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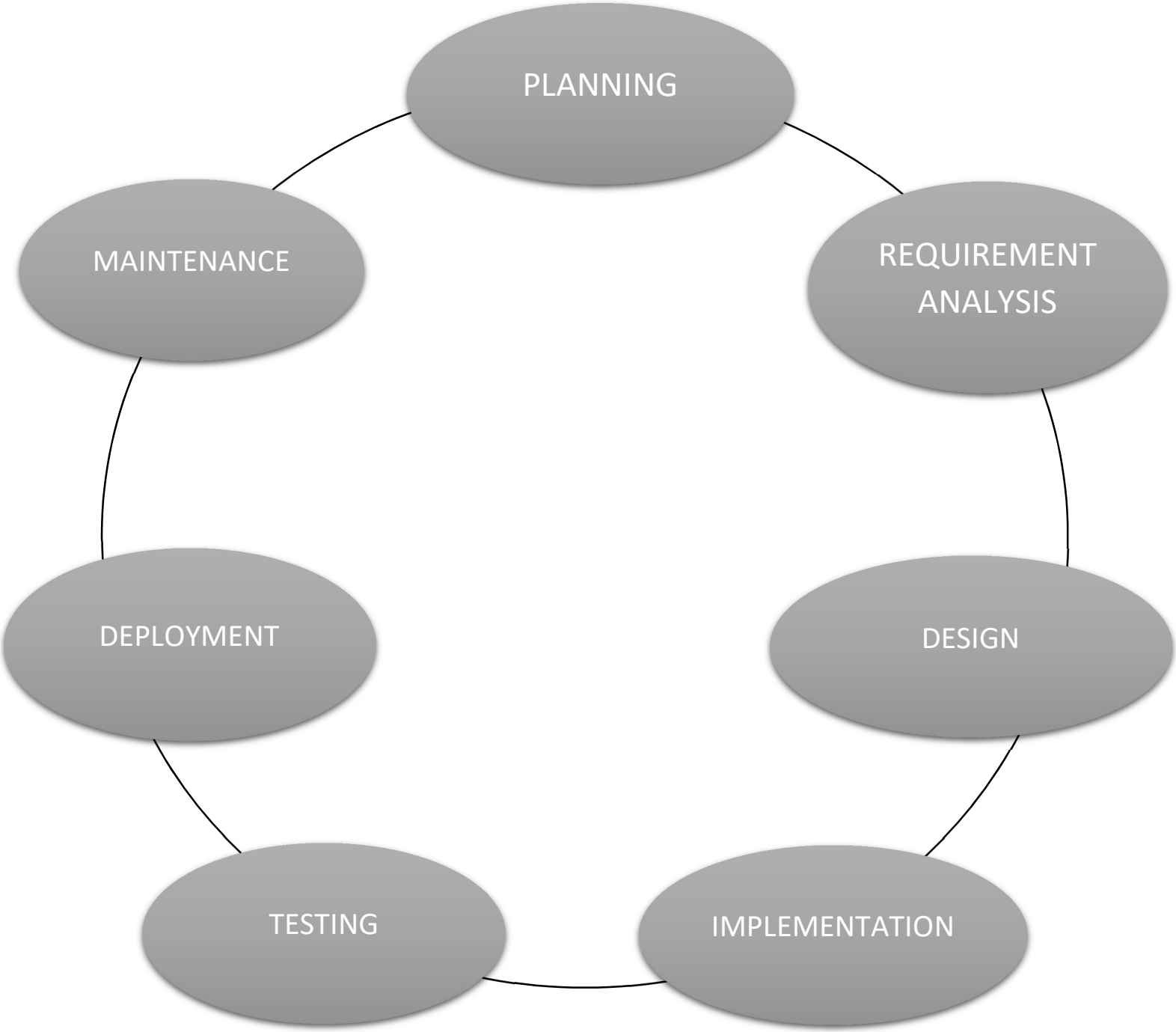
DEPARTMENT: COMPUTER ENGINEERING

TITLE: ENG 224 ASSIGNMENT

SOLUTION TO THE CLASSWORK GIVEN BELOW

A. The software development process is as follows

1. Planning
2. Requirement Analysis
3. Design
4. Implementation/coding
5. Testing
6. Deployment
7. Maintenance



Following the cycle, we begin with the planning phase.

