

# Data Security Applications For School by Using Android

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**Abstract** - School is an agency that operates in the field of education. The school uses Microsoft Office applications to support the school system regarding the grades of students' lessons. The teacher will input student grades in the form of a report card or report on student grades in the form of numbers, while students will see the grades that have been input by the teacher in the report card or report on student grades. However, the value data in the student's report card or report has not undergone an encryption process, or in other words, it is still in plaintext form. This will certainly make it easier for unauthorized parties to read and manipulate student grade data if the grade data is still in plaintext. Therefore, some literature states that the way to solve this problem is by applying cryptography. To maintain data security and avoid data leaks, various methods can be used, one of which is by using cryptography. Cryptography is the process of hiding or coding information so that only the person a message was intended for can read it. The art of cryptography has been used to code messages for thousands of years and continues to be used in bank cards, computer passwords, and ecommerce.

**Keywords:** Security, Cryptography, Android, Data

## I. INTRODUCTION

In the very rapid and accurate technological advances, every information in the field of education has experienced developments to continue to strive to improve the ability to manage data and information that is safe and efficient because it is very much needed in the field of education. Writing information today is also inseparable from the sophisticated technologies that exist today. There are still many agencies that have not used or managed technology optimally, where this technology is very useful to facilitate schools in securing student data and information, making it easier for school teachers.

School is an institution engaged in education. Schools utilize Microsoft Office applications to support the school system related to the grades of the subjects taken by students. Teachers will input student grades in the form of report cards or student grade report results in the form of numbers, while students will see the grades that have been input by the teacher.

on the report card or student score report. However, the score data on the report card or student score report has not undergone an encryption process, or in other words, is still in plaintext form. This will certainly make it easier for unauthorized parties to read and manipulate student score data if the score data is still in plaintext. Therefore, some literature states that the way to solve this problem is by applying cryptography.

To maintain data security and avoid data leaks, various methods can be used, one of which is by using

cryptography. Cryptography is a science that uses mathematical techniques related to aspects of information security such as confidentiality, data integrity, entity authentication, and data origin authentication.

Techniques are needed to secure important data so that access to the data is limited only to interested parties. Based on how it works, cryptographic algorithms are a type of stream cipher. The advantage is that by using this method, algorithm encryption can be performed on data of varying lengths. The algorithm of this stream cipher method consists of two parts, namely: key setup and stream generation.

to secure student grade data entered by teachers so as to minimize the possibility of it being read or manipulated by unauthorized parties.

The definition of an application is a piece of software that can be used to solve specific problems faced by users using computer capabilities. While the definition of sales is a process by which a person or organization convinces customers to buy the products offered. Mobile applications can be interpreted as a product of a mobile computing system, namely a computing system that can be easily moved physically and whose computing capabilities can be used while they are being moved. Examples include personal digital assistants (PDAs), smartphones and mobile phones. (Listianto et al., 2020)

Cryptography comes from Greek, namely crypto and graphia. According to the language, crypto means secret and graphia means writing. According to

terminology, Cryptography is the art of maintaining message security when messages are sent from one place to another. Overall, cryptography can be concluded as the science that studies the scrambling of messages with mathematical calculation functions so that they cannot be read by unauthorized parties. Cryptography is a mathematical study that is related to aspects of information security such as data integrity and data authenticity. In addition, cryptography can also be divided based on the type of key, namely symmetric and asymmetric algorithms. Symmetric algorithms are algorithms that use the same key to perform encryption and decryption, while asymmetric algorithms are algorithms that use different keys to perform encryption and decryption, for encryption using a public key and decryption using a private key. (Azhari et al., 2022).

Android is a mobile operating system. Android does not differentiate between core applications and third-party applications. The Application Programming Interface (API) provided offers access to hardware, as well as mobile data, or the system data itself. Android is a Linux-based mobile device operating system that includes an operating system, middleware, and applications. Some other definitions of Android.

