

Test Plan E-Garden System

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SOFTWARE TEST PLAN

The software part of the project consists of a web app and a server database to store the information acquired from the sensors. The web app is the interface between user and the system, thus the UI must be simple and easy to use. The web app has three main web pages, which are the login page, the homepage, and the history data page. The three web pages are individual pages with the login page linked to the homepage and the homepage linked to the history data page. All three web pages manage communication to the database through separate python scripts. Therefore, the three pages will be tested as individual parts for the following tasks:

- Successfully decodes and stores the JSON file sent by the controller.
- The correct soil temperature and moisture level are displayed on the homepage.
- The soil temperature and moisture level are renewed every time a JSON from controller is received by the web app.
- Pressing the “Auto Water” button enables the check function to check the moisture level every time a JSON is received from the controller.
- If the moisture level is lower than the threshold, a JSON is sent to the controller.
- Pressing the “Water Plant Now!” button sends a JSON to the controller.

The integrated system will be tested after the individual components test has completed. This test will mainly focus on the communication between different parts of the project to make sure the integration is successful. A system test will be done to test the complete functionality of the system. Power consumption of the system is measured during power consumption test. Last but not least, a stress test is performed to ensure the reliability of the system

HARDWARE-FIRMWARE INTEGRATION

- YL-69 sensor collects the soil moisture successfully.

- DHT11 sensor collects the temperature sensor successfully.
- After successfully collecting the moisture and temperature data, the sensors can send the data to the Arduino UNO successfully.
- The unit tests will be conducted by connect sensors to Aduino Uno independently to check if desired output is obtained for specified input, and the output will be observed from COM monitor in Arduino IDE, and the input such as temperature and humidity will be collected from environment and use thermometer and hygrometer

Component Name	Test Plan	Results
YL-69 Humidity Sensor	Collect sample data of humidity at SFU campus at 6:00AM, 2:00PM and 2:00AM from both YL-69 and hydrometer	The error between data from YL-69 and hydrometer should not exceed 10%
DHT11 Temperature Sensor	Collect sample data of temperature at SFU campus at 6:00AM, 2:00PM and 2:00AM from both DHT11 and thermometer	The error between data from DHT11 and thermometer should not exceed 10%
Servo Motor	With Servo library from Arduino community, observe and record position data	The error between present position in Arduino program and the actual position should not exceed 10%
Bluetooth Module	With Bluetooth 4.0 library from Arduino community,	

SYSTEM INTEGRATION

- The web app displays the right temperature and soil moisture level acquired from sensors.
- The auto-watering function is watering the plant if soil the moisture level drops below the threshold when the controller sends the plant information to the web app

- Pressing the “Water Plant Now!” button on the web app will make the watering system work immediately.

Test case	Test method	Test result
Turn autowatering on when outside condition is satisfied	<ul style="list-style-type: none"> • Check if water is released by servo motor. • Use measuring cup to contain water released 	Water is supposed to be released, and the error between realised water amount and pre-set water amount should not exceed 20%
Click “water plant now” when outside condition is satisfied	<ul style="list-style-type: none"> • Check if water is released by servo motor. • If water released, Use measuring cup to contain released water 	Water is supposed to be released, and the error between realised water amount and pre-set water amount should not exceed 20%
Click “autowatering on” when outside condition is not satisfied	<ul style="list-style-type: none"> • Check if water is released by servo motor. • If water released, Use measuring cup to contain released water 	Water is not supposed to be released, and the error between realised water amount and pre-set water amount should not exceed 20%
Click “water plant now” when outside condition is not satisfied	<ul style="list-style-type: none"> • Check if water is released by servo motor. • If water released, Use measuring cup to contain released water 	Water is supposed to be released, and the error between realised water amount and pre-set water amount should not exceed 20%