

## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1. Data collection

Data will be collected from 'Dinas Lingkungan Hidup Kota Tangerang'. This data provide the data of temporary waste location with 212 data. Those data will then be collected for this research. The information that will be taken is the coordinates of the locations.

#### 3.2. Data pre-processing

From the 'Dinas Lingkungan Hidup Kota Tangerang' the location and also the coordinates of each TPS can be found. From this, a node representing each TPS can be made. While the data collected also contained some additional information such as the address of each TPS, the districts and also the wards, those component will not be used further in this research.

#### 3.3. Implementation

The implementation in this step requires multiple processes. Before initializing the first step there will be a process of fitness evaluation, the drainage system that doesn't seem fit for the process will be eliminated. The first step is selection, selection is the process where from the initial population, parents will be selected, this has the purpose to randomly pair up the most fit individuals with other parents.

Next step is crossover, crossover operator is applied to create better strings, the function of this step is to make clones of good strings but does not create new ones. Crossover will create offstrings, this is done by taking the bits from the one parent and another parent, after the process of selection has already happened. After that there will be mutation, mutation subjects the strings to mutation. It facilitates a change in genes within a chromosome. This step guarantees the search algorithm will not be trapped on a local optimum.

#### 3.4. Evaluation

After the data has been processed, a path of each TPS of Tangerang's can be viewed. Evaluating the data has the purpose to determine the optimization of genetic algorithms in the

waste transport route. A comparison will be conducted between the route from the result of genetic algorithm and also the original route based on the number of TPS registered, genetic algorithm will also be compared with another optimization algorithm which is Brute Force, to see which produce the more optimum result. The length of each pipeline will be calculated and that length will determine if genetic algorithm gives a more optimal length or not.

