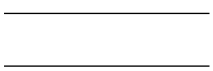
B. Building Auction

According to Tista (2013) the purpose of the auction is to sell goods as quickly as possible without paying attention to the goods being sold. Sellers basically need promotional services, offering, and delivering goods, but this cannot be done by the State Auction Office due to certain limitations.

C. DFD (Data Flow Diagram)

DFD can be used to represent a system or software at several levels of abstraction. DFD can be divided into several more detailed levels to represent the flow of information or functions in more detail. The following are the notations on the DFD (Data Flow Diagram) which can be seen in table 1.

Table 1 Symbol of DFD

Notation	Description
	Process or procedure function, in software modeling that will be implemented with structured programming, so that this notation modeling must be a function or procedure in the program code.
	Database files or storage, in software modeling that will be implemented with structured programming, then this notation modeling should be made into the required database tables, these tables must be in accordance with the design of the tables in the database.
	External entities, inputs, outputs, or people who use/interact with the modeled software or other systems related to the data flow of the modeled system.
	Data flow is data that is sent between processes from storage to process, or from process to input or output.

D. SUS (System Usability Scale)

SUS is one of the most popular usability testing tools. SUS was developed by John Brooke in 1986. SUS is a reliable, popular, effective and inexpensive usability scale Saputra (2019). The System Usability Scale (SUS) contains 10 instruments which can be seen in table 2.

Table 2 SUS Question Instruments

Number	Question	Score
1	I think I want using this application	1-5
2	I find that this application is not made this complicated	1-5
3	I think this application is easy to use	1-5
4	I think I need the help of a technician to use this system	1-5
5	I found various functions in this application are well integrated	1-5
6	I think there are too many inconsistencies in this system	1-5
7	I would imagine that most people would learn easily in learning this application	1-5
8	I found this application very impractical	1-5
9	I feel very confident in using this application	1-5
10	I need to learn a lot before using this application	1-5

From the question instrument in table 2, where respondents are given a choice of a scale of 1–5 to be answered based on how much respondents agree with each statement on the application or feature being tested. A value of 1 means strongly disagree and a value of 5 means strongly agree which can be seen in table 3.

Table 3 Scale options

Strongly Disagree				Strongly Agree
1	2	3	4	5

As explained in table 3, the System Usability Scale has 5 answers, namely Strongly Disagree, Disagree, Don't Agree, Agree and Strongly Agree. The score of the answer choices can be seen in table 4.

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Table 4 Rating Scale Score

Answer	Score
Strongly Disagree (SD)	1
Disagree (D)	2
Don't Agree (DA)	3
Agree (A)	4
Strongly Agree (SA)	5

After the questionnaire data provided by the respondent is collected, the next step will be to convert the respondent's response by means of:

a) The odd statement of the score given by the respondent is reduced by 1.

$$\text{odd SUS score} = Qn - 1 \quad (1)$$

Where Q*n* is the number of odd questions.

b) The even statement that the score given by the respondent is used to reduce 5.

$$\text{even SUS score} = 5 - Qn \quad (2)$$

Where Q*n* is the number of even questions.

c) The results of the conversion are then added up for each respondent and then multiplied by 2,5 in order to get a range of values between

$$0 - 100\ (Qn - 1) + (5 - Qn) \times 2{,}5 \quad (3)$$

d) After the score of each respondent has been known, the next step is to find the average score by adding up all the scores and dividing by the number of respondents. This calculation can be seen with the following formula:

$$\bar{X} = \Sigma xn$$

Where $\bar{X}$is the average score, Σx is the total score of the System Usability Scale and *n* is the number of respondents. From these results will be obtained an average value of all assessment scores of respondents.

Determination of the results of the assessment based on the SUS score percentile rank is carried out in general based on the results of the calculation of user ratings which can be seen in table 5.

Table 5 SUS Score Percentile Rank

Grade	Description
A	Score >= 80,3
B	Score >= 74 and <80,3
C	Score >= 68 and <74
D	Score >= 51 and <68
E	More Score <51

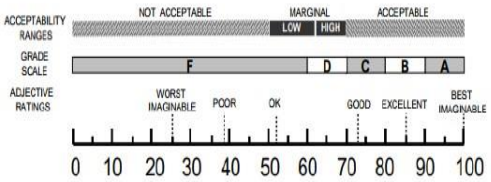
The results obtained from these calculations have their respective meanings. If interpreted based on Acceptability Ranges, it can be seen in table 6.

