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Aeronautical and Astronautical Engineering

Classwork 2

Conceptualization

This software is designed specifically for the dry season. The dry season runs from around November to March with an average temperature of 37 degrees celsius during the day. This high temperature affects the temperature of the soil. Ekiti is located at the south-western region of Nigeria so during dry season the average rainfall is about 0.2 inches, which is very low meaning the moisture of the soil would be low as well. This software is meant to integrate with the machine to irrigate the soil after proper detection of dry season using soil temperature and soil moisture data.

Specifications

The software is a password enabled and it's aim is to automate the irrigation process of the ABUAF farm during the dry season. The machine would have in-built soil thermometer and tensiometer the machine would read the temperature of the soil and if it is greater than 35 degrees celsius it shows the soil is hot but this does not prove that it is dry season next the machine would measure the soil moisture as a percentage of water ratio to soil ratio and if it shows a result of less than 30% it shows the soil has a low water ratio the machine compares the two results. If the soil temperature is greater than 35 degree celsius and the soil moisture is less than 30% the machine irrigates the soil while irrigating the machine measures the soil temperature until it becomes less than 35 degree celsius and greater than 30% respectively it stops.

Design

This stage involves the development of algorithm and flowchart to understand the program flow.

Implementation

C++ would be used to program the software.

Testing and debugging

After the program is built it would run and tested for any logical errors and debugged if any is found.

Release and Update

The program would be integrated with the machines hardware to see if it performs the required tasks. But with time as development occurs the program would be updated.

Hardware and Software Used

Hardware used

The machine would have in-built soil thermometer and soil tensiometer a water pump, water pipes.

