# File Search in Employee Archives Using Sequential Search Algorithm

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## Article Info

## ABSTRACT

PT. Jaya Nika Permata Group is one of the companies engaged in the Bakery, Café, and Restaurant which has been running for 37 years and is still active until now. Currently based in the city of Pekanbaru, and already has branches in Duri, Dumai, and Batam. With the total number of employees of PT. Jaya Nika Permata Group has approximately 485 employees, of course, the number of employee files that will be archived is quite large and the file types are varied. In addition, the process of searching for employee files at the time of archiving and when files are needed will take a long time considering a large number of employees. Currently, no system can help facilitate the employee's file archiving activities. In this study, field research was conducted to determine the condition of the current file archiving system. Based on the analysis that has been obtained, research is carried out to develop an employee file filing system that is currently running at PT. Jaya Nika Permata. Searching files in employee archives using a sequential search algorithm is expected to facilitate employee file archiving activities and speed up the process of searching for employee files when needed.

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## 1. INTRODUCTION

Information technology is currently growing rapidly and has spread to all lines of human life in the world. Information Technology plays an important role in the company's operational activities. The main role of the use of information technology is to process the efficiency of existing business activities in the company, one of which is that Information Technology can be used to facilitate archiving activities of important company documents. Archiving that utilizes information technology is also called electronic-based archiving [1].

The word archive comes from the Greek word "archium" which means the place to save or "Archeon" which means City Hall meaning a place to store documents about government. UU no. 43 of 2009 concerning Archives, explains that archives are documentation of activities or events packaged in various forms that are made and accepted by state institutions, local governments,

educational institutions, companies, political organizations, community organizations, and individuals in the implementation of social, national and state life [2].

Archives are an important source of information for a company [3]. In addition to having an important function for the company, archives also contain various uses for the company, such as legal value, educational value, financial value, and research value. Because archives have these functions and use values, archives must be managed properly so that when needed they can be available quickly and accurately [4]. According to KBBI Online (2019), archives are written documents (letters, deeds, etc.), oral (speech, lectures, etc.), or pictorial (photos, films, etc.) from the past, stored in written media ( paper), electronics (cassette tapes, video tapes, computer diskettes, and so on), usually issued by an official agency, stored and maintained in a special place for reference. According to Australian Archives in the book Managing Electronics Records, electronic archives are records that are created and maintained as evidence of transactions, activities, and functions of institutions or individuals that are transferred and processed within and between computer systems [5]. According to Odegers (2005: 371), some of the advantages of electronic records management are that they are quickly found and allow the use of archives without leaving the workbench, flexible and easy to modify indexing, full-text search, less likely to lose files, save space, reduce risk. archive damage because it is stored digitally, makes it easier to share archives, increases security, and is easy to recover data [4].

PT. Jaya Nika Permata Group is a company engaged in Bakery, Café, and Restaurant which has been running for 37 years and is still active today. Currently based in Pekanbaru city, and already has branches in Duri, Dumai, and Batam. Employee file filing system at PT. Jaya Nika Permata Group is currently running well, but its implementation is not efficient because it is still manual and conventional. With the total number of employees of PT. Jaya Nika Permata Group has approximately 485 employees consisting of permanent employees, contract employees, and DW (Daily Worker) employees. Of course, the number of employee files to be received and archived is quite large and the file types are varied. In addition, the process of searching for employee files at the time of filing and when files are needed will take a long time considering the number of employees is quite large.

In the archive management information system that will be designed, the author will apply a sequential search algorithm to search for employee files. This system is designed using UML, using the PHP programming language, and using a MySQL Server database for data storage and is based on a website. The advantage that can be felt from this system is that it simplifies the process of archiving employee files, and makes it easier to find employee files when needed by the company. With the problems at PT. Jaya Nika Permata Group, the sequential search algorithm is expected to assist in the process of finding employee files on a web-based archive management information system.

This Sequential Search Algorithm is a search algorithm that is suitable for data search processes such as searching for files on a web-based employee archive. In several studies that have been carried out, this algorithm has succeeded in processing data searches for various purposes, such as searching for letter numbers in electronic archive systems, searching student identity in the assessment of monitoring and evaluating lectures, searching for employee travel application rate data, searching for data on dermatology encyclopedia applications, searching for goods data, searching for data on the puskesmas service system, search for data on language dictionary applications plant science, journalism law data search, search for Wisma BCA's bilyet giro transaction data, and look up data in the neurology term dictionary app.