PLANNING:-

So, in this phase we identify the requirements of our employer. They want the software to be able to:-

i) Read the temperature of the soil
ii) Determine its moisture content
iii) Configure the time interval for the water system based on the above
iv) Trigger alarms if water level is insufficient in the tank for irrigation
v) Also to enable a password for the system

REQUIREMENT ANALYSIS:-

We are to critically analyze the requirements and give more planning detail about each requirement of the software. Before we advance, the first and foremost is that we should put the code and make the software to integrate and initialize all parts of the machine in order for the whole system and its processes to be automated.

a) Reading the temperature of the soil

For this to be acquired, we are to initialize the machine to be able to use the soil thermometer and store the temperature as data

b) Determine the moisture content of the soil

The software will send signals to the moisture sensors which would calculate the exact amount of water that makes up the **soil** sample and show it on the screen.

c) Configure the time interval for the water system based on the above

The software would have another function to enable the water system and as well the irrigation sprinklers to water the soil at regular time intervals with the use of the day and night sensors placed around the farm.

d) Trigger alarms if water level is insufficient in the tank for irrigation

It would also be possible that before it starts the sprinklers, it would check the level of water in the tank with the use of the ultrasonic modules. These modules then measure the depth of the

tank and if it is below the water level indicator, it trigger an alarm and automatically pump water into the tank

e) Enable a password for the system

For security reasons, the admin would be made to log into the software with a password.

DESIGN:-

In this phase, we take up the requirements of the users and begin to build up the interface of the software following our analysis. We would make use of special frameworks, libraries, Cascading Style Sheets (CSS), and also have the networking done between the software and the machine so as to achieve automation. The software would be designed in C and C++.

IMPLEMENTATION/CODING:-

In this phase, the operations team would set up the hard ware and be hosted as well. The developers would as well start to write the code needed for all exploits and the analyzers on the other hand, would also start making up test cases for test plans. Also the plumbers would be of importance here as to develop the water system for the farm

TESTING:-

In the testing phase, we usually perform trial and error situations, perform debugging where ever there are flaws and rearrange the entire software to match the idea we setup if needed and to validate that all requirements have been met.

DEPLOYMENT:-

In this phase, we see that we've made the ideal application with the requirements, we begin to set up the

hardware for the machine and henceforth it is ready to be launched.

MAINTENANCE:-

Now that the software is being put to use and it is functioning properly, we need to ensure that the system is maintained recently. It involves the maintenance of the equipment, providing solutions to increase the speed and area of work if it is too slow or whether the sprinklers are not properly irrigating the soil. Plumbing maintenance and regular updates would be made to adjust to solve any issue the user has.

B.) The software and hardware features are below

- **Processor:**
  - 1.4 GHz
  - 32-bit (x86) processor

- **RAM:**
  - 2gb recommended

- **Operating System:**
  - Window XP or later

- **Disk Storage:** 4 GB of free disk space

- **Monitor Resolution:** Recommended: 320x260

C.) **ALGORITHM**

STEP 1: START

STEP 2: IS THE DAY/NIGHT SENSOR ON?

STEP 3: IF YES THEN CHECK THE WATER LEVEL OF THE TANK, IF NO START FROM BEGINNING

STEP 4: IS THE WATER LEVEL ABOVE THE INDICATOR?

