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Department: Civil Engineering

Course code: ENG 224

Course Title: Structured Computer Programming

1. Software Development Cycle

Conceptualization

Irrigation System Application

The aim of the application is

1. For it to aid the irrigation of the farmland, especially during the dry season.
2. Read the temperature of the soil
3. Determine the moisture content of the soil
4. Water the farmland based on the temperature and moisture content of the soil
5. Trigger an alarm to alert personnel of water shortage
6. A password system will also be included in the application in case there is need to change the settings of the system.

Specification

This involves all the will hardware and software components that which will be required in order for the program to run properly. These components include;

1. Hardware components: Sensors, irrigation system, alarm, water tank
2. Software components: programming language, GUI, password system, timer

Design

An algorithm / flowchart will be used to represent and show the sequences of steps with the conditions needed in using and running the program

Step 1: Start

Step 2: Enter password

Step 3: Set time interval

Step 4: Temperature, moisture content, Water level = 0

Step 5: Read water level, temperature, moisture content

Step 5: If (Temperature > 32 C)

Turn on irrigation system till temperature = 18 C

Step 6: If (moisture content < 60)

Turn on irrigation system till moisture content = 80

Step 7: if (water in tank runs out)

turn on alert system

Step 8: Stop

Implementation

This involves all the codes required in creating the application

Testing & Debugging

After the code has been written and the application has been developed, several tests will be carried out on the code to detect and fix errors present in it and to ensure that the program runs adequately to the satisfaction of the programmers

Release & Update

After the application has been tested and debugged, and the program is running smoothly. The application will be released to the general public for use as it will be updated constantly based on feedback to ensure it provides better service to the users

2)

Hardware components:

Sensors: This will be used in detecting changes in the temperature, humidity conditions, weather, moisture content of the soil and water levels

Irrigation system: This involves all the pipes, tubes, sprinklers and other equipment used in supplying water to the farmland.

Water tank: The water being used by the irrigation system is stored here.

Alarm system: This is used in notifying the farmers of the shortage of water in the tank.

Software components:

GUI: This is used in allowing the users to interact with the program

Timer: This is used in measuring the amount of time that has passed.

Programming language: The programming language is responsible in writing the code used in the development and running of the software application.

Password system: This is used to ensure that unauthorized personnel do not alter or tamper with the application. The password system is included here

3)

Algorithm

Step 1: Start

Step 2: Enter password

Step 3: Set time interval

Step 4: Temperature, moisture content, Water level = 0

Step 5: Read water level, temperature, moisture content

Step 5: If (Temperature > 32 C)

Turn on irrigation system till temperature = 18 C

Step 6: If (moisture content < 60)

Turn on irrigation system till moisture content = 80

Step 7: if (water in tank runs out)

turn on alert system

Step 8: Stop

Flowchart

If (Temperature > 32 C)

Read water level, temperature, moisture content

Temperature, moisture content, Water level = 0

Set time interval

Enter password

Turn on irrigation system till temperature = 18 C

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Turn on sound system

If (water in tank runs out)

Turn on irrigation system till moisture = 80

If (moisture content < 60)

4) Bottom up approach

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Functions

GUI

Application

Control

Update