## 2. RESEARCH METHOD

The research method used by the researcher is as follows ;
  a. Library Research
     By studying journals and theses in the form of online softcopy as a reference to understand the problems related to the research title.
  b. Field Research

The author visited PT. Jaya Nika Permata Group directly to find out the problems that occur and the system that is running.

## 2.1    SDLC (System Development Life Cycle)

The author uses the SDLC (System Development Life Cycle) model as a reference, considering that the SDLC model is a general methodology in the system development cycle and is the preparation of a new system to replace the old system with or improve the existing system [16] [17].

The SDLC methodology or systems development life cycle is the process of creating and modifying systems and the models and methodologies used to develop these systems. The waterfall is a method that is systematic and sequential in designing a system [18]. SDLC is also a pattern taken to develop a software system which consists of the following stages: planning, analysis, design, implementation, testing, and maintenance.
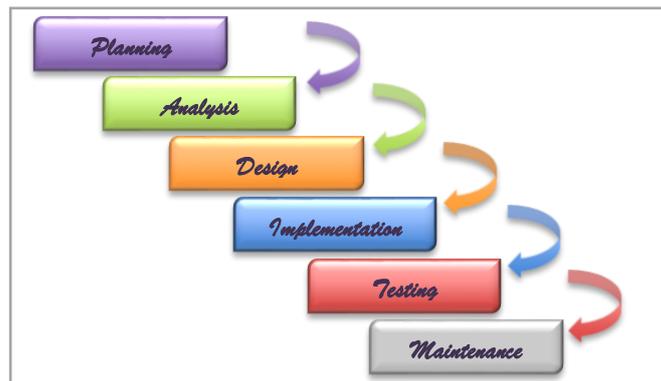


Figure 1. SDLC Method (System Development Life Cycle)

1. Planning
2. At this early stage, the researcher made direct observations to find out the problems and the actual system. After knowing and getting some employee archive data, the researcher could save the data as reference material to proceed to the analysis stage. The data needed include employee data archives that will be implemented in the PHP programming language based on the Website by applying a sequential search algorithm to search for employee archive data.
3. Analysis
4. This stage is used to determine the need for a program to be made and researchers can obtain results from direct observations that have been made. Previously, the system and employee archive data used by the company were still manual, so the employee archive data would be run by the system to assist and facilitate the archiving of employee archives.
5. Design
6. This design process is used to design the interface design on the system to be created and the process of applying the Sequential Search algorithm to be made on the archive management information system.
7. Implementation
8. At this stage, researchers do coding programming in PHP which will be run using a computer and do documentation.
9. Testing
10. At this stage, various tests are carried out related to the new system to determine whether the program is running well and by the provisions of the Sequential Search algorithm.
11. Maintenance
12. Periodic maintenance is carried out after the program is declared running by updating every time there is new information so that the program is not damaged.

## 2.2    Sequential Search Algorithm

The algorithm that will be applied to search employee archive files in this study is the Sequential Search Algorithm. In this system, a search feature will be created using the Sequential Searching algorithm to search for archived employee files, so that when needed, employee files will be easily found in a computerized archive system.

Sequential search is a data search algorithm that is carried out sequentially from beginning to end or from front to back based on the key sought [8]. Sequential Search is the process of comparing each element of the array one by one sequentially starting from the first element until the element being searched for is found or until the last element of the array. The Sequential Search method or so-called sequential search can be used to search for data both on sorted and unsorted arrays [19]. This method is a simple data processing method that can be used to find data.

The process of searching data with this algorithm is quite simple and easy. The data search process is carried out by matching the data that is carried out sequentially one by one starting from the 1st data to the data in the last order. If the data sought has the same value as the data in the data group, it means that the data has been found. If the searched data does not match the data in the data set, the data does not exist in the data set [6].

The process of the Sequential Searching Algorithm is as follows:
1. First, the data are compared one by one sequentially in the data set with the data being searched for until the data is found or not found.
2. This search only repeats data from 1 to the number of data (n).
3. For each repetition, the i-th data is compared with the data being searched for.
4. If the data is the same as what you are looking for, it means that the data has been found. On the other hand, if until the end of the repetition no data is the same as the one you are looking for, it means that no data was found.