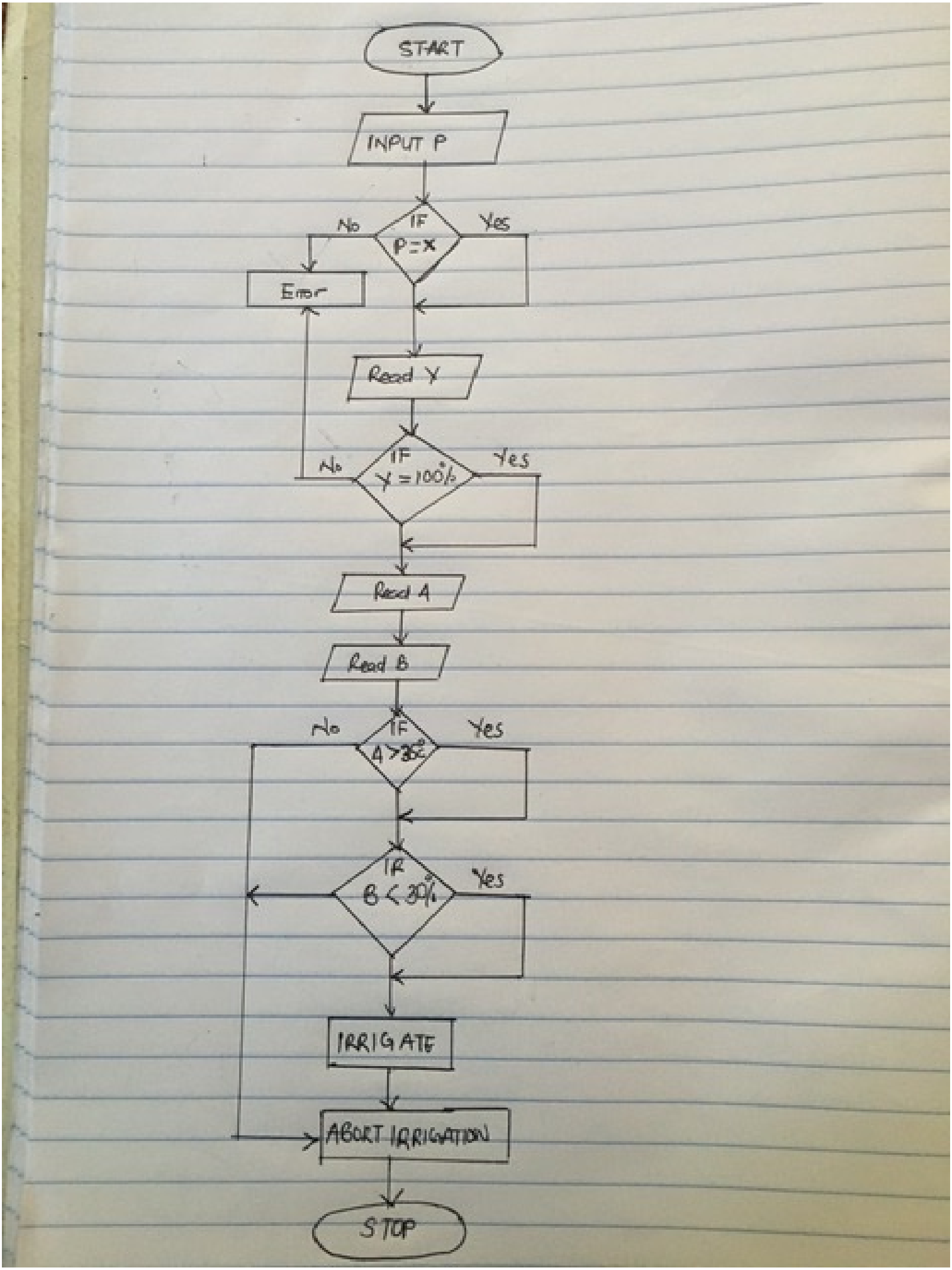
Software used

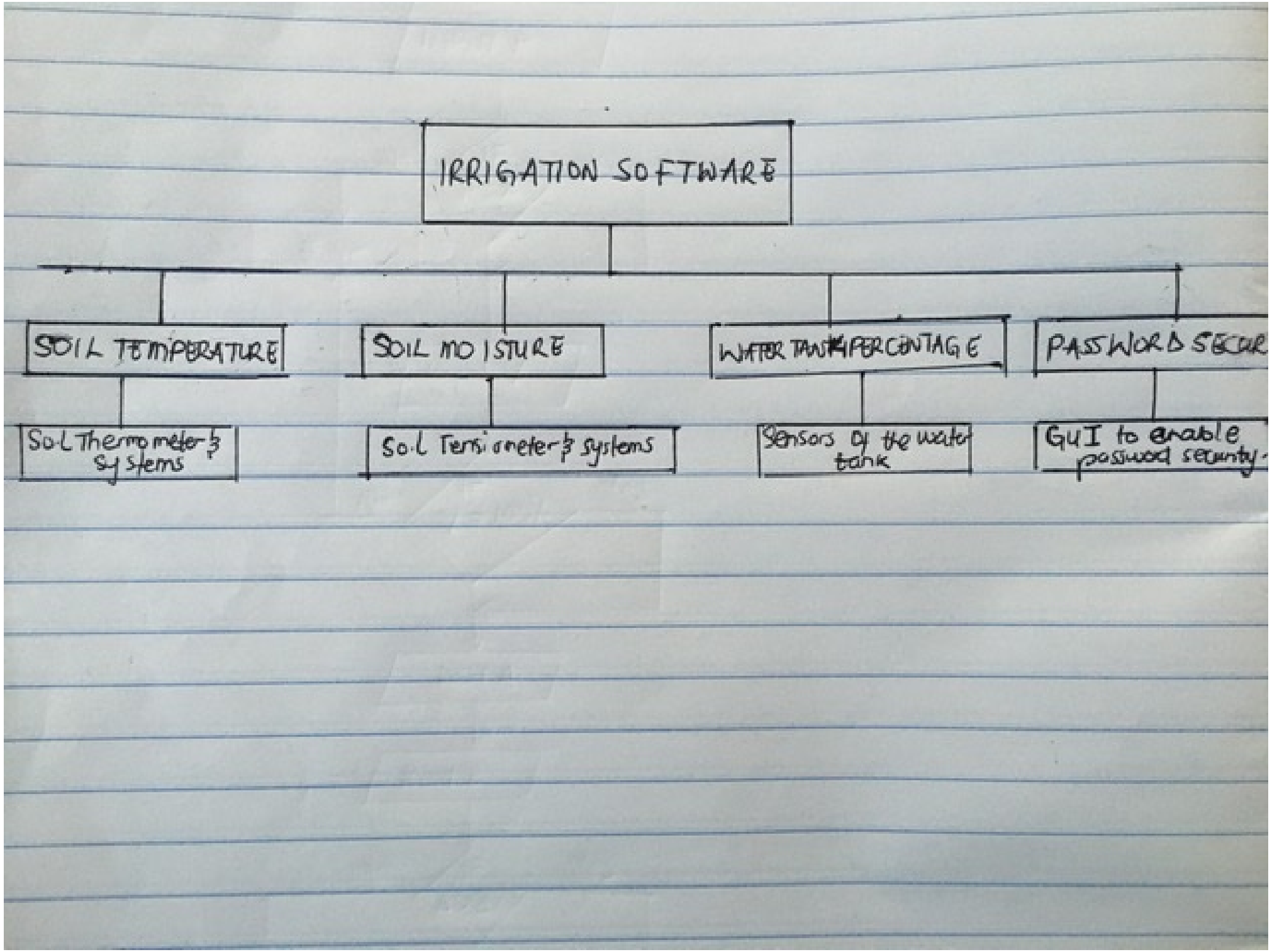
There would be a digital display system which would allow a user input a password to activate the machine. The digital display system would show the temperature and moisture of the soil at all times and also the amount of water in the tank.

Algorithm and Flowchart

Start
Input P
If P=Saved Password(X)
Read Y=Water level in percentage
Else Error
If Y=100%
Read A=Soil Temperature
Read B=Soil Moisture
If A >35 degrees celsius
While A> 35 degrees celsius
If B <30%
Irrigate
Else
If A<35 degrees celsius
While A<35 degree celsius
If B> 30%
Abort Irrigation
Else
Error
Stop

Flowchart


START
INPUT P
IF
P=X
No
Yes
Error
Read Y
IF
Y = 100%
No
Yes
Read A
Read B
IF
A > 35°
No
Yes
IF
B < 30%
Yes
IRRIGATE
ABORT IRRIGATION
STOP


IRRIGATION SOFTWARE
SOIL TEMPERATURE
SOIL MOISTURE
WATER TANK PERCENTAGE
PASSWORD SECUR
Soil Thermometer systems
Soil Tensiometer systems
Sensors of the water tank
GUI to enable password security