GEOGRAPHIC INFORMATION SYSTEM TO DETERMINE RAYON BASED SECONDARY SCHOOL WEB BASED IN DINAS PENDIDIKAN KOTA BANDUNG

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ABSTRACT

Dinas Pendidikan (DISDIK) Kota Bandung having responsibility for carrying out development in the field of education in Bandung. The purpose of Student admission change at 2014 in Bandung for eliminating favorites school status and seek equitable distribution the quality of learning in every school, from cluster system to rayon system. The rayon system is newly implemented in public school (SD, SMP, SMA/MK).

This rayon system still causing problems for students, parent of student and school, where lack of understand with this rayon system, both mechanisms as well as information about where the schools are located in each rayon and schools can not provide recommendations based on criteria. Therefore, it is necessary to build a geographic information system to determine the state secondary school based rayon WITHIN Dinas Pendidikan Kota Bandung. There are criteria to determine the views of NEM school students and region of residence of parents. The analytical approach to the development of software used is structured analysis. In the implementation, geographic information system was built based on web.

Based on the results of testing the system with a method black box and beta (interviews and questionnaires) it could be concluded that a system built to provide recommendations public secondary schools in the city of Bandung to prospective students, parents and the school system based on rayon and could facilitate prospective students, parents and the school to get information about public secondary schools based rayon in Bandung.
Key Word : geographic, information system, rayon system, Dinas Pendidikan Kota Bandung.

1. PRELIMINARY

Department of Education (DISDIK) Bandung is responsible for carrying out development in the field of education refers to the increase in Human Resources in Bandung.

Based on interview with bapak Chandra Bakhtiar, as Staff Program Dinas Pendidikan Kota Bandung, new admissions system changes in 2014 in Bandung is based on Mayor Regulation No.666 2014, with the aim to eliminate favorite school status and to seek equitable quality of teaching in every school. This rayon new system applied to a public school located in the city of Bandung , ranging from elementary school (SD) to Vocational High School (SMK). There are 319 state elementary schools , 53 junior high schools , 27 Senior High School and Vocational High School 17 are supervised by the Deartment of Education in Bandung. New admissions system in Bandung before using cluster system , which categorize schools into several clusters. The first cluster consists of favorite schools be seen from the many enthusiasts who want to get into these schoolsHowever , in 2014 in Bandung cluster system is not used anymore . Instead new admissions apply rayon systems , which classify schools by districts / villages.

Bandung City Education Department has a system of information on public schools ranging from elementary school (SD) to High School / Vocational (SMA/SMK) based on the new admissions system in 2014. However, this information system still has shortcomings , namely a system can not give recommendations to prospective students to continue their education, based NEM students and residential address of the parents concerned.

It is therefore proposed need to create an information system that allows students to get recommendations and find out where the schools of public secondary schools geographically based rayon.

2. RESEARCH CONTENTS

2.1 Research Chronology

Chronology of research are the measures taken to support the research that will be made in order to be able to run more targeted research and systematic, can be seen in Figure 1.

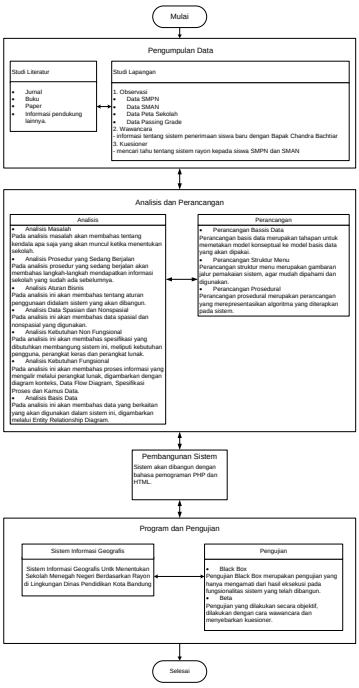


Figure 1 Research Chronology

2.2 Software Making Method

Data analysis techniques in the making software using the waterfall software paradigm, which includes several porses described as follows:

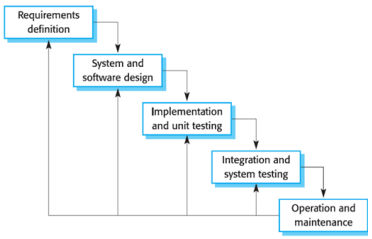


Figure 2 Waterfall Method

2.3 Database Analysis

The database is a collection of data related to each other are related to the key described relations with the Entity Relationship Diagram (ERD). Here is ERD proposed the system to be built, can be seen in Figure 3.