AndroidStudio is an Integrated Development Environment (IDE) for Android application development, based on IntelliJ IDEA. The concept owned by Android Inc. turned out to arouse Google's interest in having it. In August 2005, Android Inc. was finally acquired by Google Inc. all of its shares were bought by Google. Many estimate the purchase value of Android Inc by Google is USD 50 million. at that time many speculated that this acquisition was the first step taken by Google to enter the mobile phone market. So from there many system and software developers competed to create or design Android systems using software that supports Android, and as an example here we introduce Android Studio. In addition to being an IntelliJ code editor and a powerful developer tool, Android Studio offers more features to increase your productivity when creating Android applications.

A database is a collection of data that is neatly organized so that the data can be easily stored and manipulated. We can find the use of databases in everyday life, such as the use of ATM machines, university/school academy systems, sales information systems. One of the purposes of a database is to provide users with an abstract view of the data, namely the system hides.

details of how data is stored and maintained. Database systems should be made as easy to understand as possible because most users of database systems are people who are less trained in technology. (Kadek et al., 2019).

MySQL (My Structure Query Language) is an Open Source database creation program, meaning that everyone can use it and it can be run on all platforms, both Windows and Linux. MySQL is also a networked SQL database management system software so that it can be used for multi-user applications. MySQL is also often known as a relational database management system. A relational database stores data in separate tables. These tables are connected by a defined relationship that allows you to obtain a combination of data from multiple tables in a request. For database administration, such as database creation, table creation, and so on, web-based applications such as PHP MyAdmin with the XAMPP application can be used. (Anwar et al., 2019).

Unified Modeling Language(UML) is a set of modeling conventions used to define or describe a software system related to objects. UML is one of the most reliable tools in the field of object-oriented system development because UML provides a visual modeling language that allows system developers to create a blueprint of their vision in a standard form. UML functions as a bridge in communicating several aspects of the system through the number of graphical elements that can be combined into.

## **II. RESEARCH METHODS**

At this stage, it is carried out by studying the basic theory that supports research, searching and collecting the required data. To collect the required data, the author used several techniques. (1) Direct Observation, namely the researcher makes direct observations at the school to obtain data related to the research, (2) Interview, namely the researcher directly meets face to face with the school principal to obtain more complete data regarding Algorithm Implementation, (3) Sampling, namely the researcher selects data that is available and in accordance with the research, namely the application of previous research and previous research theses to be used as samples in this research.

This research will go through several stages. The stages in this research can be modeled on a Waterfall diagram. There are several stages used in this research:

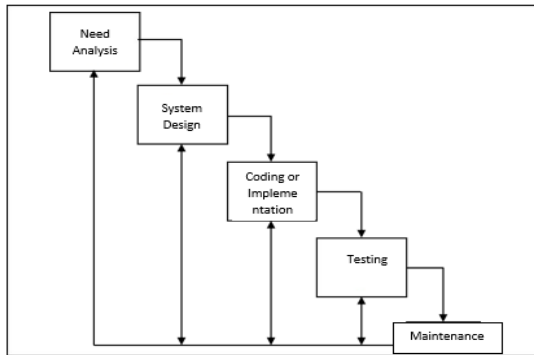


Figure 1. Diagram of Water

### III. RESULT AND ANALYSIS

In this part, we will explain the display of the results of the application that has been created, which is used to clarify the existing displays in the Design of the Student Grade Data Security Application at school in Medan using the Android So that the results of implementation can be seen in accordance with the results of the program that has been created. Below we will explain each display in the program.

#### 3.1 Registration menu View

The registration display is the first display that appears when the program is run. It functions as an input form for the admin username and password.

program. The registration display image can be shown in Figure 2.



Figure 2. Registration Form Display

#### 3.2 Login Menu View

The login display is the first display that appears when the program is run. It functions as an input form for the program admin username and password. The login display image can be shown in Figure 3.



Figure 3. Login Menu View

#### 3.3 Main Form View

FormThe main is the overall cryptographic program interface, where to use this cryptographic application can be done through the main form interface. In the main form there are several menus, namely, the file menu and the program menu. For more details, the main form display can be seen in figure 4.



