CHAPTER I
INTRODUCTION

I.1 Research Background

Wastes is a residual material from human activities that has no use, therefore this waste must be managed. Without good and correct management, waste can cause complications which leads to flooding, increase climate warming, releases foul odour, destroy pristine environment, worsen environmental sanitation and increase the threat of various diseases. The city of Jakarta population growth increased by 1.49% per year in 2011, and modern lifestyles also increased the volume of waste generated by the people of Jakarta. According to data from the East Jakarta Sanitation Service in 2012, each person in Jakarta produces 0.741 kg per day (East Jakarta Sanitation Office, 2013). Landfills in East Jakarta come from 10 sub-districts, including waste that is not picked up every day from 7 sub-districts, namely: (Matraman District 16.76 tons/day, Jatinegara 14.53 tons/day, Pasar Rebo 59.06 tons/day, Cakung 207.7 tons/day, Duren Sawit 137.98 tons/day, Ciracas 31.46 tons/day, Cipayung 77.27 tons/day) (East Jakarta Cleanliness Department, 2011). Wastes that accumulate if it is managed will be a blessing, on the other hand if it is not managed it can cause problems.

Organic waste comes from the remains of living organisms, for example leftover vegetables and fruits that are thrown away. Meanwhile, non-organic waste does not come from living organisms and is the result of human intervention. For example, waste plastic bottles, cardboard, plastic food packaging, and so on.

I.2 Research Question

1. How to design and implement an effective and accurate garbage can detect different waste?
2. How does the sensor differentiate organic and non-organic waste?

I.3 Research Objective and Benefits

The result of this final project is the design of organic and non-organic waste detection devices.

The objectives of this final project are:

1. Make a garbage can with sensor that could detect different waste.
2. Design the garbage can and where to put the sensors at.

The benefits of this final project are:

1. Informs us if there are different kinds of waste in a specific garbage can.
2. Segregation of waste which leads to more recycling and less waste goes to landfill.
3. As a reference for student who want to continue research related to the topic

I.4 Problem Limitations

Problem limitation in the design of this device include:

1. The use of inductive sensor LJ12A3-4-Z/BX to detect metal materials.
2. The use of capacitive sensor LJC18A3-B-Z/AX to detect non-organic materials.
3. The use of ultrasonic sensor HCSR-04 to detect all materials.
4. The use of servo motor MG996R to emplace different types of waste to the correct bin.
5. The use of Arduino Uno for the microcontroller.
6. The use of 12V/2A adaptor for the power supply of the device.
7. The use of step-down transformer LM2596 to lower the voltage from the power supply.
8. The maximum dimension of waste is 15cm x 10cm x 20cm.
9. The maximum weight is 500gram.

I.5 Research Methods

The research methods used in the implementation of this proposal are as follows:

1. Study Of Literature

   Understand the concept of all the sensors that is needed and different types of waste with information from the internet, journals, books as well as discussions with my thesis advisers.

2. Planning

   Perform design and modelling on the entire system to produce an outcome that will satisfy the author.

3. Device Testing

   Tests and simulations will be carried out periodically as well as continuously to achieve the objectives of system design.

4. Problem Analysis

   Analyse problems based on testing and observations on the designed system.