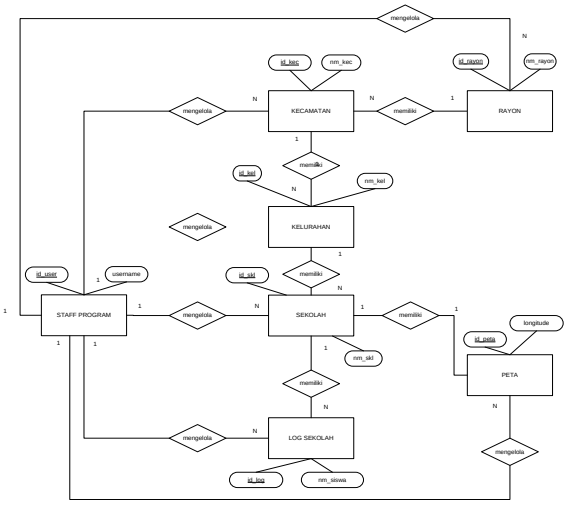


Figure 3 Entity Relationship Diagram

2.4 Context Diagram

Is a model that runs broadly about how the data is used or transformed data to illustrate the flow of data into a system. The following context diagram is shown in Figure 4.

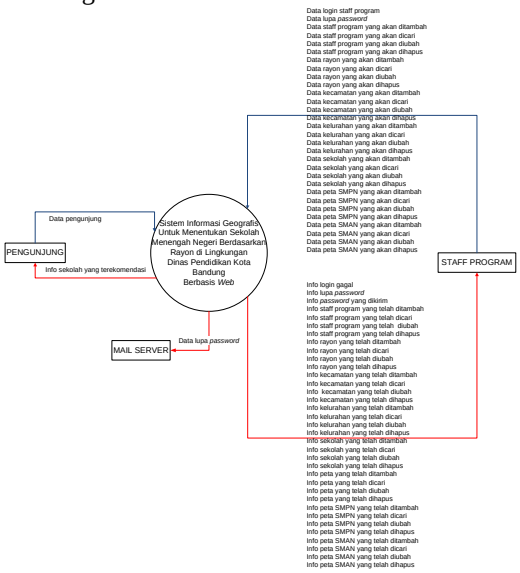


Figure 4 Context Diagram

2.5 Data Flow Diagram (DFD)

A technique that illustrates the flow of data and transformations that are used as data travels from the input to the output. Here DFD level 1, can be seen in Figure 5, consists of 9 major process consists of the login process, the data processing program staff, data processing rayon, data processing sub-districts, data processing sub, data processing schools, data processing map data, recommendation schools and forgot the password.

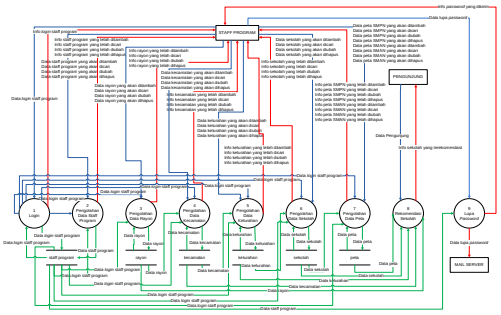


Figure 5 DFD Level 1

DFD level 2 of the recommendation process consists of three process carried out by the visitors, including the recommendation of the school's first choice, second choice school recommendation process and the process of choosing a school the recommendation, seen in Figure 6.

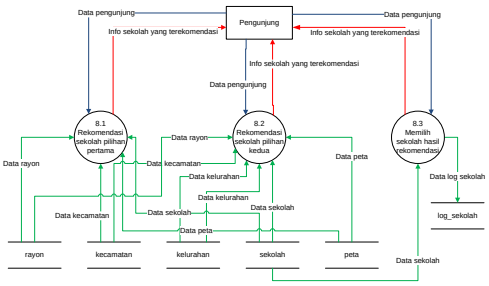


Figure 6 DFD Level 2 Recommendation Proces

2.6 Proces Specification

The specification process is used to describe all process flow model depicted in Diargam Flow Data (DFD) which have been described previously. Here Specification Process Recommendation, is shown in Table 1.