Table 6 Meaning of Score

SUS score	Meaning of score
0 – 50,9	*Non Acceptable*
51 – 70,9	*Marginal*
71 – 100	*Acceptable*

In addition to the Acceptable Range shown in table 6, there are other options for interpreting the SUS results and the steps are as follows:

1. Grade Scale, divided into 5 grades, namely A(90-100), B(80-90), C(70-80), D(60-70), F(score<60).
2. Adjective Rating, describing the value of SUS which was originally a number into an adjective. Adjective rating scale: Worst imaginable, Awful, Poor, Good, Excellent, and Best Imaginable which can be seen in picture 1.



Picture 1. Interpretation of SUS score

Below is the general interpretation of the SUS score, which can be seen in table 7.

Table 7 interpretation of SUS scores

SUS Skor	**Grade**	**Adjective Ratings**
90-100	A	Excellent
80-90	B	Good
70-80	C	Okay
60-70	D	Poor
<60	F	Awful

III. RESEARCH METHODS

A. Research Procedure

The stages of making the application for the Geografis Geographic Information System of Building Auction Mapping of Bank Rakyat Indonesia Inc. Bontang Branch Office Web-Based are used. This model approaches systematically or sequentially, in building a flow of research procedures as shown in picture 2.

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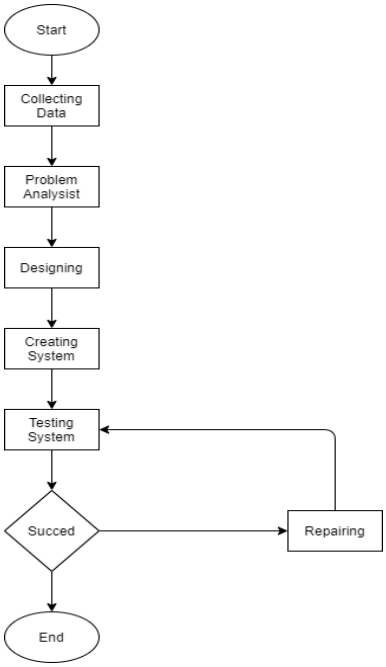
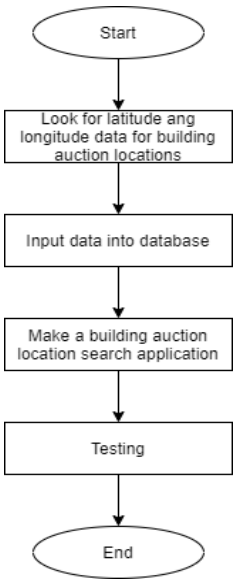


Picture 2. Flowchart of research procedure

A. Data Collection Techniques

The application developer diagram is a basic description of the system and the activities that occur when the application is run which can be seen in Picture 3.

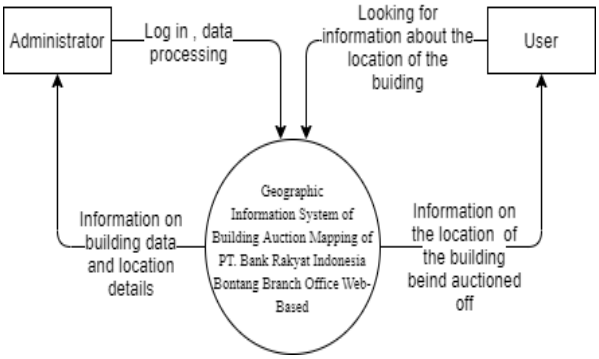


Picture 3. Flowchart of application maker

B. System design

1. DFD level 0

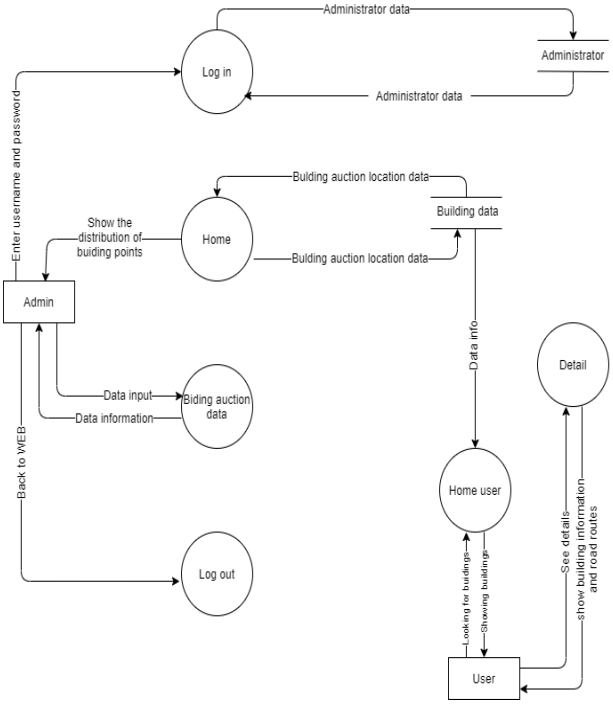
Administrators can log in and manage data so that users can get detailed information about building auction locations. The following is a DFD (Data Flow Diagram) level 0 which can be seen in picture 4.



