

Application Of DIJKSTRA Algorithm For Network Troubleshooting In SMK Telkom Malang

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Abstract—The internet network has become a daily life in the lives of modern people, but it is also very significant in the world of internet network education as in Telkom of Vocational High School (SMK) Malang. In accessing a network, there are unfortunately often obstacles or commonly called network troubleshooting. Network troubleshooting is a series of steps to minimize potential problems one by one before we finally find the source of the problem. To solve network troubleshooting, the author applies the dijkstra algorithm. Searching method in dijkstra algorithm is the method of searching for the shortest route based on the smallest weight from one point to another. By applying the dijkstra algorithm, it is expected to be able to find the shortest route for solving network troubleshooting at Telkom of Vocational High School Malang. The programming language used in making this program is xampp. The type of research used in this study is literature study. The conclusion in making this program is to be able to find the shortest route in solving network troubleshooting at Telkom of Vocational High School Malang.

Keywords—*network troubleshooting, searching method, dijkstra algorithm;*

I. INTRODUCTION

The internet network is known by all of people in this world nowadays. In daily life, internet network has become a necessity regarding in the world of internet network education is also very important indeed as in the case of Telkom of Vocational High School Malang. In a network, there are often unfortunately obstacles or commonly called network troubleshooting[1].

Network troubleshooting is a series of steps to minimize potential problems one by one before we finally find the source of the problem. Basically there are three main steps in troubleshooting wireless networks at school, at home, or in the office, namely isolating problems, troubleshooting problems, and if necessarily contact the right technical support. For this reason, it is necessary to handle quickly the resolution of network troubleshooting, so that knowledge is needed the fastest route to resolve the problem[2].

The number of nearby route search programs can be made with various methods that exist today. Searching

methods are divided into two, namely blind search and heuristic search. One of the heuristic search models is the Dijkstra method. The dijkstra algorithm is a popular algorithm in solving problems related to the problem of finding the shortest route. Therefore, the author makes an application / program that aims to determine the shortest route for solving network troubleshooting at Telkom of Senior High School Malang [3].

II. LITERATURE REVIEW

A. Troubleshooting

Network troubleshooting is a series of steps to minimize potential problems one by one before we finally find the source of the problem (Handson, 2018: 1). Basically there are three main steps in troubleshooting wireless networks at school, at home, or in the office, namely isolating problems, troubleshooting problems, and if necessarily contact the right technical support. Computers connected to the network often encounter interference or damage both in terms of hardware or software. This is due to the large number of computer users connected in a network system [4].

Before doing network troubleshooting, it is necessary to localize or isolate what is actually the main problem. Generally in wireless networks at home or in a small office, there are three layers (layers), namely the internet, modem or router, and computers on the network (Rucci, 2016: 1) [5].

B. Dijkstra Algorithm

The Dijkstra algorithm is one variant of the greedy algorithm, which is one of the popular forms of algorithms in solving problems related to optimization problems simple and straightforward. In accordance with the meaning which literally means greedy or greedy, but not in a negative context [6].

This greedy algorithm merely thinks of the best solution to be taken at each step without thinking of the consequences in the future. In principle, taking what you can get now, and the decisions that have been taken at each step will not be changed again. The point is that this greedy algorithm seeks to select the local optimum value at each step and hopes that this local optimum value leads to the global optimum value (Novandi, 2007: 1) [7]. According to

Noto (2000: 1), the dijkstra method is an algorithm to find the most optimal route. This algorithm is the search for the shortest route and minimum cost, which causes the search area to expand concentrically so that it has weaknesses which are weak efficiency, and long search time when the existing node is so large [8]. According to Fuhao (2009: 2), the weakness of the dijkstra algorithm is that if the number of nodes is very large, it will occupy a lot of CPU memory [9].

The dijkstra algorithm steps according to Noto (2000: 2) as follows : (1) Step 0 - Mark the starting point. (2) Step 1 - Calculate the cost of movement of the movement for movement from the beginning to each node connected to the starting point and mark the node where the value is the smallest. (3) Step 2 - Calculate the cost movement for the movement between the starting point and each node connected to the marked node and mark the node with the smallest value. (4) Step 3 - Repeat step 2 until the destination is marked. The value obtained here is the minimum cost, the movement to the destination. Besides the previous node will be stored in memory when marking a node that allows to get the shortest route to the destination [10].

C. Graph

In Dijkstra's algorithm, nodes are used because Dijkstra's algorithm uses directed graphs to determine the shortest route. Graphs are used to represent discrete objects and relationships between these objects (Chen, 2016) [11].

