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18/ENG03/047

CIVIL ENGINEERING

Question:

Classwork 2 **10Marks**

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.
- Triggered an alarm if there is no sufficient water in the tank for the irrigation.
- 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.

Solution:

Any software developer should be aware that before any system is created or even implemented it must have started from the developer thinking of a process. At the end of the day the system would have different sensors (Soil Moisture, Light, Temperature, level, rain, flow) with different another device |(water pump, Battery, LCD, Solenoid valve) used to make this automation successful.

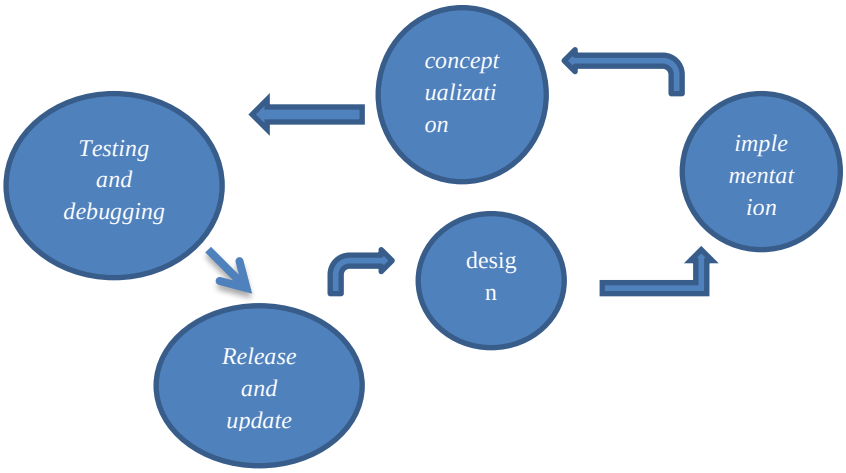

Figure 1: System Development Life Cycle

1. Conceptualization: to develop the concept of software and a need for it
2. Specification: the specification of an application must be clear and well designed. It breaks the application into modules being defined and also breaking the complex for the subtasks.
3. Design: Involves testing the various conditions for the modules being derived, taking alternate paths in the procedure depending on the outcome of events.
   There are two forms; Algorithm and Flowchart.
4. Implementation: Application software are implemented using programming languages such as HLL or LLL.
5. Testing & Debugging: Scripts and codes written but not ran due to logical errors. The errors are referred to as bugs and the process of removing them is hence debugging.
6. Release & Update: The application is released for use and with time equipped with updates.

The objectives to consider are:

- Simplify the irrigation system by installing and designing the whole irrigation system
- Save energy, which allows the application of smart irrigation system used more other application
- Optimize water consumption
- Automated system fully
- Decrease the cost of operation
- Make system easy to use by farmers
- Read temperature of the soil
- Determine moisture content of the soil
- Security structure with a password for different users

The system method includes the implementation of proto-type device work robotically and controlled thru the mobile application. For the prototype format drawing up the timeline and reading related works will be step one. After looking into benefits and downsides of previous studies in the subject of an automatic irrigation system, we can start implementing the layout and automation method for executable. The timeline of the project became set on the flowchart of the project. The steps can will be in the following process chart:

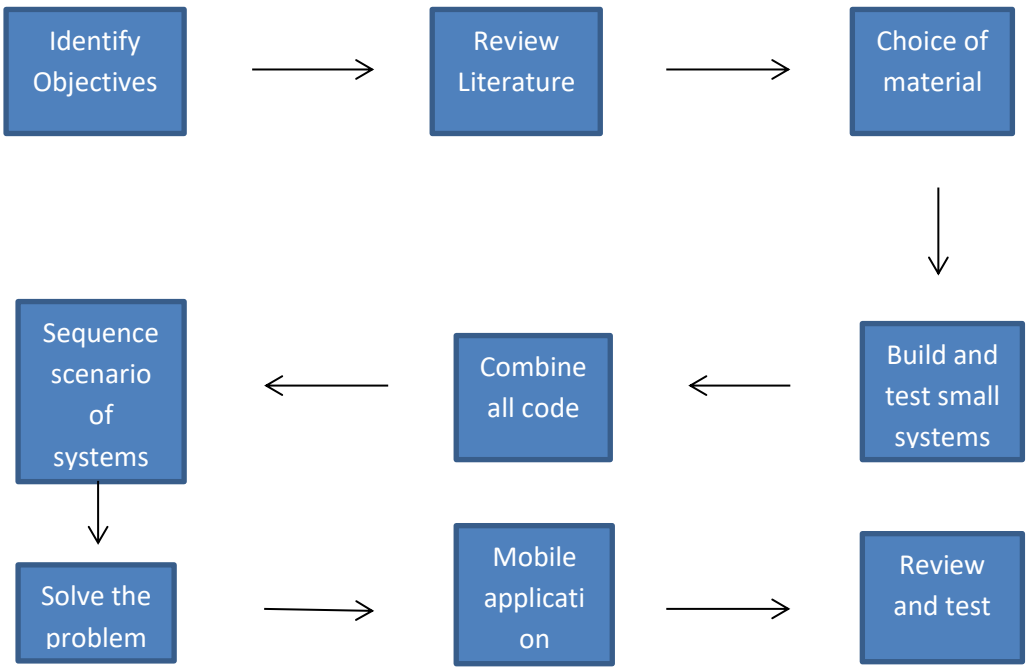

Figure 2: Process flowchart

Design and implementation of an Automatic irrigation system in Nigeria

In this machine the basic idea is to rely on the type of soil and the amount of water needed by each type of soil. This process is done by measuring the level of moisture in each type and using the pump to supply water. The result indicates that sandy soil requires less water than clay soils. The blessings of this device are to focus on soil moisture and water conservation. But making the machine much less powerful is to measure the moisture of soil from one location in the agricultural land. It's far viable that the vegetation at the other end of the rural land does no longer need watering. Also, the water source isn't constant.

Automatic Irrigation System for Sensing Soil Moisture Content

The aim of all this is also to develop a system that turns on and off the engine automatically through moisture. On this consider, I failed to find out sufficient facts around the source of water and the approach of controlling the withdrawal of water from the supply furthermore did not discover enough information nearly the supply of power applied in this scenario.

Sensor Based Automatic Irrigation Management System

The aim of this work is to build a system that helps the process of regulating water by measuring the humidity ratio. The grounded sensors all around the land area will give notice about the need for water and likewise, it will be provided. At the same time arranged a mechanized approach for the water tanker to be filled when it is empty.

Automatic plant watering system

Due to the temperature of the soil changes, the system considered to sense dryness of the soil and in the end switch on the electric pump to begin the supply of water and switch off the pump on every occasion enough water is provided.

User Identification

Before an action can be commenced on the system it must first have given authentication to the user hence the implementation of a password.

Algorithm

Step 1; Start

Step 2; Check temperature level in soil

Step 3; Set temperature level maximum = 35 degree celcius

If temperature level > temperature level maximum

Enable sprinklers

Else

Return

Step 4; Read moisture content level

Step 5; If temperature level > 35 degree Celsius && moisture content level "Low"

Enable outflow of water from tank for a time interval of 30 minutes

Else

Return

Step 6; If water from tank level < 1000 litres, trigger alarm bell

Else

Return

Step 7; If input = BABATUNDE

Else print "invalid password"

Return

Top Down design