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MATRIC NO.: 18/ENG08/003

DEPARTMENT: BIOMEDICAL ENGINEERING

COURSE CODE: ENG 224

COURSE TITLE: STRUCTURED COMPUTER PROGRAMMING

A. Discuss the application development following the software development cycle.

1. Conceptualization

The plan is to help optimize water usage on the ABUAD farm. The application in relation to the machine should be able to regulate water level, read the temperature of the soil, determine the moisture content of the soil, configure for the time interval for the water system etc.

2. Specification

- The system must work at real time.
- The reading of all data should be in details because it will be saved for analysis.

3. Design

This is the breaking down of the system that determines the nature of the input (i.e. the variables read by the some of the hardware features) and the output needed. It is a step-by-step illustration of how the application would work. This is achieved with the use of algorithms and flowcharts. They are shown in C.

4. Implementation:

The architecture of the program will be in two phases i.e. a front-end and back-end development.

5. Testing and debugging

Although the software is tested at every stage of its development, after the front-end and back-end development. The final integrated testing is carried out over the web to fix final bugs before it is finally put to use on the farm.

- 6. Release and update:** This is to ensure the application is in the market using real time interfacing to maintain it fixes bugs as they appear. It also involves getting review from users and updating the application when and where necessary.

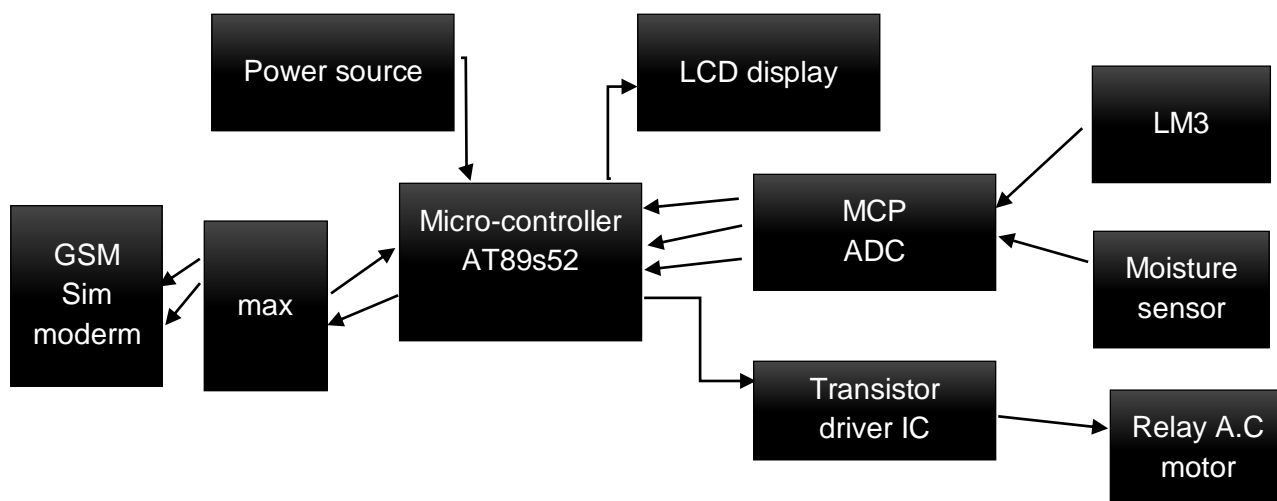
B. Critically discuss the hardware and software features.

Hardware

- Moisture sensor
- LCD display
- Soil moisture sensor
- Micro controller type AT89s52
- Relay A.C motor

