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DEPARTMENT: BIOMEDICAL ENGINEERING

COURSE: STRUCTURED PROGRAMMING(ENG224)

ASSIGNMENT TITLE: ALGORITHM

CONCEPTUALIZATION

Automation of Irrigation system

SPECIFICATION

I. HARDWARE

- Sprinkler
- Pipe system
- Temperature sensor
- Moisture sensor
- Water sensor
- Alarm
- Water reservoir

II. SOFTWARE

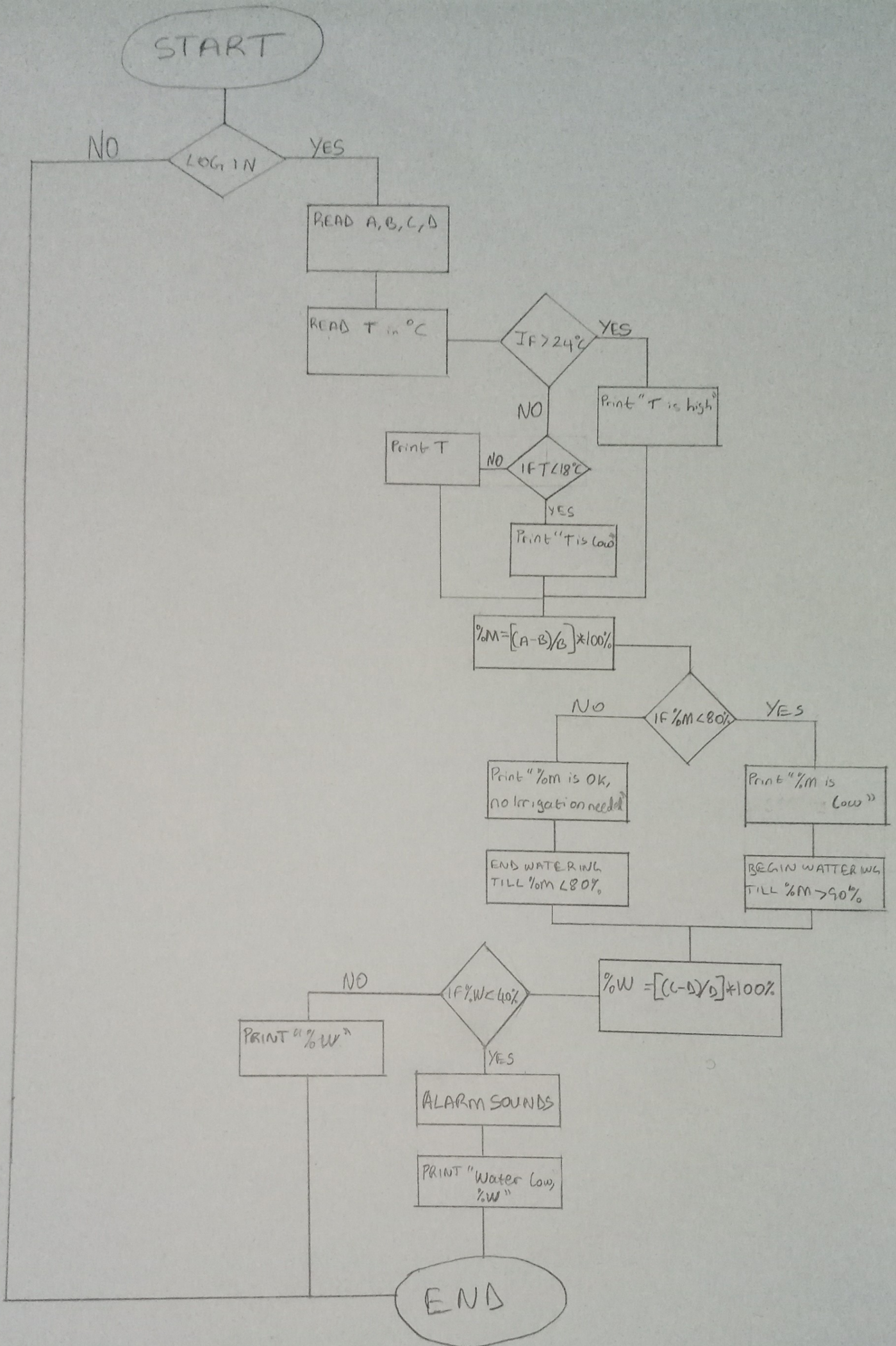
- GUI
- Timer
- Error detection
- Access control
- Storage disk

DESIGN

Algorithm

Steps:

1. Start
2. Read A, B, C, D
3. Soil temperature==T
4. %Soil moisture content==%M
5. %water content in tank==%W
6. Read T in °C
7. If $T > 24^{\circ}\text{C}$
 Print "T is too high"
 Else if, $T < 18^{\circ}\text{C}$
 Print "T is too low"
8. $\%M = [(A-B)/B] \times 100\%$
9. If $\%M < 80\%$
 Print "%M is getting low"
 Begin watering till $\%M > 90\%$
 Else,
 Print "%M is ok, no irrigation needed"
 End watering till $\%M < 80\%$
10. $\%W = [(C-D)/D] \times 100\%$.
11. If $\%W < 40\%$
 Alarm sounds
 Print "water level is low"
 Else,
 Print "water level is sufficient"
12. End.



HARDWARE FEATURES

- Sprinkler: this would be controlled by the timer which is dependent on the soil moisture content.
- Pipe system: this is how water would be transported throughout the farm.
- Temperature sensor: this will tell the temperature of the soil and give response if it is within or beyond 18°C and 24°C.
- moisture content sensor: this will tell the moisture content of the soil by using the formula $\%M = [(A-B)/B] \times 100\%$. (A=weight of moist soil, B=weight of dry soil)
- alarm: this would sound to alert users around that the water level in the water reservoir is getting low
- water reservoir: this is where water used in watering the plants would be stored.
- Water reservoir sensor: this will be calculated by using the formula $\%W = [(C-D)/D] \times 100\%$. (C=weight of tank with water in it, D= weight of tank without water in it)

SOFTWARE FEATURES

- GUI: the GUI, Graphic User Interface will be a system of interactive visual components for the computer software. The GUI will display texts, objects that convey information about the soil (i.e. the temperature, moisture content etc.) and represent actions (i.e. pushbutton) that will be taken by the user.
- Access control system: The access control system will recognize authenticates and authorizes entry of a personell to enter into the premise thereby giving complete protection ensuring security with the system.
- Storage disk: this would be where information about the weight of dry soil and the weight of the empty tank would be stored to make calculations and estimations more precise.

- Error detection: this would be placed to detect any error that may arise as the program runs, while handling patients results.
- Timer: this will depend on the soil moisture content. If the soil moisture content(%M) is getting lesser than 80% the timer will recognize and begin watering every 5 mins for 5mins until the soil moisture content rises to >90%.

Top-down design approach of the application

