

CHAPTER 1

INTRODUCTION

1.1 Background

Since the discovery of an algorithm to find and solve the minimum spanning tree or MST problem, cost savings to find the best path by connecting all the points can be done. One of the problems that can be solved with the minimum spanning tree algorithm is, to find the shortest highway path that connect all cities. To be able to find the shortest distance using graph theory, first we have to define which nodes, which are the edges, and which are the length. The city will become the node, the road that connecting between cities will be the edge, and the distance of the connecting road will be the length. The minimum spanning tree algorithm is included in greedy algorithm category, where the algorithm takes an approach to solve the problem by finding a temporary maximum local value at each step.

There are several algorithms that can be used to solve minimum spanning tree problem. The most commonly used algorithms are Kruskal and Prim, even though there are still some MST algorithms that can also be used such as Reverse-Delete and Boruvka. Each algorithm has a different way of working but with the same results in solving MST problem. Because the two algorithm work differently, the speed to find the minimum spanning tree may also be different depending on the number of nodes and edges.

Therefore in this project the author want to discuss about how Reverse-Delete algorithm and Boruvka algorithm work, and then these two algorithm will be compared to find out which algorithms will work faster and more effective in finding minimum spanning tree for constructing shortest highway system. Therefore, the test will be carried out using three sample test. The first sample test will consist of 12 city name and 27 edges. The second sample test will consist of

22 city name and 45 edges, the third sample test will consist of 49 city name and 120 edges, and the fourth one will consist of 31 city name and 60 edges.

1.2 Problem Formulation

There are one questions that will be answered in this project in the conclusion-chapter, namely:

1. Which algorithm will work faster and more effective in finding minimum spanning tree?

1.3 Scope

Limitation in this project is:

- 1 This project will only discuss Reverse-Delete and Boruvka algorithms.
- 2 The result of this program will not be visualized automatically.
- 3 All data used in this study have more edges than the number of nodes. So the speed research only covers graph with more edges than nodes.

1.4 Objective

The purpose of this research is to learn about how the Reverse-Delete algorithm and Boruvka algorithm work, then analyze the comparative results from the two algorithms to find which algorithm will work faster and more effective, so that this project can be used as a medium for learning purpose.