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18/ENG02/007

COMPUTER ENGINEERING

STRUCTURED COMPUTER PROGRAMMING (ENG224)

A. DISCUSS THE APPLICATION DEVELOPMENT FOLLOWING THE SOFTWARE DEVELOPMENT CYCLE.

Software development cycle consists of:

Conceptualization

Specification

Design

Implementation / coding

Testing and debugging

Release and update.

CONCEPTUALIZATION:

The application software is designed to interact with the irrigation system of ABUAD.

This software is reads the temperature of the soil, determines the moisture content of the soil (using a sensor available in the app), configuration of time interval for the water system is inputted into the program and optimizes the amount of water, an alarm is set when there is insufficient water in the soil, the sprinkler turns on. It is an application software that can be easily accessed by a common farmer or agriculturist.

SPECIFICATION:

Software requirements:

Proteus Design Suite

Arduino IDE

Android Studio

Hardware requirements:

Soil moisture sensor

Water Tank level detector

Arduino Uno development board

Smart phone: for password and alarm

Thermometer: to read soil temperature

DESIGN:

Algorithm, Flowchart.

IMPLEMENTATION / CODING

The application software can be implemented using the algorithm above with various programming language. Bearing in mind that the application software should be able to interact with machine, some hardware parts of the machine would have to be changed or upgraded. It would most likely be implemented using ARDUINO or Raspberry Pi with high level programming languages like PYTHON, JAVA etc.

TESTING AND DEBUGGING

Errors usually pop up and are checked by testing it at various stages using diagnostic tools such as step in, break point, etc.

RELEASE AND UPDATES

The application will be released and available to the farmer and agriculturists. It will be updated from time to time.

B. THE HARDWARE AND SOFTWARE FEATURES

SOFTWARE

Proteus Design Suite: for simulation

Arduino IDE: for programming

Android Studio: for code editing, debugging, and testing

HARDWARE

Soil moisture sensor

Water Tank level detector

Arduino Uno development board

Smart phone: for password and alarm

Thermometer: to read soil temperature

C. SUPPORT YOUR ANSWER WITH A FLOWCHART AND AN ALGORITHM

ALGORITHM

Step 1: start

2: input password for the system

3: IF water level in the tank is high

5: read the temperature of the soil

6: ELSE sound alarm and fill the tank

7: IF soil temperature <65F

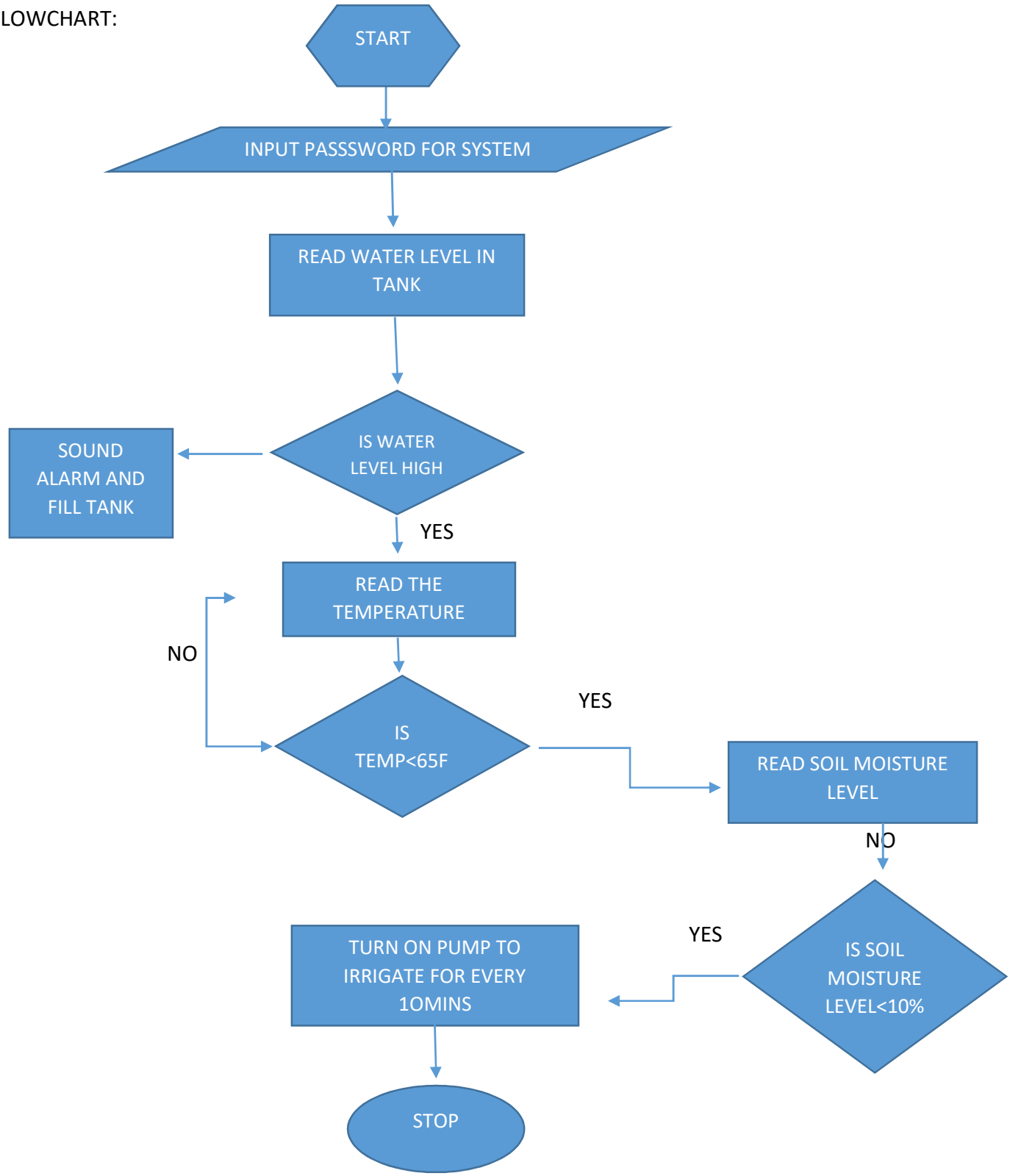
8: read soil moisture level

9: IF soil moisture

10: turn on pump to irrigate for every 10 minutes

11: stop

FLOWCHART:


START
INPUT PASSSWORD FOR SYSTEM
READ WATER LEVEL IN TANK
IS WATER LEVEL HIGH
SOUND ALARM AND FILL TANK
YES
READ THE TEMPERATURE
NO
IS TEMP<65F
YES
READ SOIL MOISTURE LEVEL
NO
IS SOIL MOISTURE LEVEL<10%
YES
TURN ON PUMP TO IRRIGATE FOR EVERY 1OMINS
STOP

D. DRAW THE TOP-DOWN OR BOTTOM –UP DESIGN APPROACH OF THE APPLICATION