NAME: TOWURU JESUTOFUNMI NISSI

MATRIC NUMBER: 18/ENG02/095

DEPARTMENT: COMPUTER ENGINEERING

COURSE CODE/TITLE: ENG 224: STRUCTURED COMPUTER PROGRAMMING

1. The name of my software is **autofarm.** This software interacts with the machine and the machine is able to read the temperature of the soil, determine the moisture content of the soil, configure time interval for the water system based on the above, trigger an alarm if there is no sufficient water in the tank for the irrigation and the system would have an enabled password. The auto software in turn will help Abuad farm in irrigation of the farm during the dry season.
   My software follows the software development cycle which is as follows
   - Planning
   - Analysis
   - Design
   - Implementation
   - Testing and integration
   - Maintenance

My designing and monitoring of the system is as follows. I designed a gsm based automatic irrigation system. It is implemented by using a gsm technology and also it is password enabled. We are using soil moisture sensor which is used to sense the moisture level in the soil to know whether it is dry or wet. The moisture sensor is interfaced with the microcontroller. The input data signals from the moisture sensor are sent to the microcontroller and based on that it activates the DC Motor and switches the motor on with the help of a motor driver. After the soil gets wet, the Motor gets switched off automatically. The system will also determine the moisture content of the soil, configure time interval for the water system based on the above, and trigger an alarm if there is no sufficient water in the tank for the irrigation

Thus, the irrigation motor can be controlled by using a mobile and a GSM modem.

The gsm auto system will be given access to this data recorded and the farmer would then analyse the information given by the system. He would check for any irregularities in the information received. In the case of an irregularity the farmer would be alarmed in order to help contain the circumstances, if there isn't any situation or a case of irregularity, the system will continue to monitor the soil.
A gsm device would be used to access the soil information
How the system would work would thereby be given by an algorithm and flowchart.
Codes for the software would be written using suitable programming software.
The software would then be tested and errors would be checked for and corrected if found.
The software has been tested, error checked and it can now be used

2).Hardware and software features

Hardware features:

- Soil moisture sensor
- An LCD display to show the moisture percentage and pump status
- A relay module which used to control the on and off switch of the water pump
- water pump

Software features:

- A coding system/ coding program that is used to execute the steps and also bring it to an end.
- Smart scheduling: Create scheduling for auto irrigation
- Notifications: get notification for water leaks, delayed schedules etc.
- Weather and soil monitoring: monitor the weather and soil
- Dashboard: Helps the Abuad farmer view information about the weather, water usage, scheduled irrigations, leaks etc. basically information about the system

3). Support your answer with a flowchart and an algorithm.

Flowchart
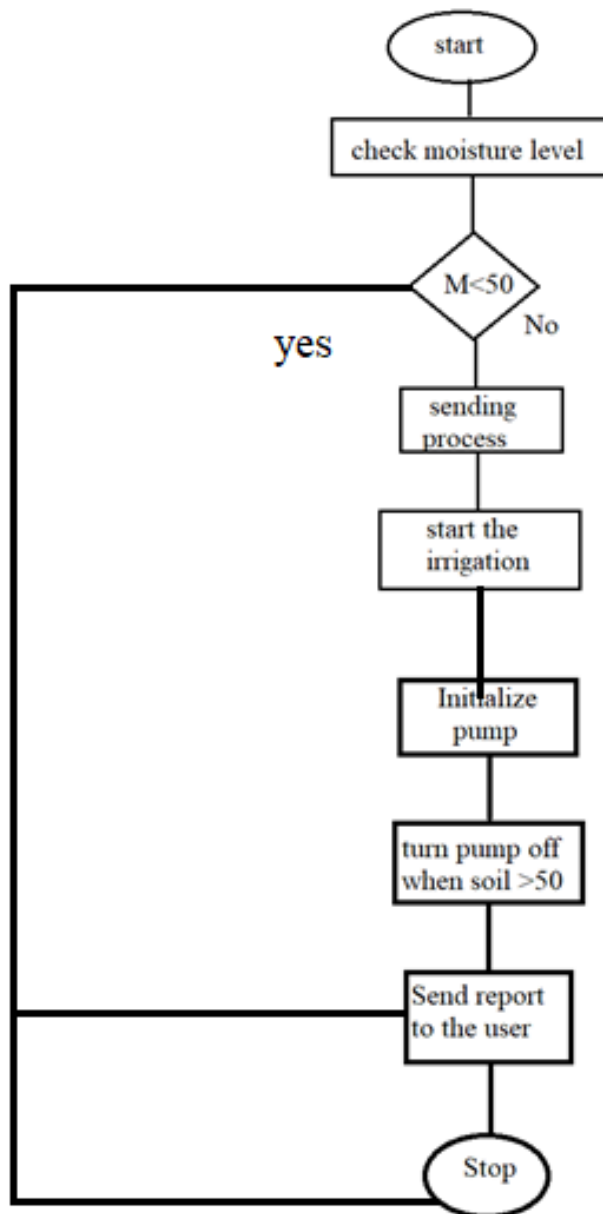
Algorithm

Step 1: start the procedure

Step 2: check moisture level

Step 3: check if moisture content is more or less than 50%

Step 4: if the water moisture is (>) more than 50% then there is no need for watering.

Step 5: if the water moisture is (<) less than 50% then begin watering

Step 6: turn pump off when water moisture is greater than 50%

Step 7: send state /report to the user

Step 8: stop the procedure

4.) Draw the Top-down or Bottom-up design approach of the application

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                          ┌──────────────┐
                          │  auto farm   │
                          └──────────────┘
                    ┌────────────┴────────────┐
            ┌───────────────┐          ┌───────────────┐
            │    Obtain     │          │    Obtain     │
            │    input      │          │    output     │
            └───────────────┘          └───────────────┘
                    │                          │
        ┌──────────────────────┐      ┌──────────────────┐
        │ check irregularities │      │ access information│
        │     in the soil      │      └──────────────────┘
        └──────────────────────┘              │
        ┌───────────┼───────────┐     ┌──────────────────┐
                                      │ give information  │
 ┌──────────────┐           ┌──────────────┐  to user    │
 │ notification │           │  dashboard   │─────────────┘
 └──────────────┘     ┌──────────────┐
                      │  irrigation  │
                      │  scheduling  │
                      └──────────────┘
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