A graph is an ordered pair (V, E) consisting of a set of objects $V = \{v_1, v_2, \dots, v_n\}$ which is referred to as a point, while E is a finite or empty set that connects a pair of points called dots called edges. E is usually denoted by $E = \{e_1, e_2, \dots, e_n\}$. The side in the graph can be written with $e = \{v_b v_j\}$ [12].

III. RESEACH METHODS

In this research, the methods are designing the website, with the searching algorithm dijkstra method and using the xampp programming language.

A. Kind Of Research

This making program is based on a literature study model from the results of research conducted by previous researchers to be further developed. Literature study according to Sukmadinanata (2009: 172) is the stage in the research conducted to examine literature intensively by exploring concepts or theories that support the creation or development of a product. Literature study activities will also be studied related to product area, technique of making and implementing product results so that they can be used optimally. In software development, literature studies are important as a basis for making or developing software.

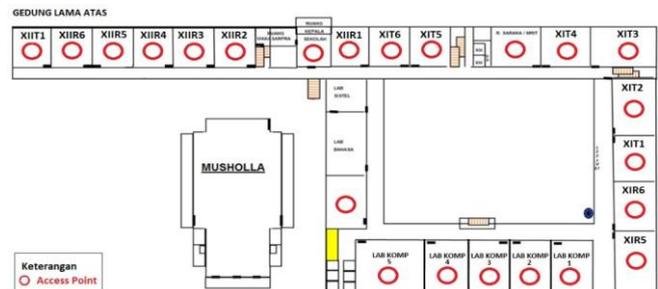
B. Planning

This program is created by applying the searching algorithm dijkstra method and using the xampp programming language. This program is created in order to

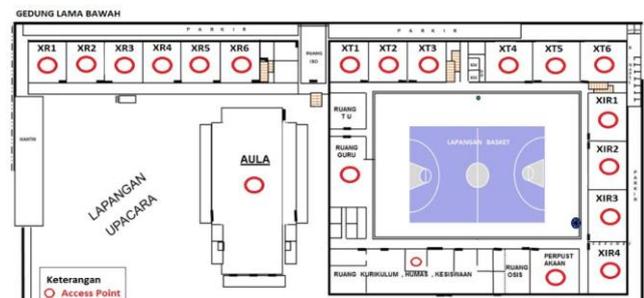
find the shortest or fastest route in overcoming network troubleshooting at Telkom of Vocational High School Malang. This program consists of two types of nodes, the first is the starting node, the starting node is merely done through one point, namely server space or infrastructure and facilities (Sarpras) while the second node is the destination node. This destination node will be input to one of the damaged spaces (trouble shooting), which will then be searched for the closest route from the node starting to the destination node. This program will help you find the closest or the fastest distance to overcome network troubleshooting at Telkom of Vocational High Schools. The purpose of this program is to facilitate the determination of the route or route that will be passed to repair network damage.

C. Mapping

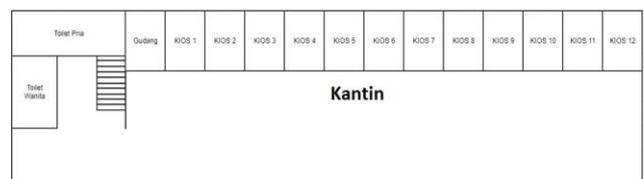
Below is a description of the mapping of the poor Telkom of Vocational High Schools, with information on the server space in the infrastructure space (sarpras) and the access point located in every space that has a red circle and in the new building the access point is only in the classes.



Picture 1. Floor plan for the old building at Telkom of Vocational High School Malang on the first floor



Picture 2. Floor plan for the old building at Telkom of Vocational High School Malang on the second floor



Picture 3. Floor plan for the new building at Telkom of Vocational High School Malang on the first floor.

LANTAI 2



Picture 4. Floor plan for the new building at Telkom of Vocational High School Malang on the second floor.