Table 1 Recommendation Proces Specification

No.	Proces	Explanation
1	Proces No.	8.1
	Proces Name	First option school recomendation
	Description	First option school recommendation proces
	Source	Visitor *Rayon Storage* *Kecamatan Storage* *Kelurahan Storage* *School Storage* *Map Storage* *Log_School Storage*
	Input	Visitor Data
	Output	Recmmended School info
	Destination	Recommending first option school
	Logical Proces	1. Visitor choose first option. 2. The System displays the appropriate school education to be implemented visitors, NEM and region of student residence.
2	Proces No.	8.2
	Process Name	Second option School Recommendation
	Description	Second option schools recommendatioon proces
	Source	Visitor Rayon Storage Kecamatan Storage Kelurahan Storage School Storage Map Storage Log_School Storage
	Input	Visitors Data
	Output	Recommended schools info
	Destination	Recommending second option school
	Logika Proses	1. Visitors choose second option. 2. The system displaysthe apropriate school education to be implemented visitors, NEM and region of student residence .
3	Proces No.	8.3
	Proces Name	Choosing school by recommendation.
	Description	School choosing proces by recommendation.
	Source	Visitors *School Storage* *Log_School Storage*
	Input	Visitors Data
	Output	Recommended School info
	Destination	Giving schools information which has been chosen
	Logika Proses	1. Visitors input schools origin, first option school and second option school. 2. System saved into Log_School storage.

2.7 Data Dictionary

The data dictionary is used to define the complete data flow between processes, data storage and outside entities. The flow of data that can be input to the system or the result of a process system. Here is the data dictionary maps SMP and SMA on this system can be seen in Table 2.

Table 2 Map Data Dictionary SMPN & SMAN

No.	Kamus	Explanation
1	Name	Map data SMAN
	Where used/How used	*storage* peta – proses 7.1.1 *storage* peta – proses 7.1.2 *storage* peta – proses 7.1.3
		storage peta – proses 7.1.4
	Description	SMAN map contains data that is processed in Bandung
	Data Structure	id_peta + nm_skl + deskripsi + no_tlp + latitude + longitude + gbr_skl
	id_peta	{0 – 9}
	nm_skl deskripsi no_tlp latitude longitude gbr_skl	{A – Z | a – z | 0 – 9} {ASCII} {0 – 9} [-] {0 – 9} [- .] {0 – 9} [- .] /* url_gambar */
2	Name	Map data SMPN
	Where used/How used	*storage* peta – proses 7.2.1 *storage* peta – proses 7.2.2 *storage* peta – proses 7.2.3 *storage* peta – proses 7.2.4
	Description	SMPN map contains data that is processed in Bandung
	Struktur Data	id_peta + nm_skl + deskripsi + no_tlp + latitude + longitude + gbr_skl
	id_peta nm_skl deskripsi no_tlp latitude longitude gbr_skl	{0 – 9} {A – Z | a – z | 0 – 9} {ASCII} {0 – 9} [-] {0 – 9} [- .] {0 – 9} [- .] /* url_gambar */

2.8 Relation Diagram

Relationship diagrams geographic information system to determine the state secondary school based rayon within the Bandung City Education Department consists of 7 tables which consist of a user table, rayon, district, village, school, log_sekolah and maps. The following relationship diagram is shown in Figure 7.

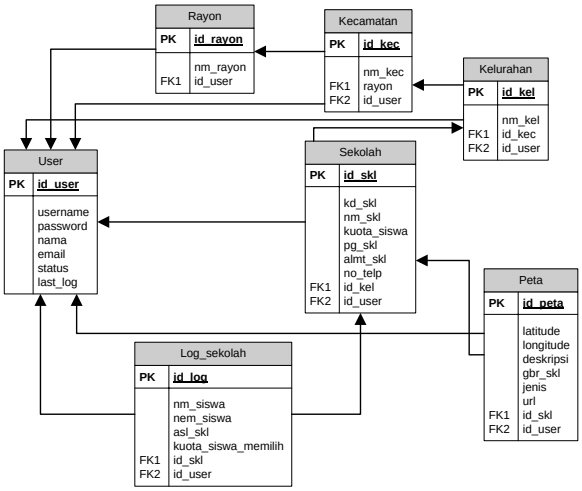


Figure 7 Relation Diagram

2.9 Table Structure

The design of the tables will be used in the database. Here one table structure of rayon and districts, can be seen in Table 3 and Table 4.

