

Name: Egbuwe Kelvin Olamide

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Department: Electrical Electronics Engineering

Course code: ENG 224

Course Title: Structured Computer Programming

1) Software Development Cycle

Conceptualization

Irrigation System Application

The aim of the application is for it to aid the irrigation of the farmland, especially during the dry season. It is also supposed to be able to read the temperature of the soil, determine the moisture content of the soil, water the farmland based on the temperature and moisture content of the soil and alert personnel if there is a shortage of water. A password system will also be included in the application in case there is need to change the settings of the system.

Specification

The application will require some hardware and software components which will work hand-in-hand to help provide satisfactory results and proper running of the program. These components include;

1. Hardware components: Sensors, thermometers, irrigation system, tensiometer, alarm, water tank
2. Software components: programming language, alert system, GUI, access control management system, timer

Design

An algorithm and flowchart will be used to help determine the nature of the input and output needed and also show the sequences of steps with the conditions needed in using and running the program

Step 1: Start

Step 2: Temperature, moisture content, Water level = 0

Step 3: Read water level, temperature, moisture content

Step 4: Set time interval

Step 5: If (Temperature > 30 degrees C)

 Turn on irrigation system till temperature = 20 degrees C

Else leave irrigation system off

Step 6: If (moisture content < 30%)

Turn on irrigation system till moisture content = 50%

Else leave irrigation system off

Step 7: if (water level < 40%)

Sound alarm, turn on alert system

Else alert system, sound alarm off

Step 8: Enter password

Step 9: If password == L10n\$y

Print Correct Password

Else

Print incorrect password, re-enter password

Step 10: Stop

Implementation

This involves all the codes required in developing and running the application

Testing & Debugging

After the code has been written and the application has been developed, several tests will be carried out on the code to detect and fix errors present in it and to ensure that the program runs adequately to the satisfaction of the programmers

Release & Update

After the application has been tested and debugged, and the program is running smoothly. The application will be released to the general public for use as it will be updated constantly based on feedback to ensure it provides better service to the users

2)

Hardware components:

Sensors: This will be used in detecting changes in the temperature, humidity conditions, weather, moisture content of the soil and water levels

Thermometers: The thermometers will be used in measuring the temperature values of the soil.

Tensiometer: This is a device that can be used in measuring and recording the moisture content/ levels of the soil.

Irrigation system: This involves all the pipes, tubes, sprinklers and other equipment used in

supplying water to the farmland.

Water tank: The water being used by the irrigation system is stored here.

Alarm system: This is used in notifying the farmers of the shortage of water in the tank.

Software components:

Alert system: This will consist of sound alarms and text notifications which will alert the farmers of the shortage of water in the tank

GUI: This is used in allowing the users to interact with the program

Timer: This is used in measuring the amount of time that has passed.

Programming language: The programming language is responsible in writing the code used in the development and running of the software application.

Access control management system: This is used to ensure that unauthorized personnel do not alter or tamper with the application. The password system is included here

3)

Algorithm

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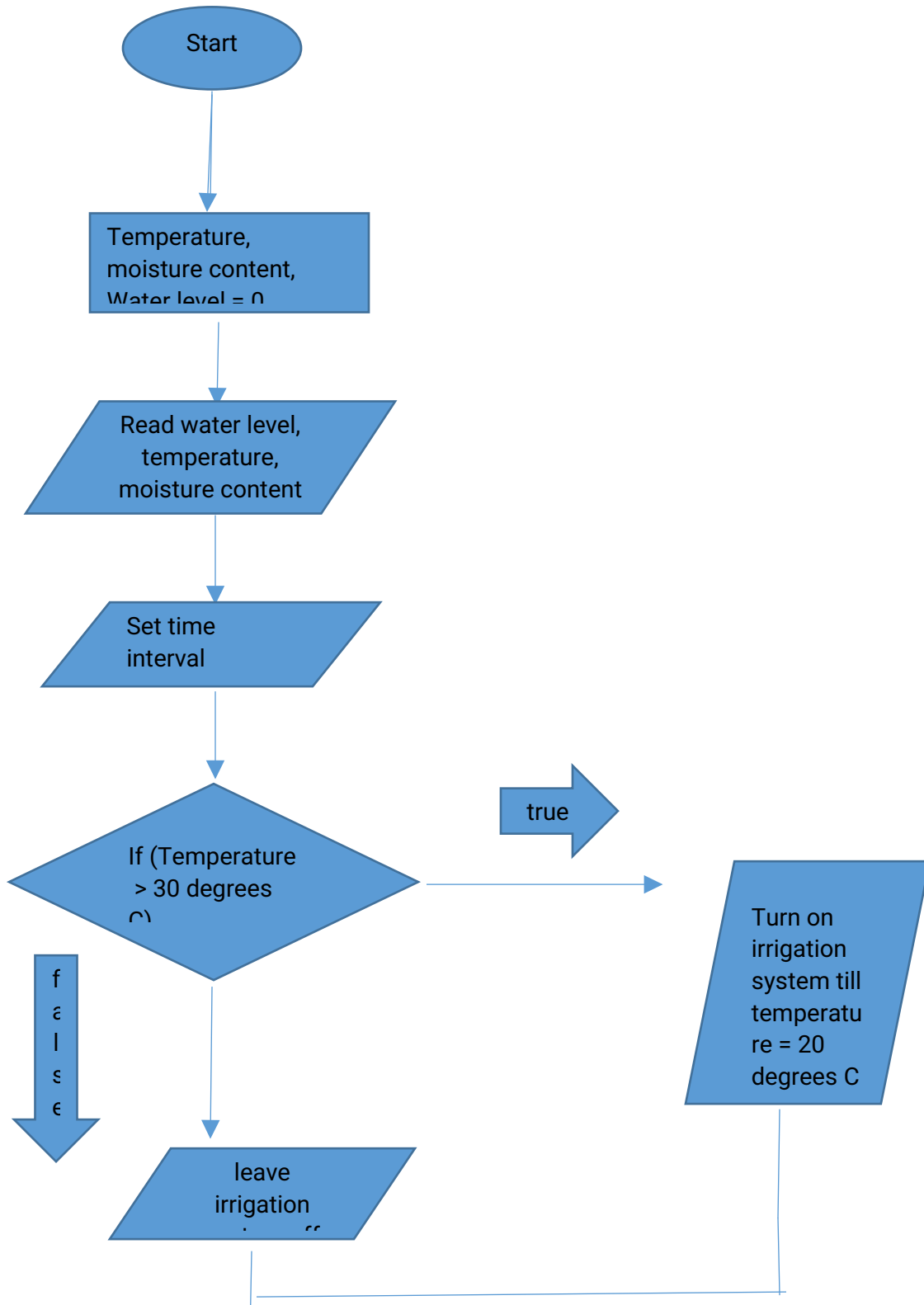
 Print Correct Password

