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editor@thedesignengineering.com

EDITOR IN CHIEF



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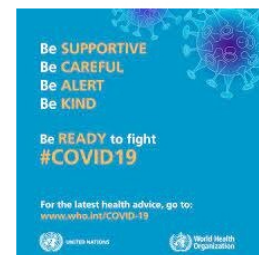
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Application of Binary Searching Algorithm for File Search on Archivering Information Systems

Chamdan Mashuri

Information Systems Study Program, Faculty of Information Technology, Hasyim Asy'ari University, Indonesia

Email: chamdanmashuri@unhasy.ac.id

Ginanjari Setyo Permadi

Manajemen Information Study Program, Faculty of Information Technology, Hasyim Asy'ari Indonesia

Email: Ginanjaripermadi@unhasy.ac.id

Ahmad Heru Mujiyanto

Information Systems Study Program, Faculty of Information Technology, Hasyim Asy'ari University, Indonesia

Email: ahmadmujiyanto@unhasy.ac.id

Hammam Nasruddin

Technical Information Study Program, Faculty of Information Technology, Hasyim Asy'ari University, Indonesia

Email: hammamnasruddin@unhasy.ac.id

Abstract

Archiving files and searching files that are still using manual or not computerized methods. The purpose of this research is to create a website-based filing system that has a file search feature with a fast and accurate time of the many files that have been archived. To find files quickly and accurately from a lot of data, we need an algorithm, the binary searching algorithm. This algorithm is a search algorithm that can search for files in a fast time and has a lighter amount of computing. From the results of testing the search speed using a binary search algorithm, the data search speed test is 100 document archive data, with the name of the data sought is population data. Searching using an algorithm has a time of 148 / ms while searching without using an algorithm is 799 / ms. From testing the search speed using a binary search algorithm this is 95%

Keywords: System, Archiving, Algorithm, Binary Searching, File, Searching

PRELIMINARY

Archiving has a very important value, in addition to being a medium of information, archiving is also one of the evidences that can be justified and able to reduce the risk of loss or damage to files, so an archiving system is needed (Lolong, 2018). The filing system has a fast search system to find a file from the number of files that are archived. This search is carried out aiming to find out whether the file is in the database storage or not (Situmorang, 2017).

Referring to that, a Kedungbetik Village Government institution has difficulty in finding and archiving files that are still not computerized, there are still many files that accumulate, resulting in many risks, one of which is the length of time it takes to search for files in large numbers. Therefore, a binary search algorithm is needed to overcome the search process. The binary search algorithm is one of the search algorithms that is able to perform fast searches with large numbers. This binary search is carried out by reducing the number of

operations comparisons between data that will be searched with the data in the table, by dividing the space .g search is repeated until the file being searched is found, and this algorithm has a smaller or lighter computational load than other search algorithms.

System

System.m a.dalah kum.pul.n from any component, whether physical or non-physical that are interconnected with each other and work together to achieve a goal (Djahir and Pratita, 2015)

Information Systems

An information system is a system that is able to provide information for all levels in real time that is needed in an organization. An information system can be said to be a system that is able to collect information from all sources and use various media to provide information. Information systems can also be interpreted as a system within an organization which is a combination of people, facilities, technology, media, procedures and controls that provide information that has value for decision making (Mashuri et al., 2020).

The simple understanding of information systems is that there must be input, process and output.

Information systems are a way of presenting information that can provide added value. Added value can be obtained in the form of information based on real data that is processed in such a way as to produce something useful for the recipient. One example of the use of information systems as planning, initiating, organizing, controlling activities and presenting information based on data processing. Resulting in information in the form of recommendations that are useful as consideration for final decision making (Prehanto ea al., 2020).

Filing

Filing is the basis of maintaining letters or files, archives contain the process of storing files that are stored and can be returned if the file is needed again (Anisya and Mayang, 2018).

Search

Search is a process in data management. In the search there is a search process that is able to find certain values (data) in a set of data of the same type. In the search process there are many ways to find a desired sata (Yahya, 2015).

Binary Search Algorithm

Binary search algorithm is a method of searching data that has been sorted. In this method, all data elements that have been sorted will be tested s.a.t.u p.ers.atu. to. in.tem.ukan. e.le.me.n ya.ng.ing.ink.an, al.gor.itm.a. time..that's..fast..fast. This Bi.n..ary Search Se.a..rc.h is carried out to...to make...a small number of operations for comparisons between different data .g will be searched with the data that is in the table, by doing the division of the room.g search repeatedly until the date .a that I was looking for was found (Andri, 2019).