Table 3 Rayon Structure Table

No	Column Name	Type	Size	Explanation
1	id_rayon	int	2	Primary Key
2	nm_rayon	char	1	
3	id_user	Int	2	Foreign key dari Tabel User terhadap atribut id_user

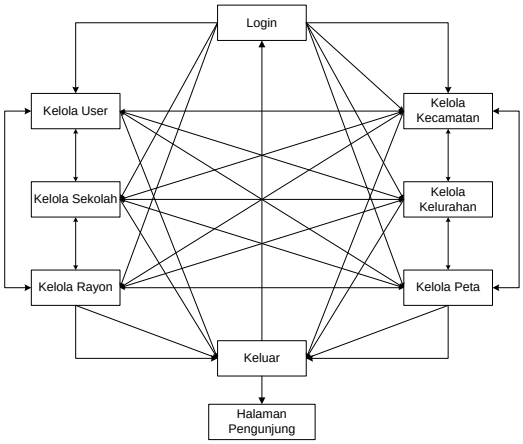
Table 4 Kecamatan Structure Table

No	Column name	Type	Size	Explanation
1	id_kec	int	2	Primary Key
2	nm_kec	varchar	50	
3	rayon	varchar	2	Foreign key dari Tabel Rayon terhadap atribut id_rayon

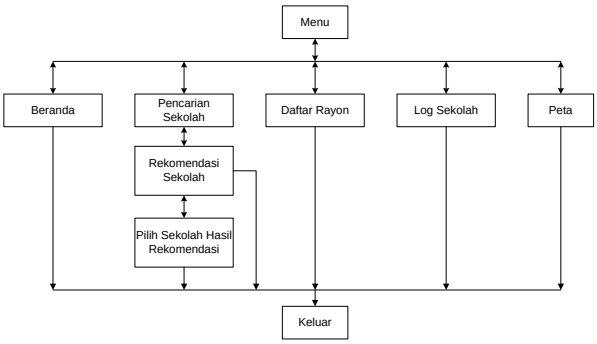
2.10 Menu Design

The menu structure is built describe the menu design process that can be used by the user. The following menu structure of geographic information system to determine the state secondary school based rayon within the Bandung City Education Department

- **Progam Staff Menu**



- **Visitor Menu**



2.11Procedural Design

Procedural design is design that represents the algorithm of the software with the type of operation that is different by using a flowchart diagrams and symbols. The following procedural recommendations first choice school and procedural recommendations second choice school, can be seen in Figure 8 and Figure 9.

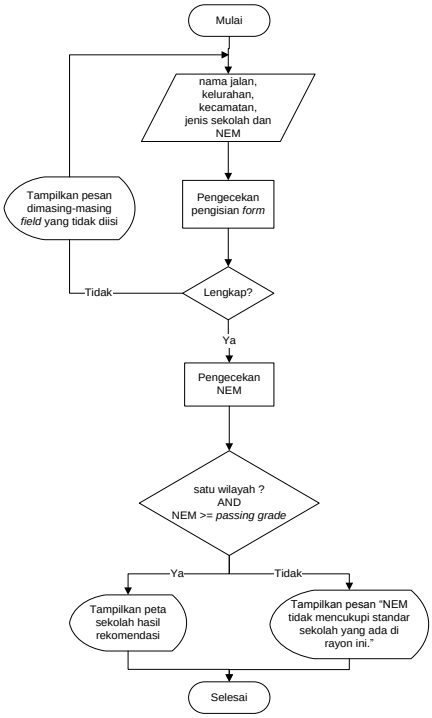


Figure 8 First option recommended school flowchart

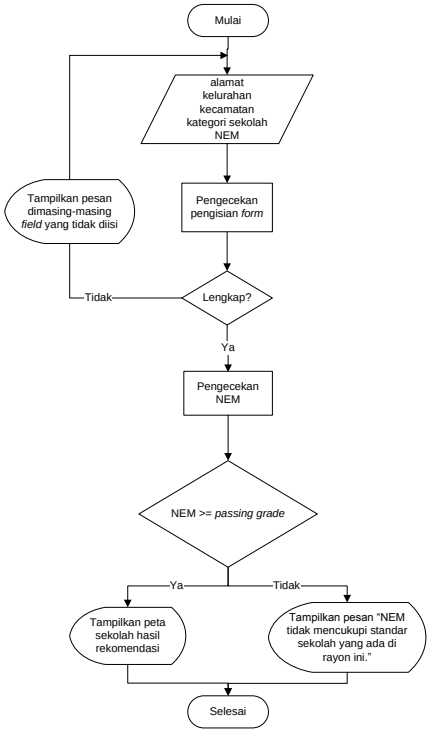


Figure 9 Second option recommended school flowchart

2.12Interface Implementing

The following interface implementation of a geographic information system to determine the state secondary school based rayon within the Bandung City Education Department.