- Water route via pipe lines
- Water storage via tanks
- Control unit

BLOCK DAIGRAM OF CIRCUIT

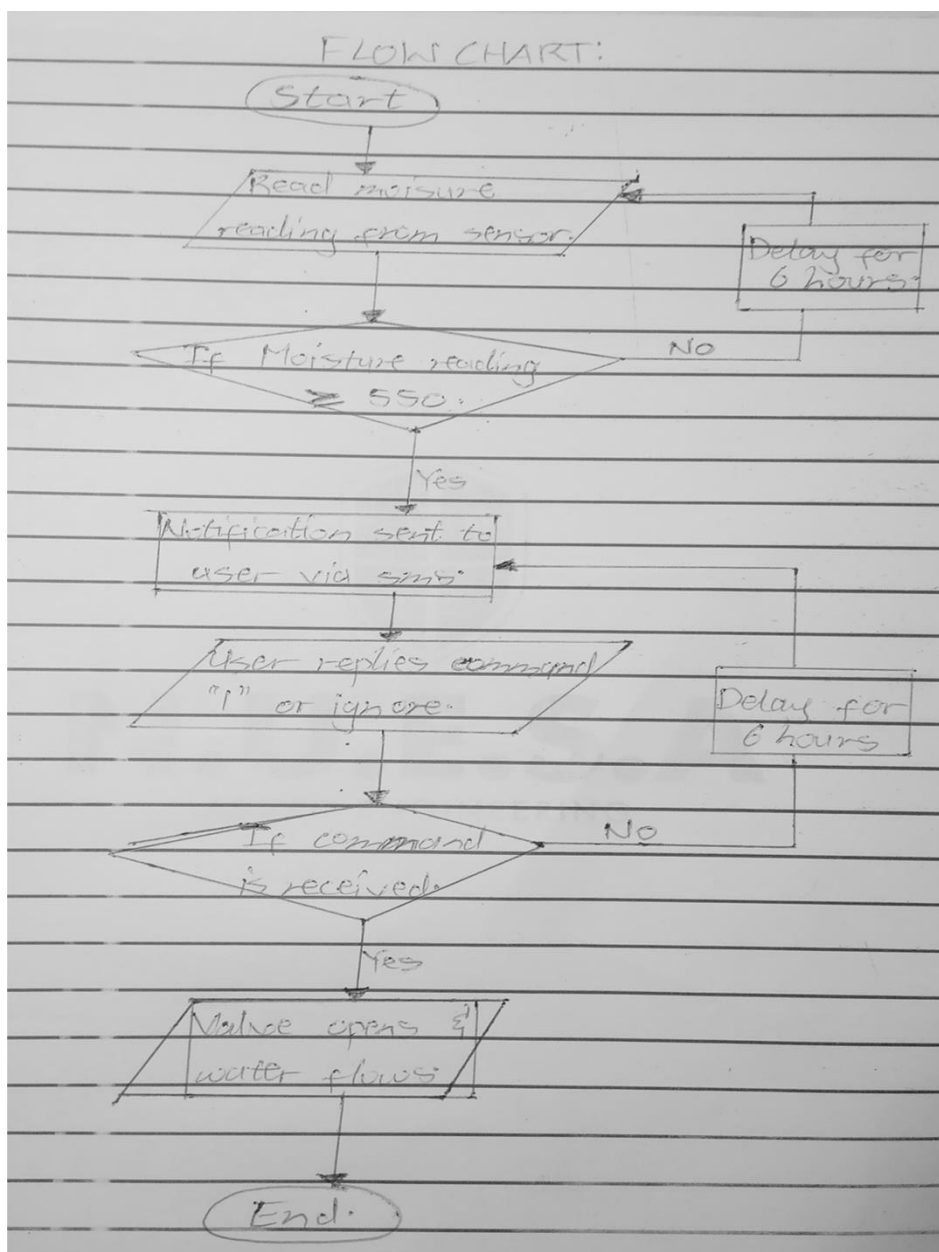


Software

- GUI (Graphical User Interface)
- Timer
- Error detector
- Access control

C. Support your answer with a flowchart and an algorithm.

FLOWCHART



ALGORITHM

```
Start ;  
Read moisture from sensor;  
If moisture reading  $\geq 550$   
Display "moisture levels low"  
else  
delay for 6 hours  
Send notification via notification on phone  
User command option "1" for proceed  
If command = "1"  
Valve opens for water pump  
else  
delay for 6 hours  
end
```

D. Draw the top-down or bottom-top design approach of the application Top-Down Approach