STEP 5: IF YES, THEN TURN ON THE SPRINKLERS AND SEND A NOTIFICATION

STEP 6: IF NO, TRIGGER AN ALARM FOR 20 SECONDS AND START THE PUMP AND CHECK IF THE TANK IS FULL

STEP 7: IF TANK IS FULL, THEN STOP PUMP

STEP 8: IF NOT, THEN START THE PUMP AGAIN

STEP 9: MONITOR THE MOISTURE CONTENT OF THE SOIL

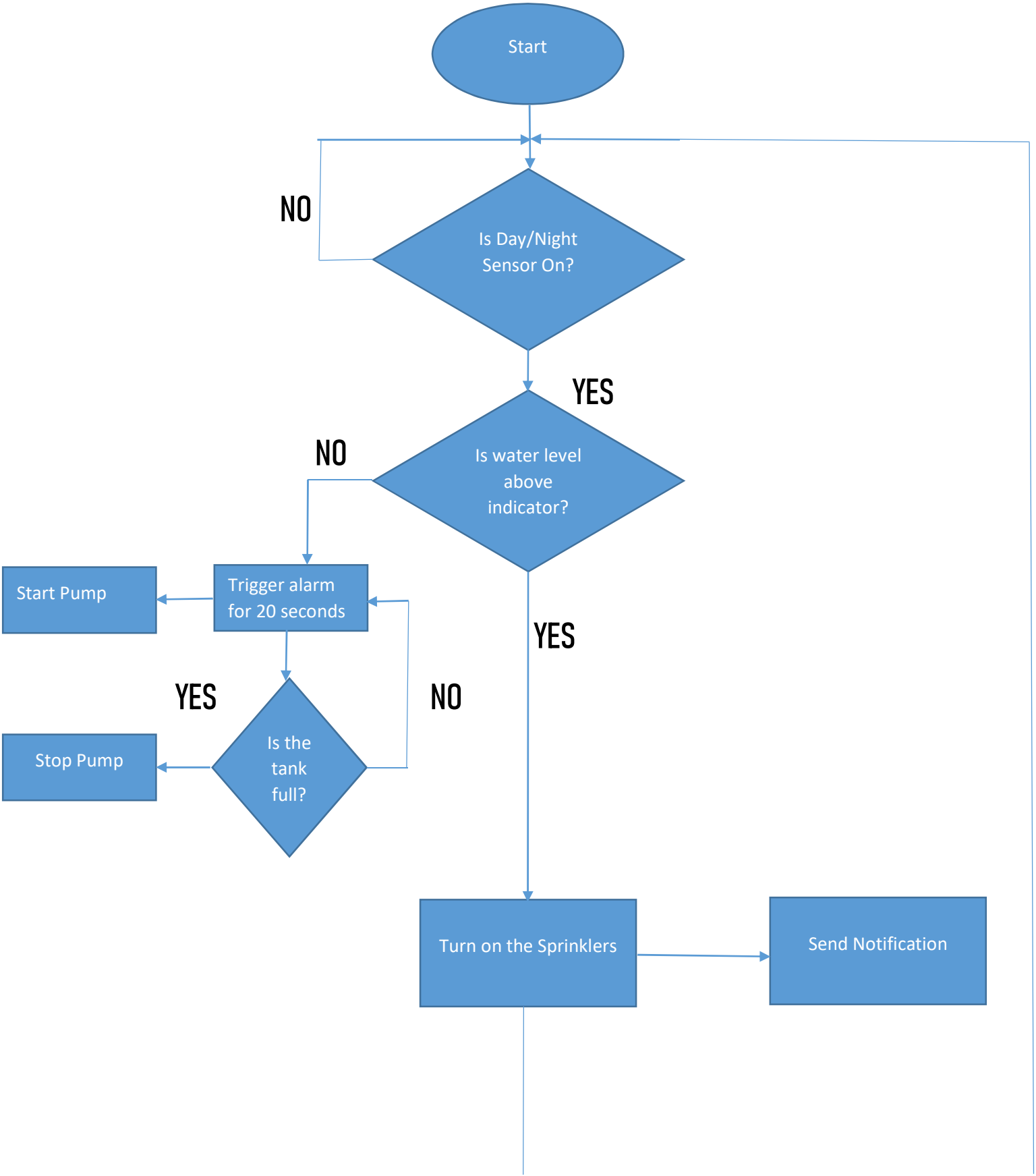
STEP 10: IS THE MOISTURE LEVEL OKAY?

