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DEPARTMENT: COMPUTER ENGINEERING

MATRIC NUMBER:18/ENG02/006

COURSE CODE:ENG224

COURSE TITLE:STRUCTURED COMPUTER PROGRAMMING

QUESTION: One of the major challenges of ABUAD farm, ado EKITI during the dry season is the irrigation system of the farm. The board of the company decided the best way to resolve the problem is to automate the system, as a software developer for ABUAD farm, you are mandated to develop software that interacts with the machine. The software through the machine must be able to;

- Read the temperature of the soil.
- Determine the moisture content of the soil.
- Configure time interval for the water system based on the above.
- Enabled password for the system.

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

B. Critically discuss the hardware and software features.

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

D. Draw the top-down or bottom-up design approach of the application.

1. THE SOFTWARE DEVELOPMENT CYCLE

1. Planning; an irrigation project is considered feasible if the total

estimated benefits of the project exceeds its total estimated cost. Adequate planning of all aspects (organizational, technical, agricultural, legal, environmental and financial) is always essential for feasible irrigation project.

2. Analyzing; for this you have to make sure there is a good water management deteriorated in terms of more water being used, head-to-tail preferential and make sure you check the condition of water usage.

3. Design.

Engineers involved in the design of irrigation systems use tools provided by manufacturers of materials for irrigation in their catalogs. Are also

developed spreadsheets and several companies offer software to design irrigation systems, but these are based on approximate algorithms. Typically, the software will be created for small projects of irrigation systems for public parks and gardening, and will make use of simplifying assumptions valid only for small plants for irrigation. The irrigation software proposed by the board of the company are inadequate for professional use and for the design of irrigation systems of large dimensions.

4. Implementing; this involves the various things done while installing and ensuring the software performs properly. There are also some factors affecting effective performance. The

proposed agricultural system is designed to solve to find an optional solution to water crisis. The design will implement IoT technology using an android or IOS device, a main controlling unit, sensors to measure various parameters and a water pump, which will supply water to the farm.

5. Testing: testing is done to check and prevent problems of the ABUAD irrigation software program; problems like; Inadequate utilization of wet season rainfall, which leads to restricted cropping opportunities in the next dry season, lack of feedback about actual ABUAD field water status leading to inappropriate responses

resulting to ineffective water releases.

6. Maintenance; deals with the measures put in place to ensure long lasting of the software setup.

B. CRITICALLY DISCUSS THE HARDWARE AND SOFTWARE FEATURES.

Hardware features are the machines that will be programmed to carry out its function which will be to create irrigation system for ABUAD farm in dry season.

- Pumps: pump choice has a major influence on an irrigation system. Ensuring a perfect pump match can save money in terms of

maintenance, energy and water costs.

- Automatic irrigation controllers: these are essentially electronic timers that are programmable to turn the irrigation valves on and off at specific times, or under certain conditions.
- Irrigation emitters: this is the method through which the water is delivered to the irrigated crop. There are many different choices here, and a specialized irrigation professional will be able to assist me in making the right choice for my particular applications.
- Filters: they will prevent debris, soil and sand from entering the system and clogging components or causing wear damage.

the delivery side(sprinkler side) and the water supply side. Pipes can be pressurized or non pressurized and there are raft options when it comes to pipe materials.

Other HARDWARE FEATURES

- measuring tape
- pegs rope
- hoe
- blade
- pipes
- sprinkler nozzles
- hydrometer apparatus(E.g glass rods volumetric tubes etc.)

