

# CHAPTER I

## INTRODUCTION

### 1.1. Background

When visiting cities, traveler used to find many ways of creating best route to reaching the goal in their mind. Sometimes the route traveler taken, only directed them into another way. Or maybe could detour the traveler from the simpler one. This problem may have been looked simple in life application.

But imagine when traveler needs to visits many cities in one route. This problem usually can be found in salesman work. Salesman needs to visits multiple places in order to deliver something. But because of the time limitation, salesman needs to be efficient in traveling the places in one route. To create route which not make them detour, many study starts to investigate the problems. And so, for this problem are named Traveling Salesman Problem.

Traveling Salesman Problem (TSP) are problems that needs to be solved by finding the shortest route. Where TSP requirements must visits each places only once and returns to their starting place. The results of investigating the TSP found that some algorithms really gives good solution. But unfortunately, still not quite optimal solution yet.

These problems become more appealed when there is multiple route option more than normal people can calculate in their mind. It leads to confusion for the salesman to choose the best option between the routes. Because many factors needs to be calculated, such as shortest route and minimum cost required. So, this project are discuss and helps to solve this Traveling Salesman Problem.

A\* (A-star) and Genetic algorithm will be provided in order to solve this problem. Which will be using tree graph data structure for A\* and array list for Genetic algorithm. These two algorithms are chosen because it's well-known of solving and providing optimal solution in TSP.

## 1.2. Scope

The scope for the project are as follows:

1. Finding the shortest route will not focuses on highway and traveling mode. It's just focuses on distance and pathway.
2. Available cities that can be visited are only around Semarang city.
3. Programs are integrated with Google Maps to get real distance of TSP.
4. Two algorithms consists of A\* and Genetic algorithm.
5. Algorithm process will calculates optimal route in Java Swing version.
6. Data structures are consists of data received from Google Maps Direction.
7. Genetic algorithms will be used tournament selection, single-point crossover, and swap mutation for their process.

## 1.3. Objective

The purpose for this project must be able to calculate the shortest route with best performance of distance and time. And the purpose is to compare which is the better algorithm between A\* or Genetic algorithm that gives more optimal solution for TSP. And also the reason why the algorithm are better than the other one.