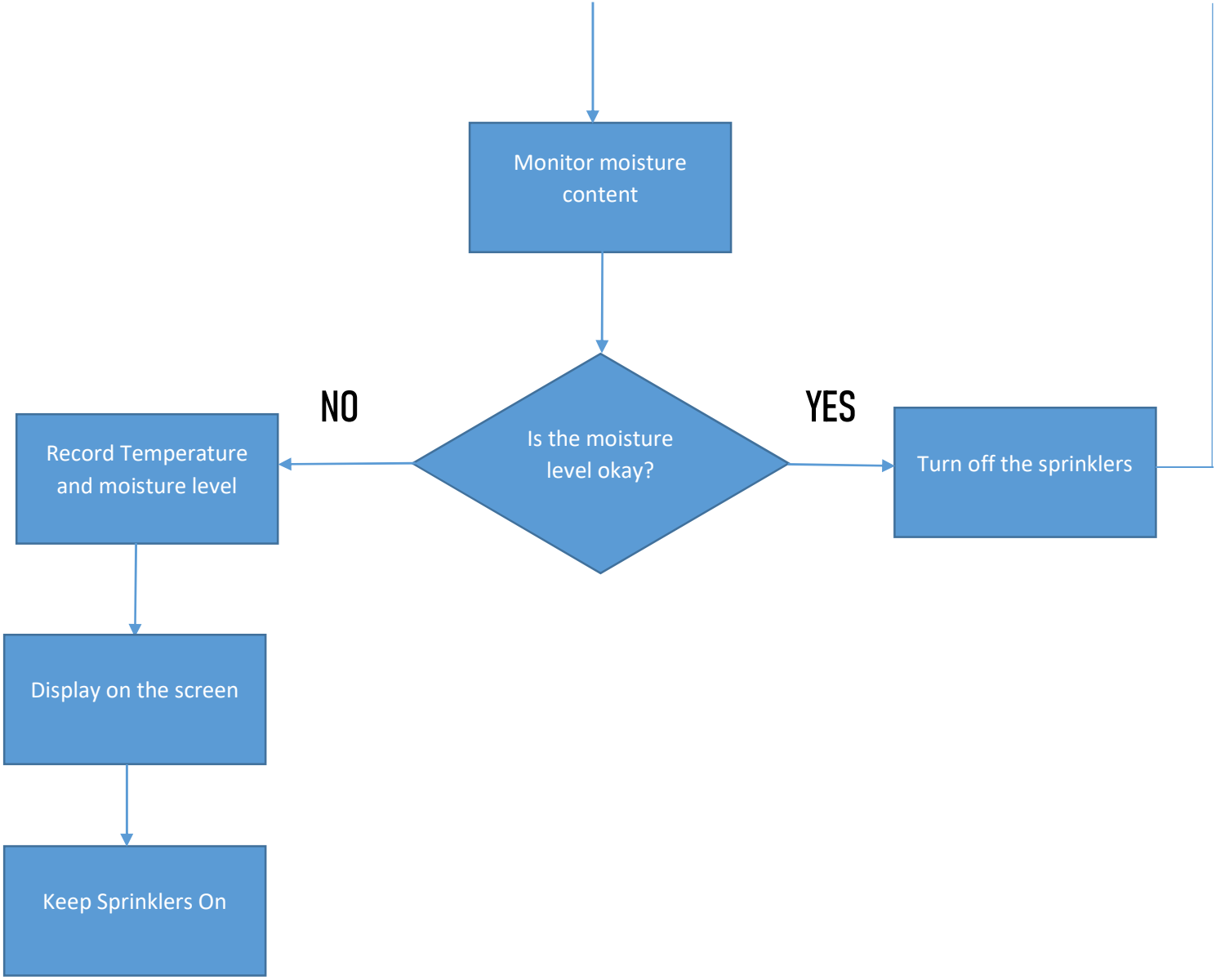
STEP 11: IF YES THEN TURN OFF SPRINKLERS AND START FROM BEGINNING

STEP 12: IF NO, THEN RECORD TEMPERATURE AND MOISTURE LEVEL AND DISPLAY ON THE SCREEN

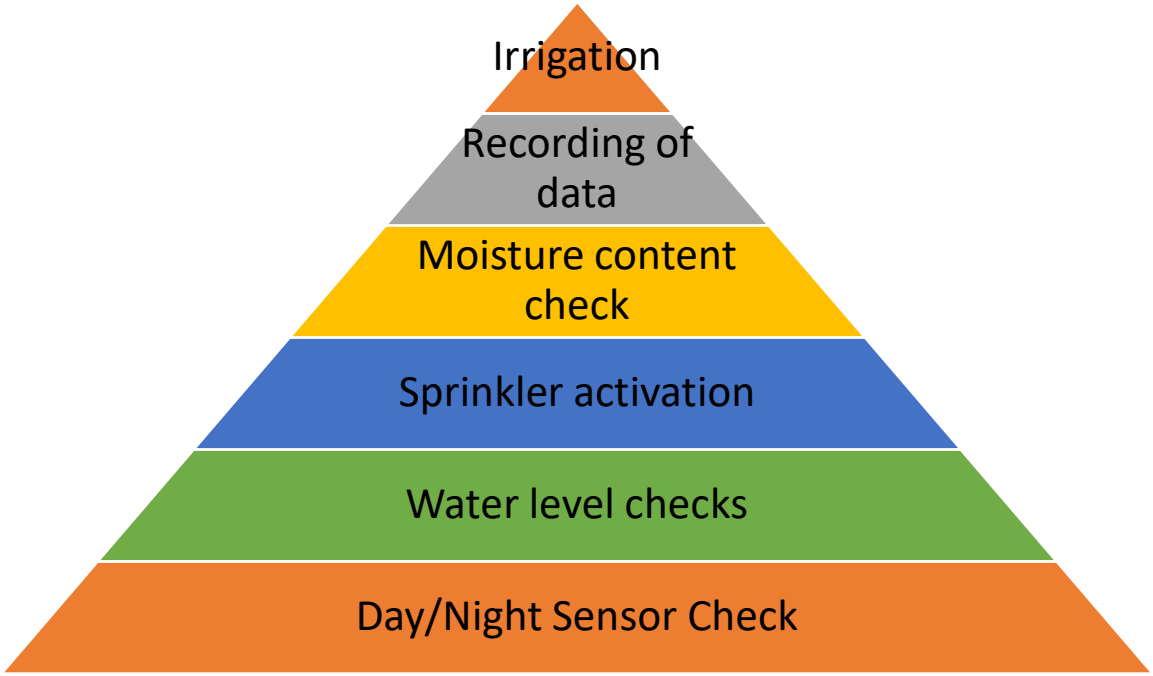
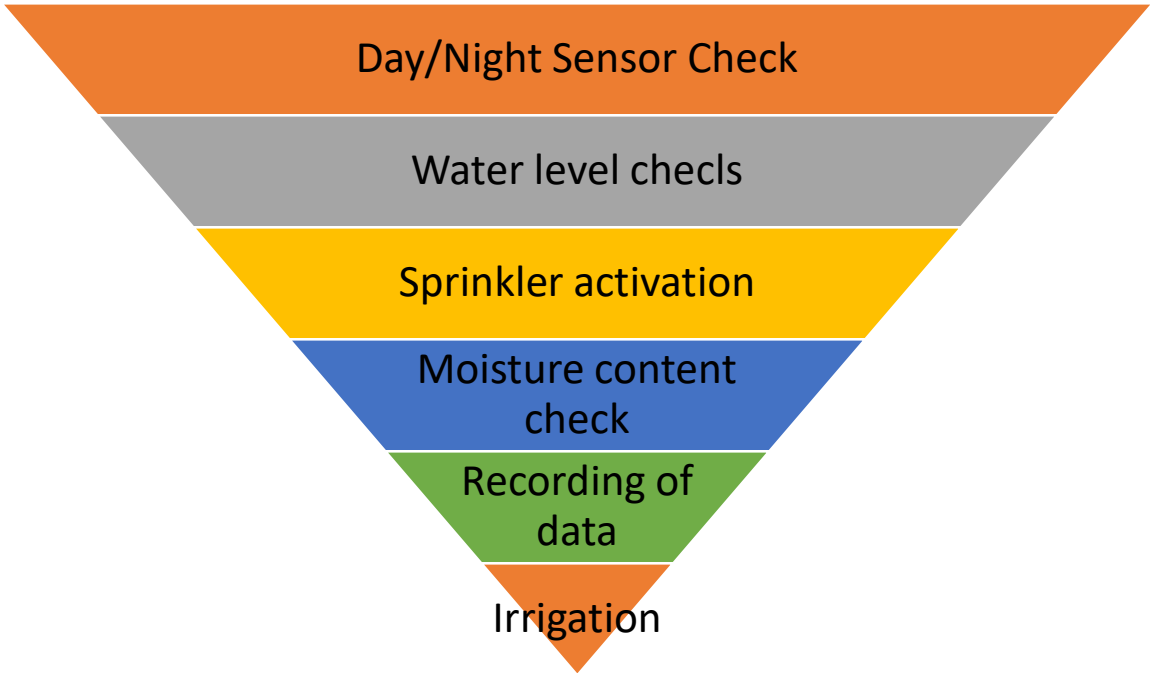
STEP 13: REPEAT

FLOWCHART


Start
NO
Is Day/Night Sensor On?
YES
NO
Is water level above indicator?
Start Pump
Trigger alarm for 20 seconds
YES
YES
NO
Is the tank full?
Stop Pump
Turn on the Sprinklers
Send Notification


Monitor moisture content
Is the moisture level okay?
NO
YES
Record Temperature and moisture level
Turn off the sprinklers
Display on the screen
Keep Sprinklers On

C.) BOTTOM-UP APPROACH



TOP-DOWN APPROACH