Picture 4 DFD Level 0

2. DFD level 1

Administrators can log in to enter applications and manage data. Users can see information and distribution of buildings being auctioned with a route from the user's point to the location of the building being auctioned off, the following is a DFD (Data Flow Diagram) level 1 which can be seen in picture 5.



Picture 5. DFD Level 1

IV. Results and Discussion

The results of this research after making the system, namely producing a Geographic Information System of Building Auction Mapping of Bank Rakyat Indonesia Inc. Bontang Branch Office Web-Based. This system helps the public in finding the location and information of the building being auctioned off. The following are the results of the research.

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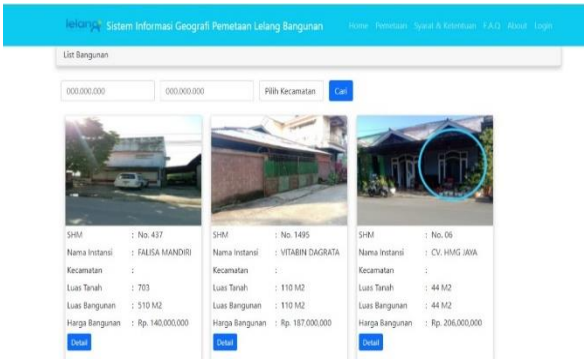
1. Home User Page

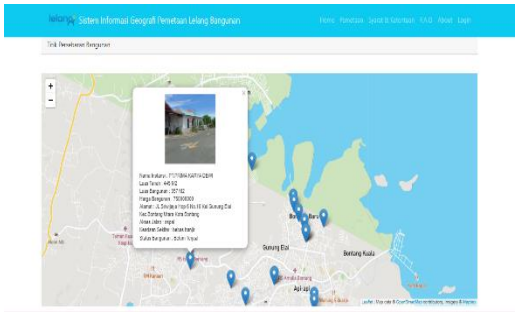
The home page is the page that will appear first when accessing the system. On this page the user can view the home menu, price filters, sub-district filters, mapping, terms & conditions, F.A.Q, details, about and log in. This page is the main function of the system because on this page the user can search for building locations based on the available building distribution maps and there are several features that can be used such as price filters based on the desired price and sub-district filters based on the desired building location, the home page is shown in picture 6.



Picture 6. Home User Page

2. User Mapping Page

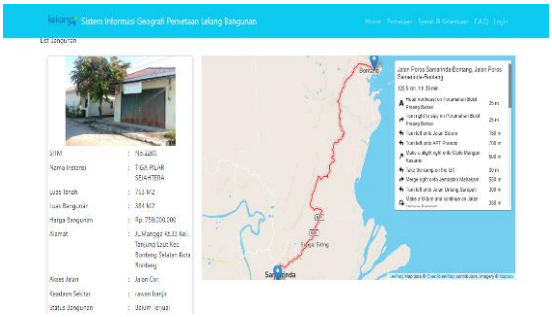
On the mapping page, the user can see the location distribution points and building information including building pictures, agency names, land area, building area, building prices, addresses, access roads, surrounding environment, and the status of the buildings being auctioned can be seen in picture 7.



Picture 7. User Mapping Page

3. Details Page

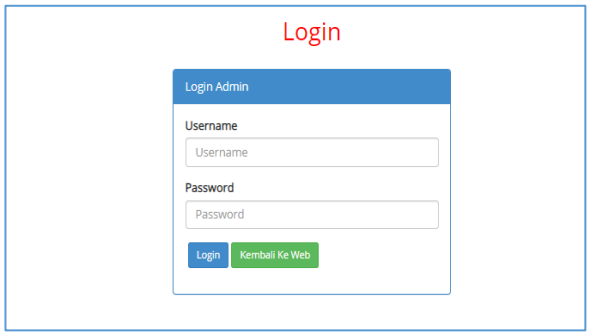
On the detail page the user can see building information, photos of the building, the route from the user point to the location of the building being auctioned off, the return button and the button to join the auction aimed at participating in the auction process which can be seen in picture 8.