I. METHOD

This research aims to assist the process of finding files in a village government institution. An algorithm is needed that can help the file search process from many stored files quickly. Binary search algorithm is an algorithm for searching data that has been sorted. This binary search reduces the number of comparison operations between the data being searched for and the data in the table (Andri, 2019).

The following are the steps of the binary search algorithm process:

1. It is known that the lower limit ($data_low$) = 1 and the upper limit ($data_up$) = N is the number of data that has been sorted.
2. Determine the middle value (mid_point) with the formula: $bottom\ data + (top\ data - bottom\ data) / 2$
3. The results of the middle value data will be compared with the data we are looking for.
4. If it is smaller than the searched data, the search will be repeated but the upper limit is considered the same as the middle position $(upper\ limit - 1) / 2$.
5. If it is greater than the data sought, the search will be repeated but the upper limit is considered the same as the middle position $(lower\ limit + 1) / 2$.
6. If the result of the middle value is the same as the data we are looking for, the iterative search process will be stopped.

This research system design includes, system analysis, system design, design description, system implementation and testing.

a. *Flowchart*

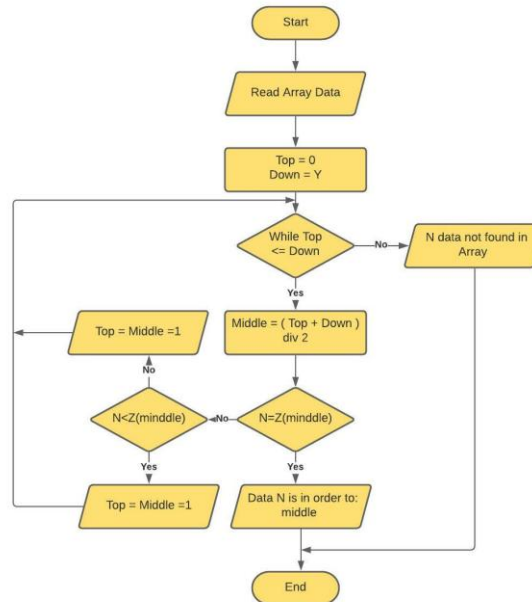


Figure 1 Flowchart Search binary search

The flowchart in the search in this archive system first reads the array data, then the system will look for the middle data, if the middle data results are the data sought, the search will be stopped. If the result of the middle data is not the data you are looking for, the search will continue until the data you are looking for is found.

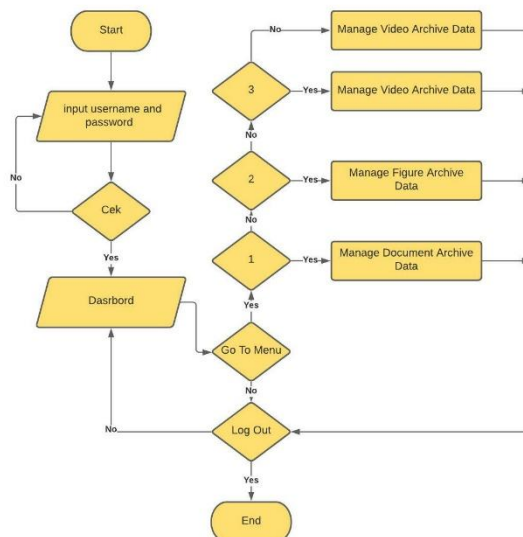


Figure 2 Flowchart of the filing system

The flowchart in the file archiving system, the first admin must enter a username and password in the login menu, after that it will be checked by the system if it is wrong it will log back in, and

if it is correct it will go to the main page, on this page the admin can manage archived data documents, videos, images and file search, processing on this system is in the form of data input, delete data, change data, print data, and search data using binary search algorithms.

I. RESULTS AND DISCUSSION

The results of the thesis research entitled "Application of the Binary Searching Algorithm for Searching Files in the Archiving System" in the results of this study are in the form of a website-based application. The process of searching for files stored in the database applies an algorithm, namely the binary search algorithm so that searches are generated quickly and efficiently. This application is made using the PHP language and uses a MySQL database. The following are the steps for searching the archive file on the filing system.