C. SUPPORT YOUR ANSWER WITH FLOWCHART AND ALGORITHM

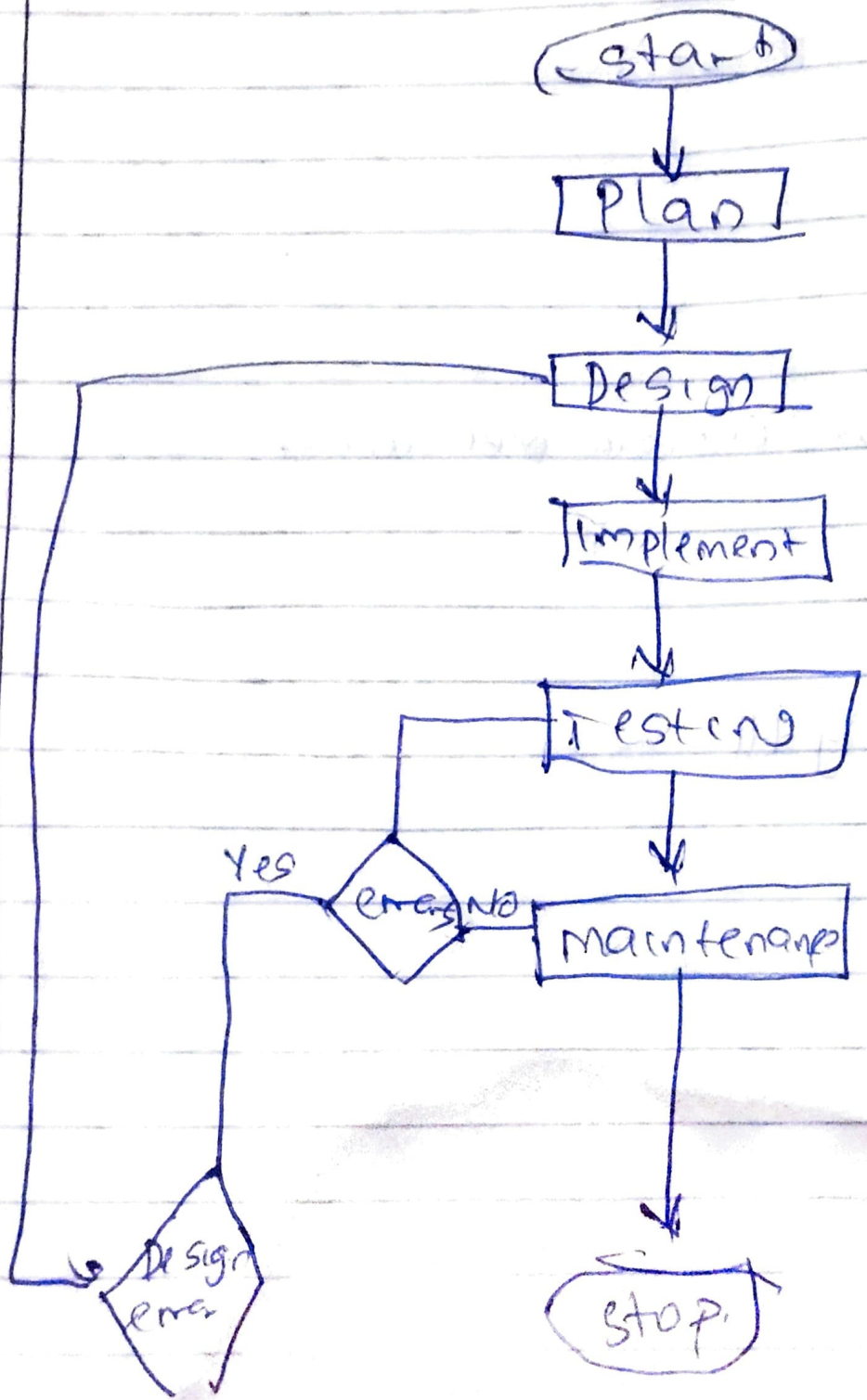
ALGORITHM

- Valve boxes: these boxes protect valves and other irrigation components underground, and make for easy access for maintenance and servicing. These valves will be very helpful in controlling the flow of water in the system. There are many types of valves, isolation valves, solenoid valves, vacuum release valves and flush valves.
- Back flow prevention devices: they allow water flow in one direction only. They are particularly important where the system is connected to a portable water source preventing dirty water from being able to travel into the portable water source.
- The ABUAD irrigation system will be made up of many pipes, on both

step1. Start
Step2. Plan the design
Step3. Design the application layout
Step4. Implementation of the program
Step5. Test the software for errors or bugs
Step6. Maintenance of the software
Step7. Stop

FLOWCHART
WILL BE SENT DIFFERENTLY

D.
Sketch your app ideas
Design it
Look for errors or bugs
Correct the errors or bugs
Build the app
Launch it


start
Plan
Design
Implement
Testing
Yes
error
No
maintenance
Design error
stop