# CHAPTER 3
# RESEARCH METHODOLOGY

## 3.1 Study Literature

This is the first step to conduct this project. In this step some journals collected to gain more information about Steganography. The journals discuss about methods like Least Significant Bit (LSB), Linear Congruential Generator (LCG), Conversion decimal to binary and binary to decimal, Encryption Decryption, Exclusive Or (XOR) logic gate, Spread Spectrum and Peak Signal to Noise Ratio (PSNR).

## 3.2 Collecting Sample

This project will be used 100 images obtained from the internet with various color with same resolution. This project use png type file because png has lossless compression format, so the value of Red, Green, Blue (RGB) will not change when it processed using Spread Spectrum method. When the program force to use lossy compression format like jpg, the program will extract different data because of the compression, so the data can't be decrypt correctly.

## 3.3 Applying Method

This step starts with design the system using flowchart. The flowchart is used as a guideline to make the program using Java language on Netbeans IDE. After the program successfully created, every functions will be testing to make sure the program run correctly. This program has 2 functions. Those are Embedding and Extraction. Embedding is a process to embed message into the

image, while an Extraction is a process to extract the hidden message from the stegano image.

## 3.4 Testing

The program will be examine with 2 tests in this project. The first test is examine the program with 4 different messages. The messages that used have different length. The program will embed 4 different messages into 100 sample images. The sample images have same resolution to generalize the result. The parameter that used to calculate the image quality is Peak Signal to Noise Ratio (PSNR). The second test is examine the program with 3 different keys. The program will embed a message into 10 sample images. The sample images used same key to encrypt it. After that examine the stego images with 3 different keys. The result of this test to find out whether the wrong keys can decrypt the hidden message correctly.

## 3.5 Report

The first report is focus on analyze the image quality of stego images. This project used Peak Signal to Noise Ratio (PSNR) to calculate the image quality. After getting the PSNR value of each images, we can determine whether the character length has effect to quality of images.

The second report is focus on the analyze the key. The stego images that examined will be analyze whether another keys can decrypt the hidden message correctly. After getting the result of examined, we can determine whether the Spread Spectrum method is safe or not.