Figure 4. Login Menu View

### 3.4 Subject Data Form View

FormThis subject is used to display subject data at School. The following is a display of the subject data form which can be seen in Figure III.4 below:

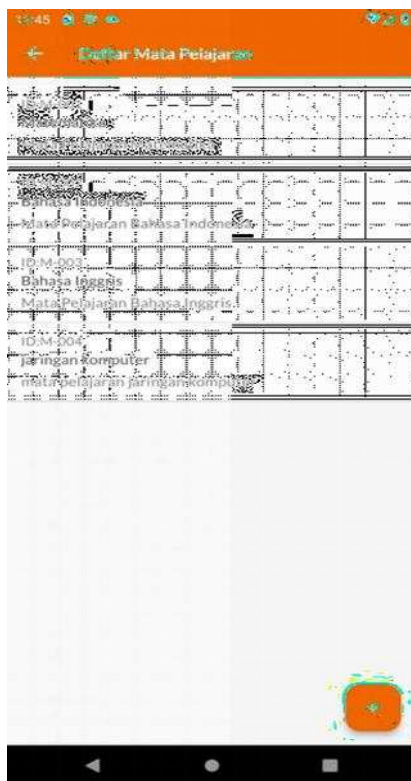


Figure 5. Subject Data Font View

### 3.5 Class Data Form View

FormThis class functions to display class data at School. The following is a display of the class data form which can be seen in Figure 6.

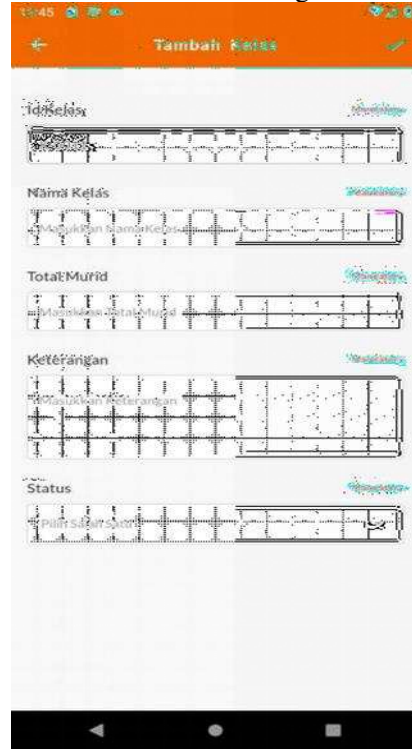


Figure 6. Class Data Font View

### 3.6 Student Data Form View

FormThis student is used to display student data at School. The following is a display of the student data form which can be seen in Figure 7.

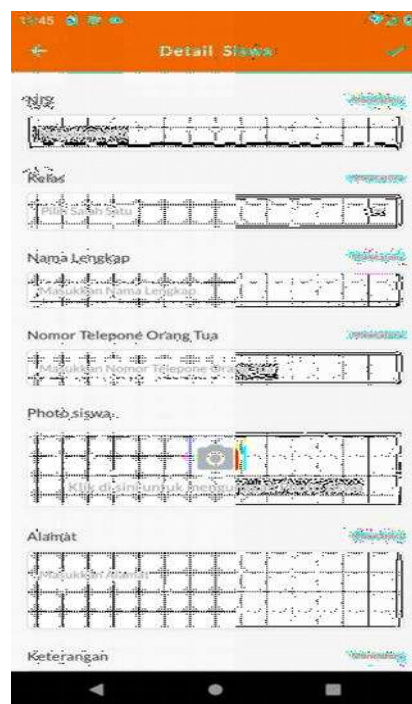


Figure 7. Students Data Font View

## VI. CONCLUSION

Based on the results of the discussion and trials that have been carried out, namely the Design of Student Grade Data Security Applications at School in Medan using the Android-Based RC4 Method, it can be concluded:

1. The application has been built and can maintain the security of student grade data at school with the RC4 method encoding system.
2. The system that has been built is capable of encrypting and decrypting student grades at school so that it can protect student grade data.

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