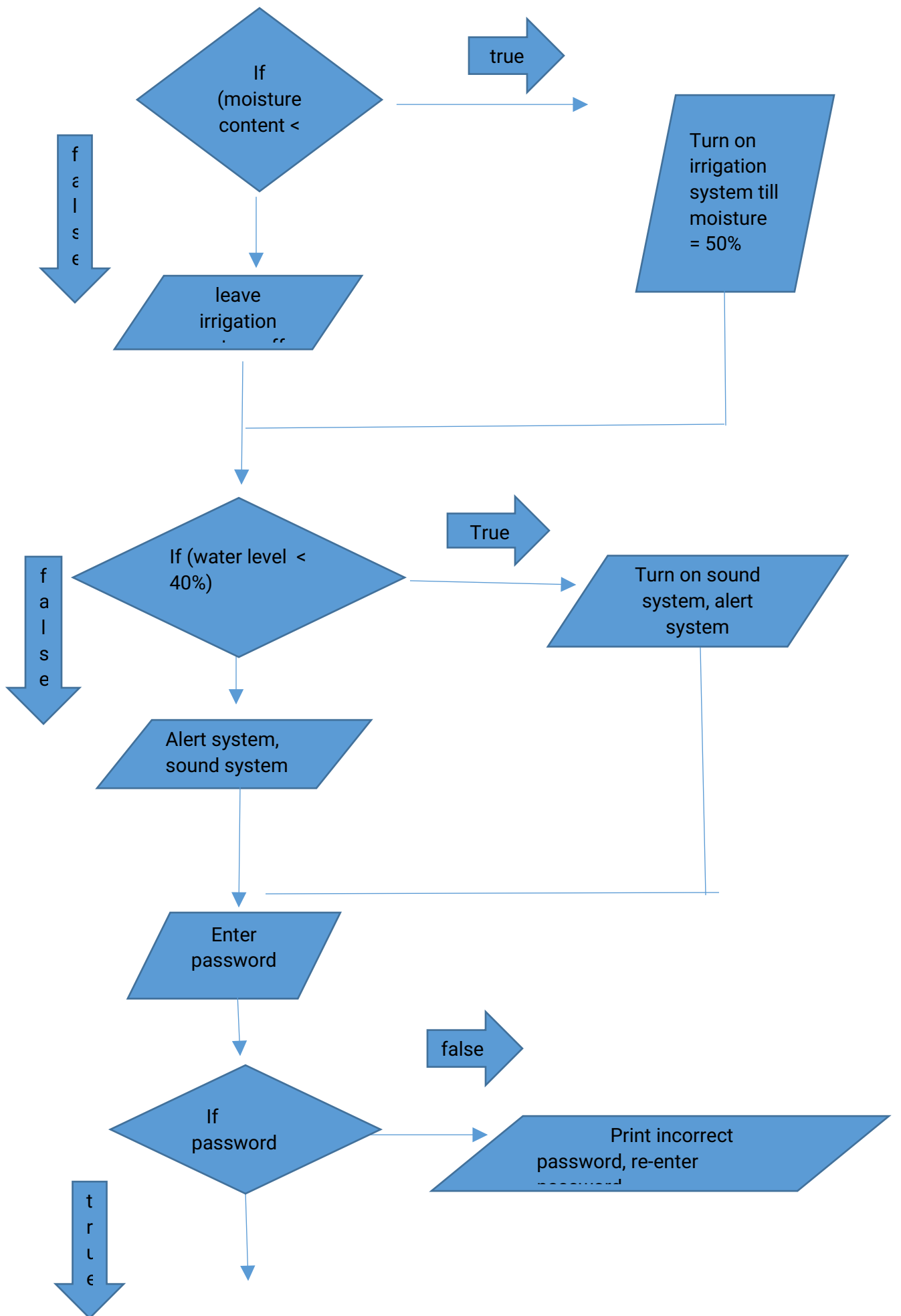
Else

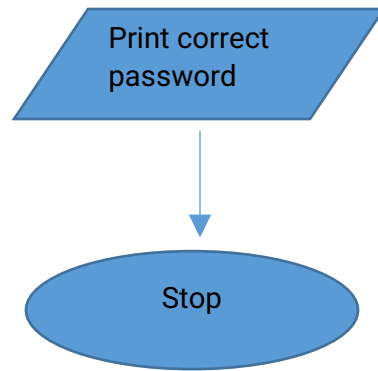
Print incorrect password, re-enter password

Step 10: Stop

Flowchart







4) Top down approach

