CHAPTER 3
RESEARCH METHODOLOGY

3.1 Preparing the devices.

The devices which is needed to be prepared in this project are Arduino UNO as microcontroller and Ethernet shield W5100 to connecting the microcontroller into internet. LAN cable used to make Ethernet shield connected to internet. Arduino can do watering in two ways. One of which is from sensor readings. Those sensor are soil moisture sensor, humidity and temperature sensor, water flow sensor. Another device are servo which will make pipe turning up and turning down. LCD also needed in this project to display the value of humidity and temperature in room from humidity and temperature sensor. Relay is also used to turn on and turn off aquarium liquid filter. The last one is cable jumper, which is used to connect all sensor and another device to Arduino.

3.2 Examine and learn how to use the Sensor and searching the IoT server.

After preparing the devices, the next step is to examine and learn how to use a soil moisture sensor, water flow sensor, ethernet shield, and servo. First step, put soil moisture sensor on the ground for a day. The next step is trying a water flow sensor and store the data into the IoT Server (cayenne.mydevices.com). After all devices are examine and go well, the next step is to create a program to complete the project.
3.3 Building The project

The steps above show how to build this project:

1. Connected the soil moisture sensor, servo, and 3 LED, humidity and temperature sensor to Arduino microcontroller.

2. Put soil moisture sensor in the ground to get data about moisture of the soil.

3. Soil moisture sensor will give data about the moisture of the soil. If it’s dry the relay status will be HIGH, and aquarium liquid filter will get the power supply for pumping water in water containers, so that water can flow in pipes and pipe will turn down and watering the plants. If the soil become very moist, the relay status will be LOW, aquarium liquid filter will not get the power supply and pumping water will be stop and the servo turn the pipe 90°, so the hole in the pipe will facing up, and So that the remaining water in the pipe will not flow out again.

4. After all sensor worked correctly, Arduino and all sensors began connected to Ethernet Shield. So it can send data about how much water that used to watering and temperature of the box to Cayenne IoT Server.