There is a variable L, where the variable L is a series containing n pieces of data (L[0], L[1], L[2]...L[n-1]) and the variable k is the data to be searched. The data search process is carried out to find $L[a] = k$ Where a is the index that satisfies the condition $0 \leq k \leq n - 1$ [8]. Details of the Sequential Search Algorithm are described as follows:
1. Variable $a = 0$
2. Variable found = False
3. As long as the value of $L[a]$ is not equal to k and ($a \leq N$) then do row 4
4. If the value of $L[a] = k$ then the variable found = True
     otherwise $a = a+1$
5. If the variable found = True
     a is the index of the data being searched for,
   If not then,
     data not found.

## 3.    RESULTS AND ANALYSIS
## 3.1    Information System Design
### 3.1.1    Use Case Diagram

According to Sukamto and M. Saladin, (2014:155) The use case diagram is modeling for the behavior of the information system to be created, the use case describes an interaction between one or more actors and the information system that will be created [20]. The design of the archive management information system is made based on the depiction in the form of a Use Case diagram. The diagram in question is found in the following figure.
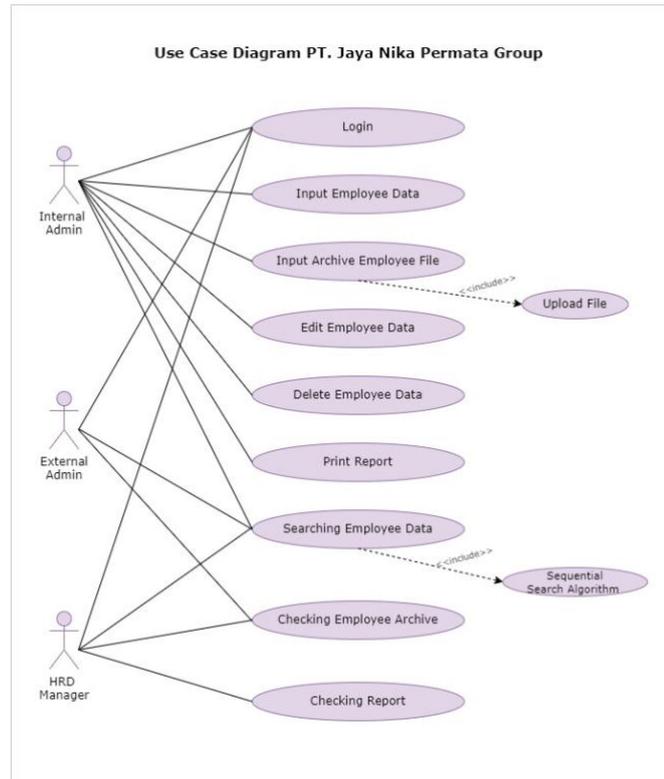
Figure 2. Use Case Diagram

In the use case diagram, internal admins have access to input employee data, input employee archive files, update employee data, delete employee data, print reports and perform searches on employee data. External admins have access to check employee archives and perform searches on employee data. Meanwhile, the HRD Manager has access to check employee archives and reports and perform searches on employee data.

### 3.1.2 Activity Diagram
The Activity Diagram below describes the activities carried out by actors and the system from the start of running the system to the end.

### 3.1.2.1 Internal Admin Activity Diagram
The activity diagram below describes the activities carried out by internal admins when accessing the web. Internal admins are asked to log in first in order to enter the system. In this system, the internal admin can input employee data, input employee archive files, update employee data, delete employee data, print reports and perform searches on employee data. The internal Admin activity diagram can be seen in the image below:
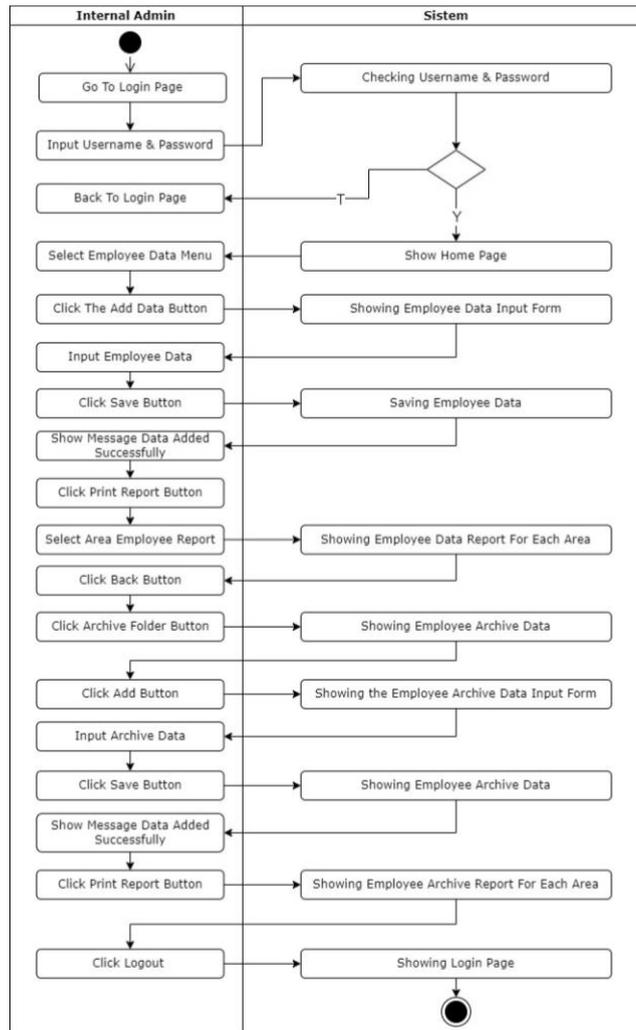
Figure 3. Internal Admin Activity Diagram

