

NAME: FIDUDUSOLA FISEYE SAMUEL

MATRIC. NO.: 18/ENG06/023

**DEPARTMENT: MECHANICAL
ENGINEERING**

COURSE TITLE: ENG 224

CONCEPTUALISATION

A fully automated irrigation system that reads the temperature, determine the moisture content of a soil. Under certain harsh condition unfavourable for the plants, sprinklers are activated depending on the temperature and moisture for certain intervals, for which the system reads the temperature and moisture content of the soil to ensure the soil permits and is very favourable for plant growth, solving the problem of dry soil, thereby reducing soil acidity, which is very favourable for plant growth.

For security reasons the system needs to be protected from unwanted individuals. To achieve this the system will be secured with a password by Knox.

It will be designed to show the water level, therefore, alerting the operator when the water level is low.

SPECIFICATION

- ✓ Ability to read soil temperature
- ✓ Ability to read moisture content of soil
- ✓ Alarm system
- ✓ Secured with Knox
- ✓ Sends bug report to the developers
- ✓ Timer
- ✓ Database management
- ✓ Wireless transmission

DESIGN

- A submersible thermocouple is used to read the soil temperature, this will read the soil temperature without interference from the sun, thereby giving accurate, since it is buried in the soil.
- A soil moisture sensor is submerged in the soil to read the moisture content of the soil.
- Since the alarm system uses very small current which cannot affect humans, a circuit is created by which has a floatable conductor with a chain connected to the bottom, if the water rises the conductor follow suit, therefore, if the water level is low the conductor falls in line with the circuit, completing it, the alarm is activated

The submersible thermocouple and soil moisture sensor are connected to a transmitter connected to a receiver via electromagnetic waves, since we do not want wires lying around the farm, so that farm machines can be used without damaging any wire.

The receiver decodes the data and sends it to the database, which displays the data.

An ideal soil for planting must have a maximum temperature of 32°C. At 28°C, the system activates the sprinklers for 600seconds, after which, it stops.

IMPLEMENTATION:

The system will be designed using C language for efficiency and ease, considering the fact that a lot of people have vast knowledge of the language. This will allow for ready availability of people who can maintain the system.

TESTING AND DEBUGGING

The system has been built to perfection and can only be tested on site, to ascertain full proof working condition. The system will be installed by professional in corporation with software engineers and tested on site. In case of any others bugs, the system will require the operator to send a bug report.

RELEASE AND UPDATE

Updates which will be constant improvements, will be sent regularly after release. The updates can be done over a cellular or Wi-Fi network.

2. HARDWARE AND SOFTWARE COMPONENTS

HARDWARE COMPONENTS

The hardware components will be toggled using the written programs, as explained in the design. The hardware consists of

- ❖ Submersible Thermocouple
- ❖ Soil moisture sensor
- ❖ Transmitter and receiver
- ❖ Remote computer system
- ❖ Alarm system
- ❖ Sprinklers
- ❖ Pipes to supply water to the sprinklers
- ❖ Tanks

SOFTWARE COMPONENTS:

The software component will ensure smooth running of the system, how it will be controlled, as explained in the design. The software consists of

- ❖ Knox security
- ❖ Database
- ❖ Timer

Algorithm

Start

Read password

If

 Password= 0000

 Continue

Else

 Display “wrong password”

Read soil temperature from database(scan)

If

 Temperature $\geq 28^{\circ}\text{C}$

 Activate sprinklers for 600seconds

 Print “sprinklers activated”

Else

 Print “End process”

Read moisture content

If

 It is not up to the set amount

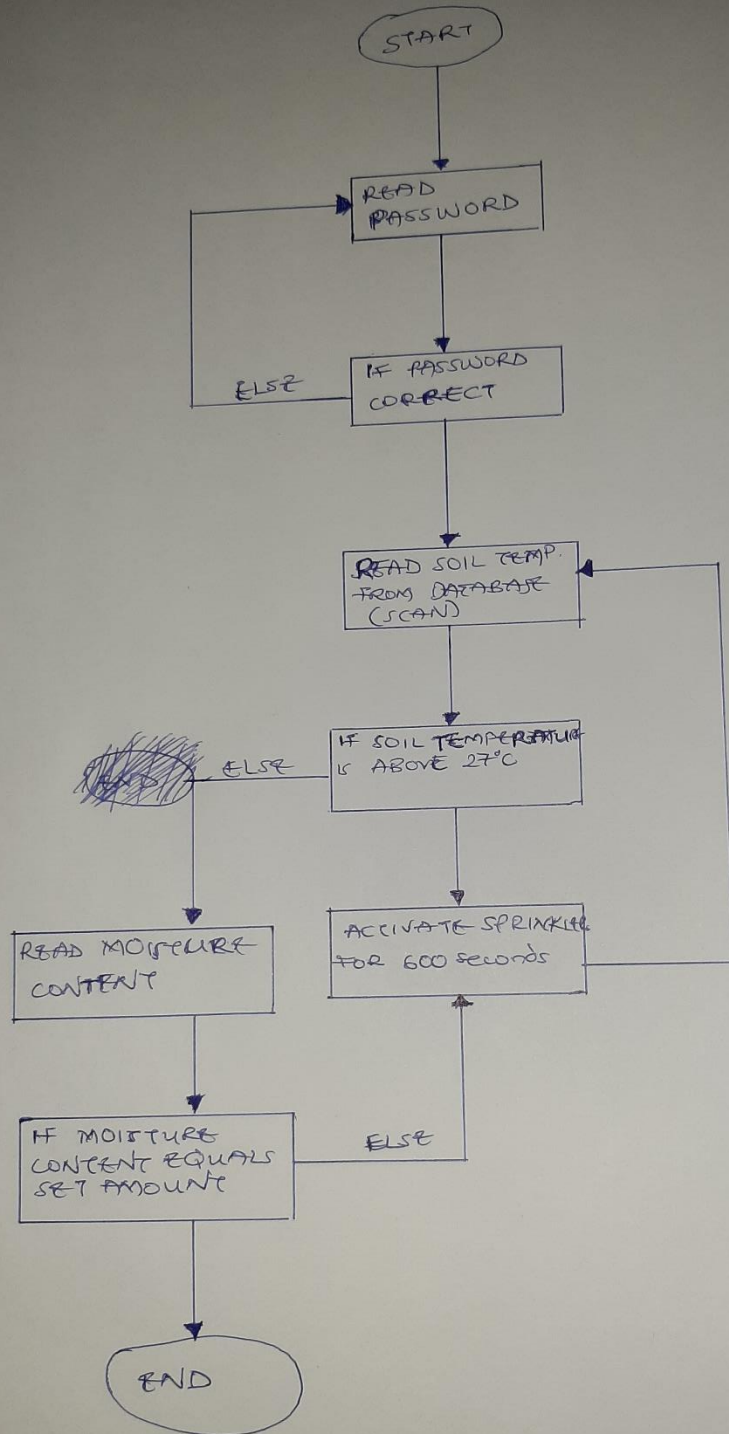
 Activate sprinklers

Else

End

- ✚ Since the alarm system is designed to alert the operator without sending information to the computer, it will not be involved in the software design. The water pump will be operated manually considering the efficiency of the circuit breakers involved.

FLOWCHART



TOP TO DOWN APPROACH