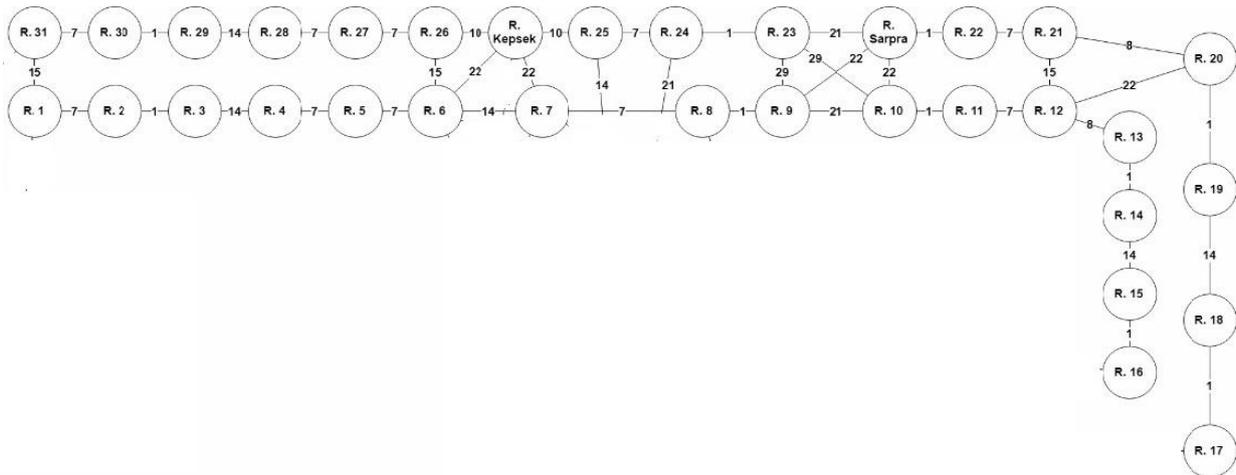
LANTAI 3



Picture 5. Floor plan for the new building at Telkom of Vocational High School Malang on the third floor.

D. Node and Distance

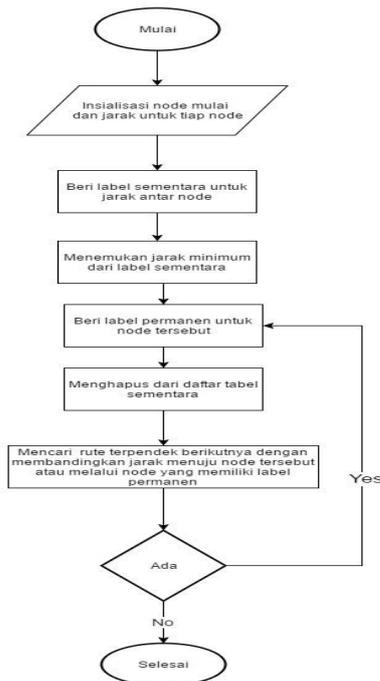
Below is a description of the node and the distance illustrated.



Picture 6. Illustration of node and distance

E. Flowchart

The flowchart of making this program is as follows :



Picture 7. Flowchart Program

F. Algorithm

The algorithms for making this program are as follows :

1. Start
2. Declaring Variables
3. In the initial initialization, the distance values for each position are given
4. Input the destination node (click on the desired destination)
5. In the djikstra function, the shortest path is searched
6. Line output and shortest mileage
7. Finish

IV. EXPERIMENTAL RESULT

A. Description of Darf Products

The product to be created in the form of an xampp application using notepad ++ was developed in the form of a web Djikstra algorithm network troubleshooting. The results of the program will be disclosed.



Picture 13. example of program application

Below is an example of the results of running from the Djistra Algorithm troubleshooting network with the example of the origin of the sarpra space. The goal is Lab. 5 click the search button and it will appear, click the search button, there will be problems that occur in trobleshooting and displaying nodes.



Picture 14. example of program application

Below is an example of the results of running from the Djistra Algorithm troubleshooting network with the example of the origin of the sarpra space. The goal is R. Kurikulum click the search button and it will appear, click the search button, there will be problems that occur in trobleshooting and displaying nodes.



Picture 15. example of program application

Below is an example of the results of running from the Djistra Algorithm troubleshooting network with the example of the origin of the sarpra space. The goal is R. Kepsek click the search button and it will appear, click the search button, there will be problems that occur in trobleshooting and displaying nodes.



Picture 16. example of program application

Below is an example of the results of running from the Djistra Algorithm troubleshooting network with the example of the origin of the sarpra space. The goal is R. 20 click the search button and it will appear, click the search button, there will be problems that occur in trobleshooting and displaying nodes.



Picture 17. example of program application

Optimization Test Results

It is known that the results of the optimization trials in the Djistra Algorithm troubleshooting networks below are as follows:

lintasan	Uji coba ke -	Status	Waktu	Memory pencarian rute	CPU pencarian rute
			Rute (s)		
R. Sarpra, R12	1	C	0,005006	0,176	3
R. Sarpra, R13	2	C	0,004053	0,178	4
R. Sarpra, R20	3	C	0,004053	0,174	4
R. Sarpra, R7	4	C	0,003814	0,177	3
R. Sarpra, R19	5	C	0,004053	0,175	4
R. Sarpra, R25	6	C	0.003099	0,177	3
R. Sarpra, R24	7	C	0,004053	0,175	2

V. CONCLUSION

The dijkstra algorithm is one of the search methods that has a high accuracy value. This is because Dijkstra generates all points to determine the distance traveled. This algorithm can be used as a solution to problems related to finding the shortest route.

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