### 3.1.2.2 HRD Manager Activity Diagram

The activity diagram below illustrates the activities carried out by the HRD manager when accessing the web. HRD manager is asked to log in first to the system. In this system, the HRD Manager can only access it for the purposes of checking employee archive files and checking reports. Activity diagram Manager can be seen in the image below:
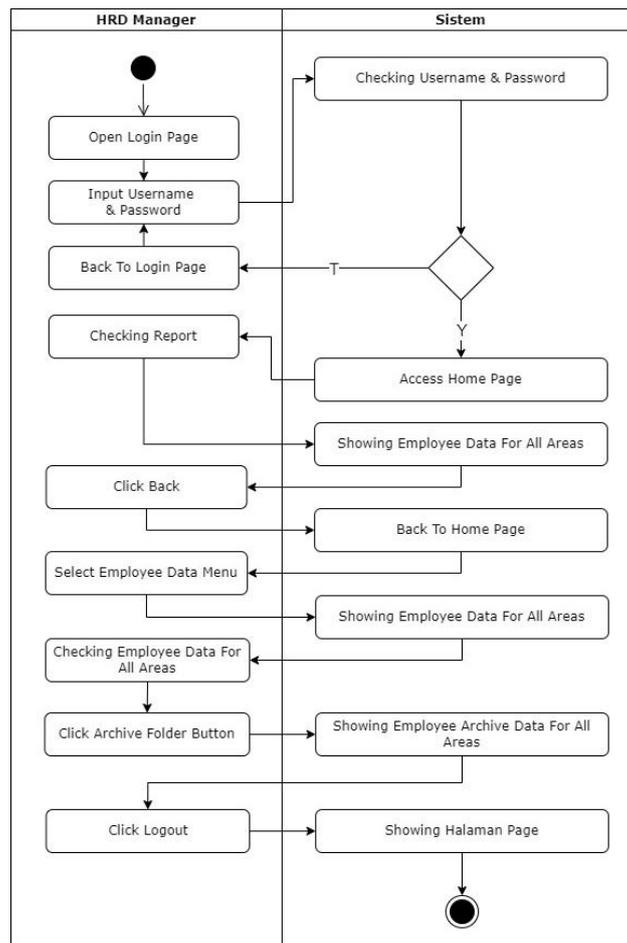
Figure 4. HRD Manager Activity Diagram

