CHAPTER 3
RESEARCH METHODOLOGY

1. Literature Study

The first step in this research is to test 2 important sensors in this tool. The ultrasonic sensor helps get data in the form of the height of the garbage on this tool and the load sensor will help in measuring the weight of the existing garbage. All journals included are references that are very helpful in introducing object detection sensors and make it easier for us as researchers to get ideas for testing data and selecting algorithms.

2. Review Topic

This project is the creation of a tool in the form of a trash can that has several features to help deal with waste management in a place. To test the ability of this tool, testing is carried out in 3 ways. The first is to test the accuracy of the ultrasonic sensor in measuring the height of the garbage. The second is to test the accuracy of the weight sensor in measuring the weight of the waste. The last one is to test the comparison of manual and fuzzy fuzzy calculations on Arduino.

3. Program design

Create a code program to detect object movements from humans so that the trash can opens by itself. The program can also monitor the level of waste fullness with the help of fuzzy logic. The fuzzy logic here helps in categorizing the fullness of this bin. Combining weight sensors and ultrasonic sensors into this algorithm serves to provide only one category of output.

4. Coding

This program uses C++ as a programming language to implement pre-processing and detects objects in order to move around them. The algorithm used in this program is a fuzzy algorithm that determines 1 decision in 3 categories.

5. Implementation and Analyze

This project uses 3 types of tests. The first is to test the accuracy of the ultrasonic sensor in measuring the height of the garbage. The test uses 15 kinds of objects with different heights. The second is to test the accuracy of the weight sensor in measuring the weight of the

waste. The test uses 15 kinds of objects with different weights. The last is to test the comparison of manual and fuzzy calculations on Arduino. This test uses 15 items of known height and weight.

6. Conclusion

So the conclusion of this final project is to prove that Fuzzy logic is right in helping perfect this tool so that it can function with the main goal of helping improve waste management in an area.