Picture 8. Details Page

4. Log In Page

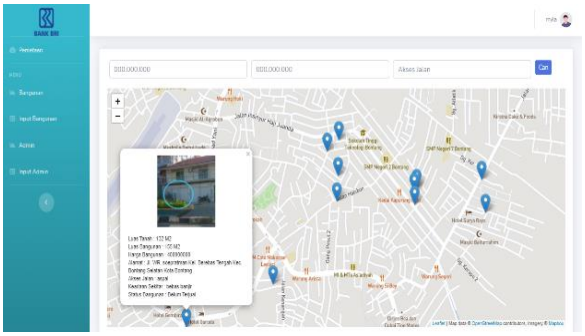
The log in page is the page that will be displayed before entering the system administrator. Previously, the administrator would be asked to enter the administrator account username and password to secure the system so that only certain people (administrators) could enter, as shown in picture 9.



Picture 9. Log-In Page

5. Administrator Mapping Page

The administrator mapping page is the page that appears when the administrator successfully logs into the system. This page has information about the distribution of buildings being auctioned. To log out, there is a button in the upper right corner of the page, after pressing the administrator name, a log out button will appear as shown in picture 10.



Picture 10. Administrator Mapping Page

6. Building Data Input Page

On this page, administrators can add building auction location data including SHM, agency name, land area, building area, building price, address, sub-district, road access, surrounding environment,

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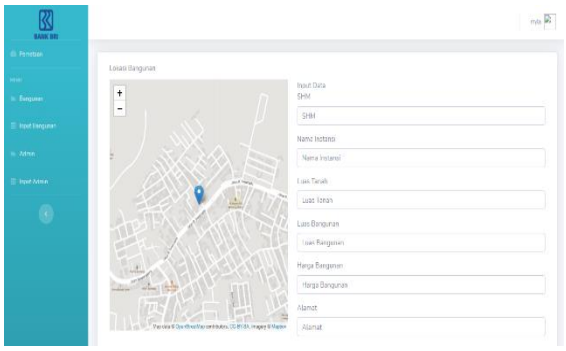
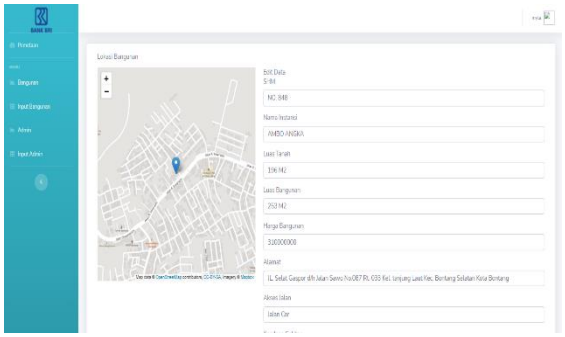
building status, latitude, longitude, and photos of buildings that can be seen on picture 11.



Picture 11. Building Data Input Page

7. Edit Building Data Page

On this page the administrator can edit the building data which can be seen in picture 12.



Picture 12. Edit Building Data Page

8. Administrator Building Data Page

On the administrator's building data page, administrators can view building information, edit data, and delete data that has been entered which can be seen in picture 13.

Picture 13 Administrator Building Data Page

9. Black Box Testing

The results of the black box testing are as follows:

1) Administrator Login Page Test

Tests on this page are carried out to find out whether the system is running well in accordance with the program created, the test results can be seen in table 8.

Table 8 Test Results for Administrator Login Page

Testing	Output	Status
Login page view	Get the permission to access data after entering username and password	Success
Log in access	Get the permission to access data after entering username and password	Success

2) Administrator Page Test

Tests on this page are carried out to find out whether the processes on this page are running well in accordance with the program that has been made, the test results can be seen in table 9.

Table 9 Test Results for Administrator Pages

Testing	Output	Status
Add Button	Administrators can add location points and auctioned building information	Success
Delete Button	Administrator can delete data	Success
Edit Button	Administrator can change data	Success
Add photo	Administrators can add photo of the building being auctioned	Success
Searching Buildings by price	Administrators can search building information by using price filters	Success

3) Map Page Test

Tests on this page are carried out to test the appearance and processes in it whether they are functioning according to the program created, the test results can be seen in table 10.