- Program Staff Interface



Figure 10 Login Interface

- Program Staff Interface

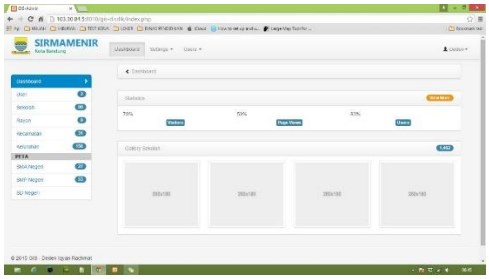


Figure 11 Program Staff Interface

- Visitor Interface

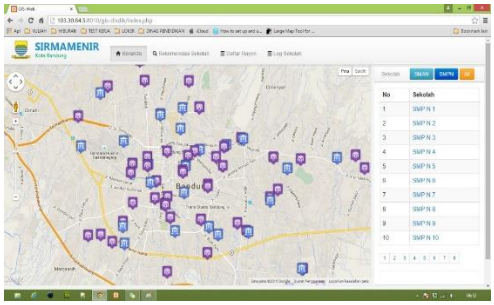


Figure 12 Visitor Interface

- School Map Search Interface

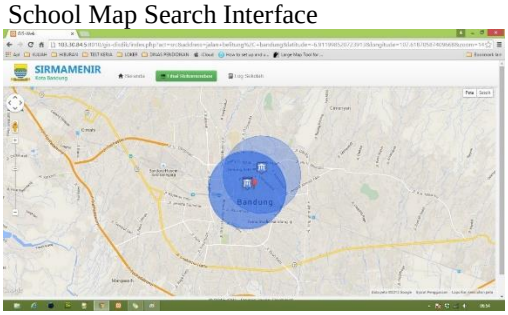


Figure 13 School Map Search Interface

2.13 System Testinng

System testing is done to test whether the system built is feasible to be used. Testing was conducted on the test page program staff and visitors using blackbox testing strategy, questionnaires and interviews.

Here are some steps for blackbox testing, ranging from designing the testing program staff pages, designing test page visitor, blackbox testing and beta testing:

Table 5 Program Staff Page Testing Plan

Kelas Uji	Butir Uji
Login	1. Fill login data 2. Logn data verification
Forgot Password	1. Forget password data fill 2. Forget password data verification 3. Sending password
Program staff data processing	1. Program staff data adding 2. Program staff data searching 3. Program staff data editing 4. Program staff data deleting

Table 6 Visitor Page Testing Plan

Class Testing	Item Testing
Map seeking SMPN dan SMAN	1. Map providing.
School Recommendation	1. Data filling for school recommendation. 2. Giving school recommendation rayon based. 3. Print school recommendation list. 4. Choosing school from recommendation.
Seeking school list rayon based	1. Providing school lost rayon based. 2. Print shcool list rayon based.
Seeking school voter list	1. Providing school voter name list of school based on the results of recommendations rayon. 2. Print a list of voter school.

- *Black Box* Testing
  Based on the testing plan that had been developed, then tested as follows:

- Login Testing

Table 7 Login Testing

Case and Test Result (DataTrue)			
Data input	**Data expected**	**Observation**	**Verification & Validation**
Enter *username* and *password*. Example : username : deden *password* : deden	Show program staff main page.	Data *username* and *password* appropriate with database.	Accepted
Case and test result (Data False)			
Data input	**Data expected**	**Observation**	**Verification & Validation**
username column blank	Shows massage "username dan password tidak cocok".	Data *username* not listed on *database*.	acepted

- Forget Password Testing

Table 8 Forget Password

Case and test result (Data True)			
Data input	**Data expected**	**Observation**	**Verifivation & Validation**
Input same *email* when doing admission and must be gmail. Example input: Email: dedeniqyanrachmat@gmail.com	Data login listed sent to *email* staff program.	Data *email* entered is listed on *database*.	Diterima
Case and testing result (Data False)			
Data input	**Data expected**	**Observation**	**Verification & Validation**
Email not filled.	Displaying massage" Email tidak terdaftar".	Email column not filled.	Accepted
Input wrong email. example: Email: dedeniqyanrachamt@yahoo.com	Display massage "Email tidak terdaftar".	Data *email* ot listed on database.	Accepted

