**User Guide for Secret Garden**

(Please use Java 8 to implement this system)

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**GUI Explanation:**

The GUI was designed to be concise and user-friendly. There is a menu bar on the top of window with two menus on it.

When clicking, the left menu “Check Garden Status” should show three drop-down menu items, which are “Check Current Setting”, “Check Crop List” and “Check Log”.

When clicking, the right menu “Change Setting” should show three sections. There are two menu items in the first section: “Set Temperature” and “Turn on/off Air Conditioner”. Two Menu items in the second section: “Set Irrigation” and “Turn on/off Irrigation”. And one menu item in the third section shows “Turn on/off Nutrient”.

**Instruction for Each Button:**

Check Current Setting - User can keep track of current temperature, water content, nutrient status and the on/off switches status of heater and irrigation systems.

Check Crop List - User can keep track of current crops in the field, and also the price and quantity for each kind of crops. The list can be re-ranked by crop name, price or quantity. User may add or delete crops by using the input area at the bottom.

Check Log - User can keep track of the events happened in the garden by going through the log, such as irrigation/heating schedule, setting changes, random accidents, etc. Basically everything happened in the garden will be logged into system.

Set Temperature – User would be able to check and set the maximum and minimum temperature setting of air conditioner system in garden. The input should be between 20-80 ºC to avoid frozen or fire.

Turn on/off Air Conditioner - User may choose to turn on or turn off the air conditioner. When it is off, the temperature will be stable around 20 ºC since that is the temperature of outside environment as assumed.

Set Irrigation - User would be able to check and set the maximum and minimum water content setting of irrigation system in garden. The input should be between 20-80% to avoid soil drying out.

Turn on/off Irrigation - User may choose to turn on or turn off the irrigation system. When it is off, the water content can drop down to 0-2% gradually. And the soil could be totally dried out.

Turn on/off Nutrient - User may choose to turn on or turn off the nutrient supply system. The nutrient can be ran out occasionally, but when the supply system is on, it will be refilled automatically.

**Random Events:**

Five random events may or may not happen in Secret Garden for every 5 minutes (5 hours in the real world). Once happening, an alert window should be popped up and notify the user what is going on right now. User may close or ignore it since the gardening system will handle those events automatically. And the popup window will be disappeared after 15 seconds. Five events listed as below:

Nutrient out: nutrient is ran out. By checking current status, user will see that nutrient is off. But it will become “ON” after a while, unless user manually turns it off by changing the setting.

On Fire: garden is on fire. The temperature climbs up to 100 ºC and water content drops to 0%.

Frozen Weather: temperature drops to 0 ºC.

Raining Today: water content climbs up to 100%. Irrigation system will be off automatically until it drops down to normal level.

Pest Attack: plants are under attack by pests. Pesticide will be spraying in the garden.

**Environment Simulation:**

Once the Secret Garden starts to run, several settings will be initialized such as current temperature, current water content, max and min values for heating and watering systems. And there are five crops in the garden already, which are also showing on the list if user checks on GUI.

The outside temperature was assumed to be 20ºC. The temperature in garden drops 1ºC per 30 seconds (per 30 minutes in reality) until 20ºC because of the thermal difference between natural environment and the garden. Air conditioner will sense the temperature per 10 seconds (10 minutes in reality). Once it drops below minimum setting, it will start working to heat up the garden, and stop once the temperature reaches the maximum setting so that the temperature in the garden should be always between min and max.

Water content was assumed to be 0% without raining. It drops 3% per 30 seconds (per 30 minutes in reality) until 0-2% because of the water absorption by plants. Irrigation system will sense the water content per 10 seconds (10 minutes in reality). Once it drops below minimum setting, it will start spraying water to reach the maximum setting so that the water content in garden should be always between min and max.

The Secret Garden system should be able to run for 30 hours (30 days in reality), and automatically shuts down after 30 hours.

**How to check the log:**

Assume the application will be ran in Linux system. Pleasego to “Home directory”, then the logs can be found in the folder named “garden”.

Or run “open $HOME/garden/logs/garden.log” in terminal.

**References:**

The images showing on GUI were from Google Image Search.

GUI designing with JavaFX was learned from some online sources like StackOverFlow and GitHub, but no specific code was copied directly.

The link was provided below for the most of learning process:

<https://github.com/buckyroberts/Source-Code-from-Tutorials/tree/master/JavaFX>

<https://www.youtube.com/watch?v=FLkOX4Eez6o&list=PL6gx4Cwl9DGBzfXLWLSYVy8EbTdpGbUIG>

http://stackoverflow.com/questions/14126975/joptionpane-without-button