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### **Eng224 assignment**

Abuad has hired me to help ease their trouble during times of dry season to help them design a smart machine which will help them water and nurture their crops to ensure they have plenty for their community and members of Abuad.

The machine I am designing will be able to distribute water all around the farm to ensure the soil is kept moist with nutrients and not dehydrated due to the atmospheric conditions. This can only work with sensors to

1. Check the temperature of the soil ie. whether hot and needs water or if the soil has enough moisture content
2. A maintenance check to alarm when the device lacks oil, water, power etc.

#### Important specs to be included:

A graphical user interface, biometric interface, tensiometer, thermo-sensor. The source code for the program will all be written in C++ due to its simplicity and easy access for maintenance and debugging.

## Develop the software

- Developing an algorithm or flowchart
- Writing and implementation of the source code
- Modifying the program to fit the specs of the sensors
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- Running the program and testing for bugs
- Final implementation of the software into the machine

## 2. Hardware and software features

### A. Software:

Security operations; This helps to protect the software from virus and detect malware with the aid of an anti-virus and scanner management tools used to protect the system from unauthorized users

Input/output operations; control the input and output delivery and operations in and out of the software

A graphical user interface; This is a user friendly interface created for the user to provide a platform in which the user will see what tasks they want to perform, monitor different aspects of the system for maintenance.

Radio frequency identification; This system used for automatic identification and capture, it will allow the software keep track of the progress and store already taken data

Hardware:

1. Water tank; This is where water will be stored and distributed through pipes. Continuous water will be pumped into it from a borehole. The sprinkler will dispense the water on the soil.

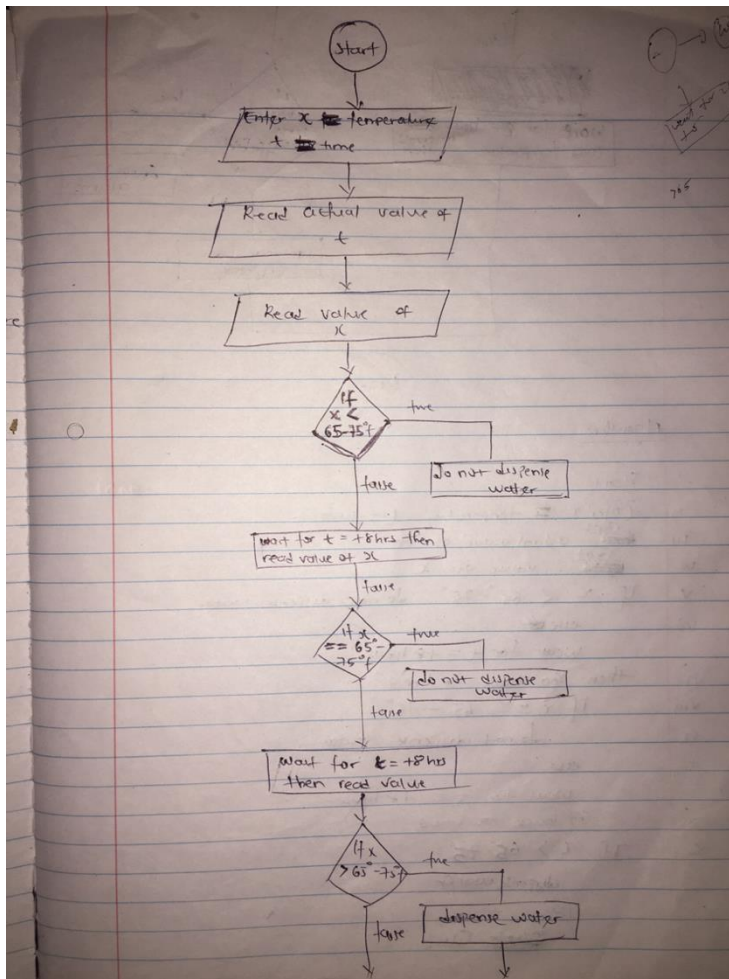
2. This is to alert the system user on any issue on the machines safety, individual safety, soil or crops. This safety will flash different colors for different problems, eg for oil, it will show red for oil , green for water and yellow for power with the aid of a sound system to voice out the alarm.

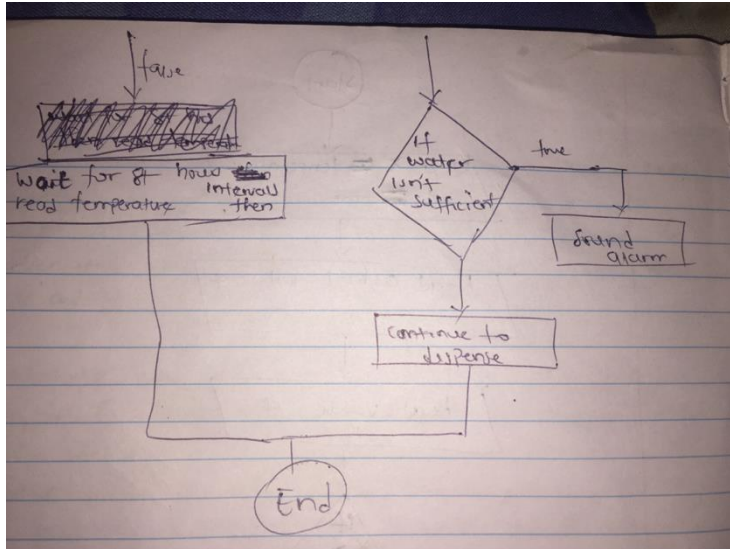
Thermometer; used to measure the temperature of the soil in order for the sprinkler to take action if it's hot

Tensiometer; This will measure and determine the matric water potential (soil moisture tension) of the soil.

Timer(clock system); a digital clock will be displayed which will show the last time machine was in use with duration, count the number of hours needed for the machine to dispense water and last time maintenance was done on it.

### 1. Flow chart (pictorial diagrammatic representation)





Algorithm:

1. Start
2. Enter  $x$  = temperature,  $t$  = time,  $p$  = power
3. Check whether  $p$  is sufficient
4. If  $p$  is not sufficient, sound alarm
5. Else  $p$  is sufficient.
6. Get value of  $x$
7. If  $x < 65 - 75$  degrees Fahrenheit, do not dispense water
8. Else wait for  $t == t+8$  hours
9. Then go back to line 6
10. If  $x == 65 - 75$  degrees Fahrenheit, do not dispense water
11. Else wait for  $t == t+8$  hours
12. Then go back to line 6
13. If  $x > 65 - 75$  degrees Fahrenheit, dispense water
14. Else
15. Quit

Top-down design approach