- program staff Data Processing testing

Table 9 Program Staff Data Testng

Case And Test Result (Data True)			
Data input	**Data expected**	**observation**	**Verification & Validation**
input data staff program example: Name: Chandra Bachtiar Username: Chandra	Display massage "Berhasil, Data user berhasil ditambahkan".	Data staff program can be saved into *database*.	Accepted
Password: admin Email: chandrabachtiar@gmail.com Status: Active			
Data staff program for search. Example enter: search category: username password: Chandra	display data staff program search result.	Data serach listed on database.	accepted
Data	Display	Data	Accepted

staff program change. example enter: Name: Chandra Bachtiar Username: Chandra Password: admin18 Email: chandrabachtiar@gmail.com Status: Active	massage "Berhasil, Data staff program berhasil diubah"	updated into *database*.	
Data staff program will be deleted.	Display massage "Apakah anda yakin akan menghapus data ini ?"	Data choosen will be deleted on *database*.	Accepted
Case and testing result (Data false)			
Data input	**data expected**	**Observation**	**Verification & Validation**
Name not filled.	Display massage "Nama harus diisi."	Column *name* not filled.	Accepted
Password not filled.	Show massage "Password harus diisi."	Column *password* not filled.	Accepted
Email not filled.	Show massage "Email harus diisi."	Column *email* not filled.	Accepted
Data staff program listed on database. example masukan : Name: Chandra Bachtiar Username: Chandra Password: admin Email: chandrabachtiar@gmail.com Status: Active	Show massage "Gagal, username sudah digunakan"	Data tcan not saved on *database*.	Accepted

- Beta Testing
  Testing is conducted objectively. Data collection techniques by interviewing teachers Public Elementary School and Junior High School and distributing questionnaires to visitors of this geographic information system (students, parents and the school).
  - Interview
  Done by using quantitative techniques through a closed question. The following list of questions:

Table 10 Interview Questions

1. Wheter this geographic information system to help parents, school representatives and students to get information about public middle schools based rayon in bandung?
2. Wheter the results of the recommendations resulting from geographic information syatem faciliates parents, school representatives and students to choose a public high school based rayon?
3. Does the geographic information system is easy to use?
4. How about the display of geographic information system i built?
5. Are there any suggestions for geographic information system, to be better in the future?

- Questionnaire

Granted to some users who will use this information system. Users composed of parents, students SMPN 3 class and the school. This questionnaire using Likert scale.

Table 11 Questionnaire question

No.	Pertanyaan
1	Does the display of this geographic syatem information interesting?
2	Does the geographic system information esy to use?
3	Is this geographic information systems can be a solution for a new admissions system newly implemented in Bandung in 2014? (systems rayon)

4	Is this geographic information system allows you to get information about public secondary schools based rayon in Bandung?
5	Whether the results of the recommendations resulting from the geographic information system allows you to choose a public high school based rayon?

Table 12 Questionnaire value score

Answer Scale	Explanation	Score
SS	Sangat Setuju	5
S	Setuju	4
RG	Ragu – ragu	3
TS	Tidak Setuju	2
STS	Sangat tidak Setuju	1

Data from the questionnaire can be searched percentage of each answer by using the formula:

P = S/(Skor Ideal)×100%

Explanation:

- P = Percentation value needed
- S = Total value of done frequency response categories (Σ=N x R)
- N = value from every answer
- R = Frequencies
- Skor Ideal = Higest value done with total sample (5 x 30 = 150)

3 Closing

3.1 Conclusion

After doing the analysis, design and testing it can be concluded, from a geographic information system to determine the state secondary school based rayon in Bandung, which is built as follows:

1. The system can provide recommendations based rayon public secondary schools in the coty of bandung to prospective students, parents and the school will continue to the next education level.
2. The system can facilitate prospective students, parents and the school to get nformation about public secondary schools based systems rayon in bandung.

3.2 Suggestion

Based on the results that have been achieved in establishing a geographic information system to determine the state secondary school based rayon in Bandung still has shortcomings, therefore it is advisable to add things that can equip the future, including:

1. Display of geographic information systems can be made more interesting.
2. Can display passing grade the previous year.
3. Can display features make predictios passing grade by calculating the value of the UN in each region.
4. Can provide nformation about which scholls become the favourite candidate selected by the students in each school in each region.

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