

## CHAPTER III

### RESEARCH METHODOLOGY

The steps undertaken to complete this project are:

#### 3.1. Study of Algorithm

The first step to build this project is to find and study the entire algorithm used to complete the project. The algorithm that is required is histogram, pattern recognition, euclidean distance and coefficient correlation.

#### 3.2. Design

The first step, process the image scans and detect the location of the money on image, then crop the image of the money only. After getting the image of money, resize the image to get the same size of the input image and database image. Then, run the histogram calculation to find out the value of the image. Histogram calculation process obtained from the RGB values of each image of money. The data obtained from the calculation of the histogram are stored in the form data array. After that, calculate the similarity of histogram with euclidean distance formula. Next, the application will extract specific patterns by cutting some of the images which are characteristic of a particular pattern of money. After getting a specific pattern of money, application will run the mean filtering to reduce a noise of the image. After that, image segmentation is processed to isolate a foreground image with a background image with thresholding the ways. After the image has patterns in segmentation, edge detection process is done to be able to figure out the pattern from the image edge, after edge pattern is detected, then the pattern will be stored value in the variable data. After that, the process of counting the coefficient of correlation is done to know the nominal currencies based on existing data matching.

### 3.3. Implementation and Testing

Programs created using the Java programming language. The main display of the application using the GUI. The purpose of the creation of a GUI to ease the user in using the application introduction of nominal currency. In this project, There is 20 images test of nominal money. Testing of an image have variant in position in scan image, vertical or horizontal image and some tilt images scan.