1. Reading Array Data or original data

Table 1 Original Data

In	No	ID	Name	Month
0	1	24	population data	June
1	2	25	crowd permit	January
2	3	26	sale and purchase letter	August
3	4	27	GDPT 2015	July
4	5	28	BPDT monitoring	July
5	6	29	Kedungbetik village KJS data	February
6	7	30	TOLL SHM data	March
7	8	31	Description of BPKB Collection	April
8	9	32	land ownership certificate	May
9	10	33	Jamkesda statement letter	September
10	11	34	BRI information	October
11	12	35	smart indonesian card data	November
12	13	36	moving introduction	December
13	14	37	Dero pembangunan development LPJ	March
14	15	38	M . Empowerment Cadre	July
15	16	39	PKH recipients	February
16	17	40	Funding Proposal	January
17	18	41	Recipients of food aid	December
18	19	42	TPQ in Kedungbetik Village	May
19	20	43	Letter from the government of Jombang	November

1. Data Sorting

Table 2 Ordering Data

Ind	No	ID	Name	Month
0	1	30	list of SHM toll	March
1	2	35	smart indonesian card data	November
2	3	29	Kedungbetik design KJS data	February
3	4	24	population data	June
4	5	38	Community Empowerment cadres	July
5	6	34	BRI information	October
6	7	31	information on taking BPKB	April
7	8	37	LPJ DERO DEVELOPMENT	March
8	9	28	BPDT monitoring	July

9	10	27	GDPT 2015	July
10	11	41	Food Aid Recipients	December
11	12	39	PKH recipients	February
12	13	36	moving introduction	December
13	14	40	Village Fund Submission Proposal	January
14	15	43	Letter from the Jombang Regency Government	November
15	16	25	crowd permit	January
16	17	26	sale and purchase letter	August
17	18	32	land ownership certificate	May
18	19	33	JAMKESDA statement letter	September
19	20	42	TPQ in Kedungbetik Village	May

The data sought is TPQ data for Kedungbetik Village and the data is in the 20th place. To perform the calculation, the first step is to determine the middle element of the data array:

1. It is known: Initial Data = 0 (list of TOL SHM), Final Data = 19 (TPQ throughout Kedungbetik Village)
2. Determine the middle value $\text{Middle value} = (\text{Initial Data} + \text{Final Data})/2$ Mean value = $(0+19)/2 = 9$ (2015 GDPT)
3. Checking whether the data is "TPQ in Kedungbetik Village" (19) = "PDBT 2015" (9), (false) looping 1
4. middle value < searched data, final data = middle value + 1 = 9+1= 10
5. looping 2 = $(10+19)/2 = 14$
6. Checking whether the data "TPQ in Kedungbetik Village" (19) = "Letter from the Jombang Regency Government" (14), (false).
7. Middle value < searched data, final data = middle value + 1 = 14+1= 15
8. Looping 3 = $(15+19)/2 = 17$
9. Checking whether the data "TPQ Se-Kedungbetik Village" (19) = "Land Ownership Certificate" (17), (false).
10. Middle value < searched data, final data = middle value + 1 = 17+1= 18
11. Looping 4 = $(18+19)/2 = 18$
12. Check whether the data "TPQ Se-Kedungbetik Village" (19) = "JAMKESDA Statement Letter" (18), (false).
13. Middle value < searched data, final data = middle value + 1 = 18+1= 19
14. Looping 4 = $(19+19)/2 = 19$
15. Check whether the data "TPQ for all Kedungbetik Village" (19) = "TPQ for all Kedungbetik Village" (true).
16. Data found, loop stops.

Searching using the binary search algorithm there is a time difference with searching without using an algorithm. The types of test data on this system are document archive data, video archive data with an average file size of 30 to 50 mb, image archives with an average file size of 2 to .6 mb. The results of the difference in comparison time from searching data from each archive between using the binary search algorithm and without using the binary search algorithm are described in table 3.

Table 3 Results Comparison of search speed by time

NO	Archive Type	No Algorithm	Algorithm	Difference
1	Document	799/ms	148/ms	651/ms
2	Videos	181/ms	177/ms	4/ms
3	Picture	558/ms	315/ms	243/ms