### 3.1.3  Sequence Diagram

A sequence Diagram is a description of the interaction between objects inside and outside the system (including users, displays, and so on) in the form of messages that are depicted against time. The sequence diagram below describes the activities of the Internal Admin and HRD Manager in a system that will be built so that the process of running the system can be understood by the Internal Admin and HRD Manager.
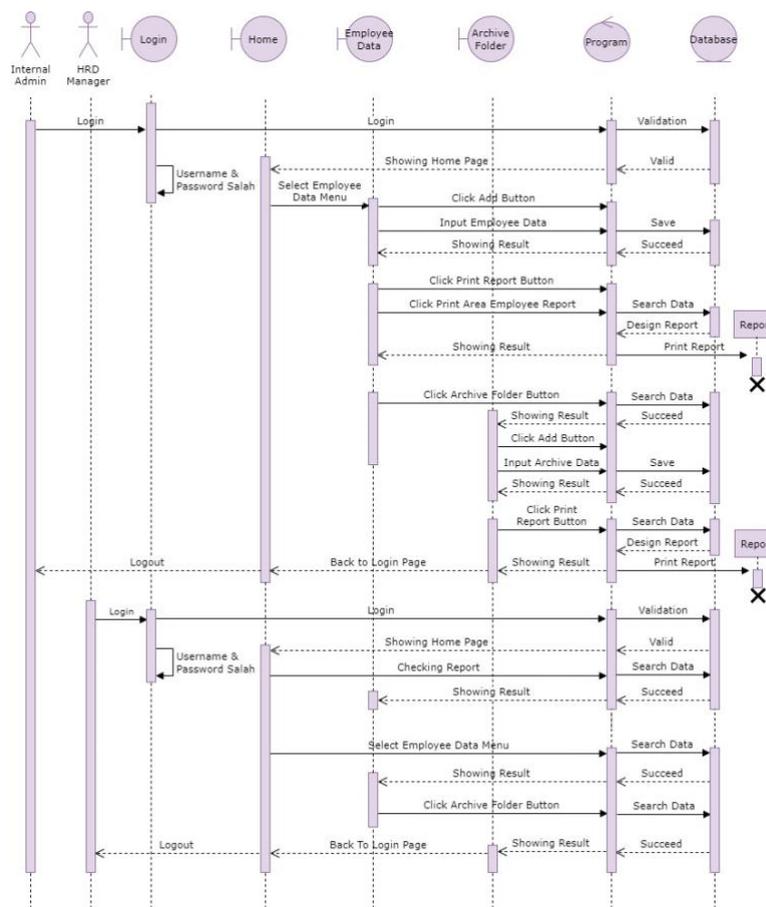
Figure 5. Sequence Diagram

## 3.2 Discussion of the Sequential Search Algorithm

In searching with a sequential search algorithm, the writer uses two data, namely searching employee data with the keyword employee NIK and searching for archive data with the keyword archive type. To describe the flow of the algorithm process, the author takes the example of searching for employee data. The implementation steps are as follows:

1. In the employee data menu, there is a search column to search for employee data based on the keyword employee NIK, where users only need to fill in the search field with the employee NIK they want to find. For example, if you want to find an employee with the NIK "30021100" type the Nik into the search field then click the search button, then the program will process the search by reading the NIK in the database.

2. Then determine the employee NIK you want to find, starting from the first to the last NIK, the employee NIK being sought is compared with each of the data in the table. If the searched NIK is found then the data comparison will be stopped and the searched NIK will be displayed. If the NIK you are looking for is not found, then all data in the table will be compared to completion and the message data not found will appear. This is where the use of the sequential searching method occurs.

Table 1. The Performance of the algorithm process

| 10021102 | 20021100 | **30021100** | 40021100 | Data |
|----------|----------|--------------|----------|-------|
| 0 | 1 | **2** | 3 | Index |

Then the program will process the data to be searched for, for example, employee NIK 30021100 ( i = 30021100 )

Iteration:
30021100 = 10021102 (Not the same ! )
30021100 = 20021100 (Not the same ! )
30021100 = 30021100 ( Same ! )
30021100 = 40021100 (Not the same ! )
Output: Data found at index 2.

3. If the last data is not found in the same Employee NIK in the database, then the search ends and the message data not found will appear.

## 3.3 Algorithm detail explanation

A detailed description of the sequential search algorithm will be described as follows :
Description :
Variable a: index
Variable k: searched keyword
Variable L: a series containing (n) data pieces
Variable n: the amount of data
Variable N: array max

Table 2. The Performance of algorithm detail explanation

| No. | Algorithm Details | Explanation |
|---|---|---|
| 1 | Variable a = 0 | index starts at 0. |
| 2 | Variable found = False | The initial condition of the variable before performing the search is false. |
| 3 | As long as the value of L[a] is not equal to k and ($a \leq N$) then do row 4 | The process of comparing index data with the keywords being searched for with the condition that if the index data does not match the keywords and ($a \leq N$) then the process will continue according to the provisions of number 4 |
| 4 | If the value of L[a]= k then the variable found = True, If not a = a+1 | If the index data being searched for is the same as the keyword then the data has been found. If not, the search process will continue. |
| 5 | If the variable found = True, then a is the index of the searched data. If not, then data is not found. | If the searched keyword is the same as the index data, then the data has been found, If they are not the same, the system will display a message data not found. |