Table 10 Map Page Test Results

Testing	Output	Status
Display the front page of the WEB	User can see list auctioned building	Success
Searching for Building Locations	Users can search for buildings being auctioned using price filters	Success
Show Location Details	Users can view information on the building being auctioned and the route from the user's point to the site building location	Success

4) Respondent Calculation Analysis

In this study, data obtained as much as 35 respondents that consisting of bank customers and the general public who use this application. Respondents will answer 10 questions given. The results of the answers from respondents will be calculated using

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equations (1), (2) and (3), so that it will produce an average score as can be seen in table 11.

Table 11 Respondent Test Results

Number	R	Question Score										Amount
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	
1	R1	4	2	4	4	3	2	5	2	3	3	65
2	R2	4	3	4	4	4	3	4	2	4	4	60
3	R3	4	3	5	4	4	3	5	3	5	3	67,5
4	R4	5	2	2	5	5	2	5	1	5	1	77,5
5	R5	5	2	4	1	4	2	5	4	4	1	80
6	R6	4	2	2	4	5	4	4	2	5	2	65
7	R7	4	2	1	5	4	3	4	2	5	2	60
8	R8	3	4	3	4	4	4	4	2	3	4	47,5
9	R9	4	2	2	4	4	3	4	2	4	2	62,5
10	R10	4	2	2	4	4	3	4	2	4	3	60
11	R11	4	2	3	4	4	2	5	2	4	2	70
12	R12	4	3	2	4	4	3	4	2	4	2	60
13	R13	4	2	2	5	4	2	4	1	4	2	65
14	R14	4	3	4	5	3	5	2	1	5	2	55
15	R15	4	5	4	4	5	4	5	4	4	4	52,5
16	R16	5	2	2	5	5	4	5	2	5	2	57,5
17	R17	4	2	3	4	5	3	5	3	4	3	65
18	R18	4	3	4	4	5	4	5	3	4	2	65
19	R19	5	3	2	5	5	3	5	3	5	3	62,5
20	R20	4	3	3	4	4	3	4	2	4	4	57,5
21	R21	5	1	2	5	5	2	4	1	5	1	77,5
22	R22	4	2	2	4	4	2	4	2	4	2	65
23	R23	5	1	2	4	5	2	4	2	5	1	77,5
24	R24	5	2	2	4	5	2	4	2	4	2	70
25	R25	5	1	1	5	5	1	5	1	5	1	80
26	R26	4	2	2	4	4	2	4	2	4	2	65
27	R27	4	1	2	5	5	2	4	2	5	2	70
28	R28	5	1	2	4	5	2	4	2	4	2	72,5
29	R29	5	2	1	4	5	1	4	2	4	2	77,5
30	R30	5	2	2	4	5	2	5	2	5	1	77,5
31	R31	5	1	5	2	5	2	4	1	5	1	92,5
32	R32	5	1	5	2	4	1	5	1	4	2	90
33	R33	5	1	5	1	5	2	5	1	5	1	97,5
34	R34	5	2	5	2	5	1	5	1	5	1	92,5
35	R35	5	1	5	1	5	2	5	1	5	1	97,5
Average Score												70,21

Information from table 11, where R is the respondent and Qn is the n question. The results of research conducted on 35 respondents can be obtained the average score through a questionnaire with a score of skor 70,21. In terms of Acceptability Range, this application program is in the Marginal category, while the Grade Scale is in the Grade C position and the Adjective Rating is in the Good position. While the assessment with a *percentile rank* on the average score of 70,21 lies in Grade C, where the value is greater than 68 and less than 74.

IV. CONCLUSION

The Geographic Information System Application of Building Auction Mapping of Bank Rakyat Indonesia Inc. Bontang Branch Office Web-Based can facilitate users in finding locations and detailed information related to buildings at auction by Bank Rakyat Indonesia Inc. Bontang Branch Office and the results of research conducted on 35 respondents obtained the average score through a questionnaire with a score of 70.21. In terms of Acceptability Range, this application program is in the Marginal category, while the Grade Scale is in the Grade C position and the Adjective Rating is in the Good position. While the assessment with a percentile rank on the average score of 70.21 lies in Grade C, where the value is greater than 68 and less than 74.

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