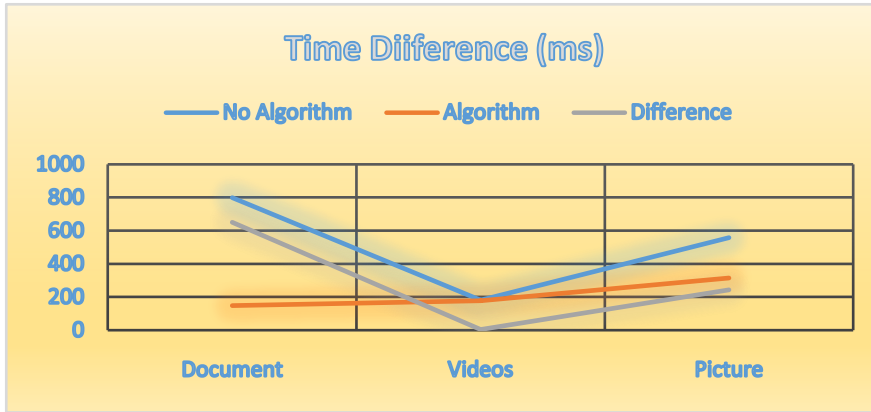


Figure 3 Time Result Dffierence Algorithm

a. The result of the time difference using the binary search algorithm

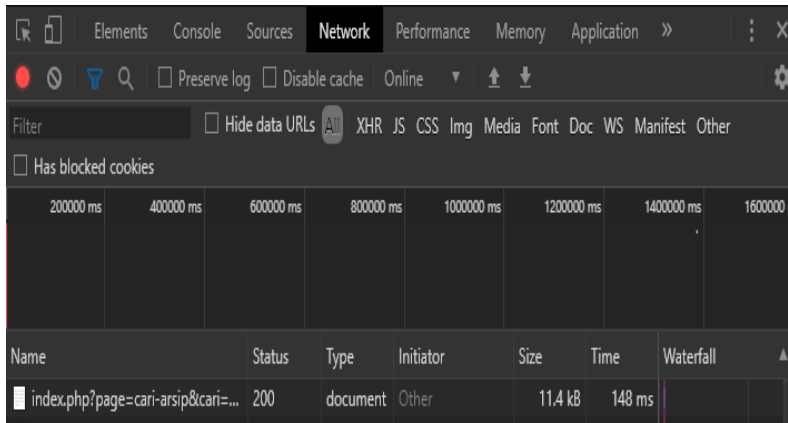


Figure 4 Time Result Using Binary Search Algorithm

The file search speed on an archiving system that uses the binary search algorithm is calculated based on time, in this test using the inspect element and using the network feature to see the speed based on time. The result of this test is 148/ms.

b. The result of the time difference without using an algorithm

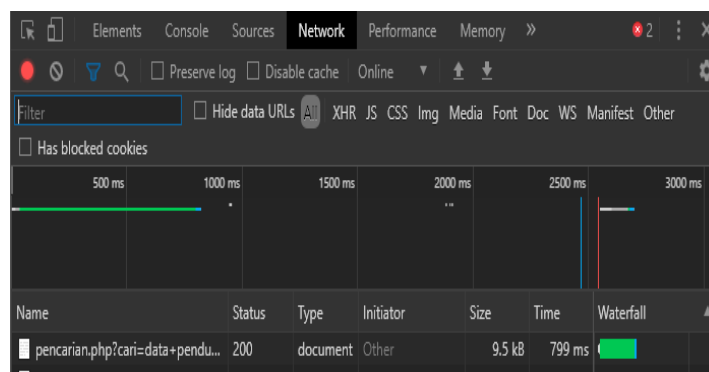


Figure 5 Time Result Without Using Algorithm

The speed of searching files on an archiving system without using a binary search algorithm is calculated based on time, in this test using the inspect element and using the network feature to see the speed based on time. The result of this test is 799/ms.

I. CLOSING

Conclusion

Based on the results of the research, data analysis that has been carried out by the researcher and after passing the implementation stage and testing the system, there are several conclusions that can be concluded that:

1. The application of the binary searching algorithm to search files on the filing system is carried out in the following stages: designing the filing system, designing the database system, retrieving data at the Kedungbetik village government, followed by inputting data on the filing system, searching for data on the system, then the search process using binary search algorithm. The results of the search using the binary search algorithm will display the data sought or not found and the system also displays the results of the looping calculation of the search for the data.
2. The process of testing the performance of the binary searching algorithm for searching files on the archiving system produces a fast and efficient search, to simplify the process of searching for files on this archiving system, it requires that the data must be sorted first, so that the binary searching algorithm technique can be carried out with a very large amount of data. Searching using the binary search algorithm there is a difference in the search time without using the algorithm. The test data on this system is 100 document archive data and the name of the archive being sought is population data. The result of the time difference from searching the data using the algorithm is 148/ms, while the search results without using the algorithm are 799/ms. So the results of the accuracy of the search speed on this filing system that uses the 95% binary search algorithm.

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