### 3.4 Program Design

**1. Login Form**

Login Form is the first display when the user successfully enters the program. The user will be asked to enter a username and password to be able to access the program features.
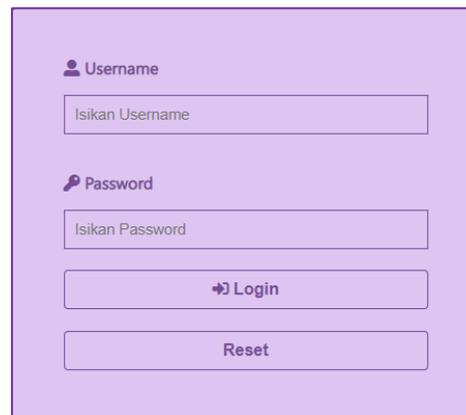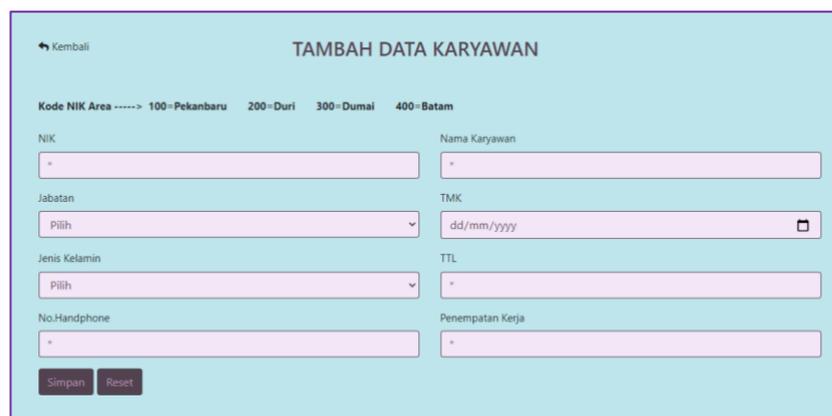


Figure 6. Login Form

**2. Employee Data Input Form**

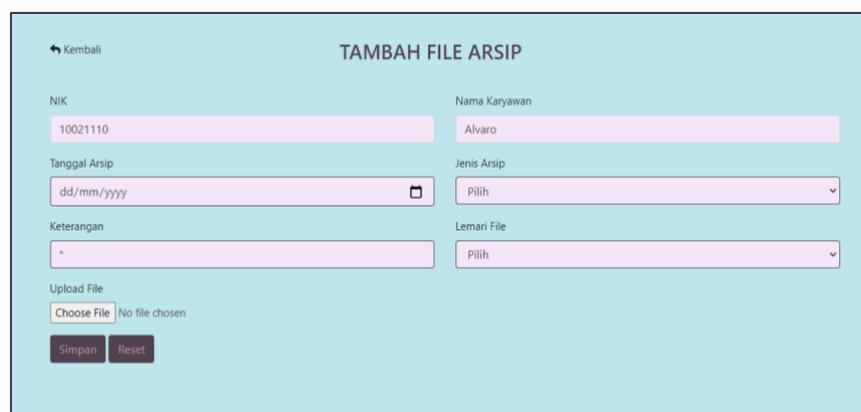An employee data input form is a form used to input data or adds employee data.



Figure 7. Employee Data Input Form

**3. Employee Archive File Input Form**

The employee archive file input form is a form used to input or adds employee archive files.



Figure 8. Employee Archive File Input Form

4.  **Sequential Search Algorithm Process Form**
    A sequential search algorithm process form is a form that is used to perform the search process using a sequential search algorithm. The following is a display of the results of the data search when data is found and when data is not found.



Figure 9. Sequential Search Algorithm Process Form When Data Is Found



Figure 10. Sequential Search Algorithm Process Form When Data Is Not
Found

4.  **CONCLUSION**
    Based on the results of the analysis and discussion of the whole that has been discussed previously, the following conclusions can be drawn:
    1.  With the implementation of the sequential search algorithm, the search for employee NIK in the database for archiving employee files will be easier to find.
    2.  With the existence of a web-based archive management information system, it can help facilitate employee file archiving activities at PT. Jaya Nika Permata to be more effective and time efficient.

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