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MATRIC NUMBER; 18/ENG01/012

DEPARTMENT; CHEMICAL ENGINEERING

COURSE CODE

TITLE

ASSIGNMENT

INTRODUCTION

What exactly is irrigation?

Irrigation is the application of controlled amounts of water to plants at needed intervals. Irrigation helps to grow agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of less than average rainfall. Irrigation is also used in crop production, including frost protection.

It is usually very tedious going with a covering several hectares of land with the use of a hose to try water various crops. So this brings up the need to automate the entire process where it is easier to run various pipes to sprinklers placed at strategic locations on the farm for the even distribution of the water. This automated system can be well designed in such a way together with various sensors to help relay certain information as to when the soil is dry (so as to inform the farmer when to switch on the sprinklers) as well as even going on to tell the farmer if the water present in the tank will be enough for irrigating the farm at that particular time.

CONCEPTUALIZATION

To develop a program for the automation of irrigation processes at the **ABUAD** farm. This software, should be able to instruct the machine to perform the following functions;

- To read and display the temperature of the soil
- Determine the moisture content of the soil
- Configure a time interval for the water system based on the temperature and moisture content of the soil

- Trigger an alarm if there is no sufficient water in the tank for irrigation
- Enable a password for the system

SPECIFICATIONS

S/N	HARDWARE FEATURES	SOFTWARE FEATURES
1	Timing System	Arduino IDE
2	Volume and Storage based System	Microsoft Visual Basics
3	Water Transmission System	
4	Power Supply And Regulation system	
5	Sensing System	
6	Control System (micro controllers and comparators)	
7	Display Systems (use of LCD)	

HARDWARE FEATURES; includes

1. Time System; (the timer or stop clock) irrigation time clock controllers, or timers, are an integral part of an automated irrigation system. A timer is an essential tool to apply water in the necessary quantity at the right time. Timers can lead to an under- or over-irrigation if they are not correctly programmed or the water quantity is calculated incorrectly. Time of operation (irrigation time – hours per day) is calculated according to volume of water (water requirement - litres per day) required and the average flow rate of water (application rate – litres per hours). A timer starts and stops the irrigation process
2. Volume And Storage Based System; the tanks used for storing the water used for irrigation the pre-set amount of water can be applied in the field segments by using automatic volume controlled metering valves . This is for checking the volume of water present in the tank
3. Transmission Systems (Mainlines And Sub-mainlines); this consists of the various pipes (which may vary in size depending on the volume and in length depending on the distance it is to cover) that run from the tank and through the farm carrying water to sprinklers.
4. Power Supply and regulation system; proper supply to power as well as a backup generator that is turned on by the supervisors once there is no power

and the system needs to be ran. Also the use of transformers, rectifiers and voltage regulators to control the amount of current entering the system

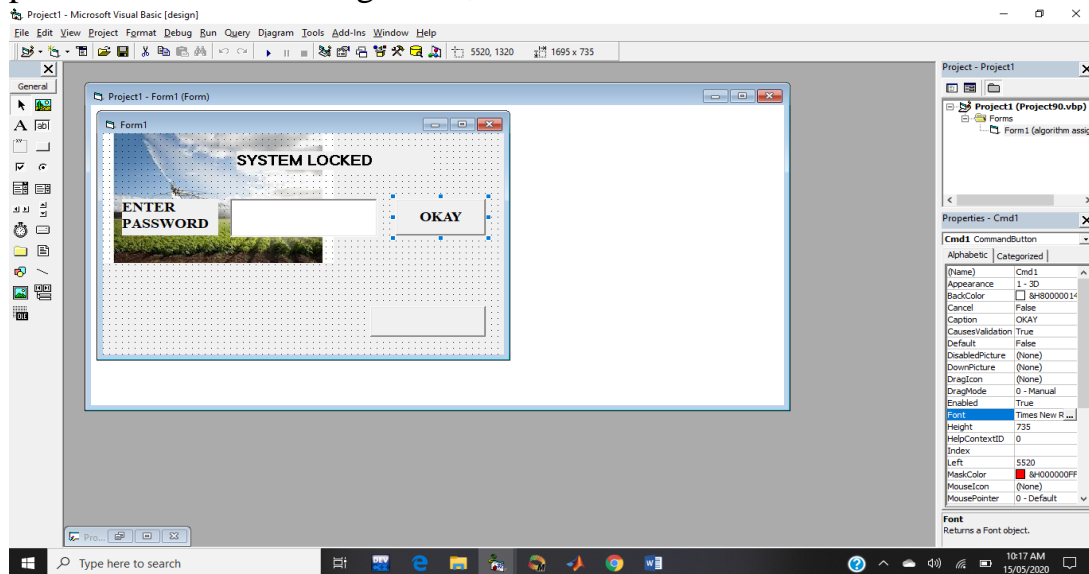
5. Sensing System; both the temperature sensors and moisture content sensor. To check the moisture content, we insert copper wires into the ground for testing whether the soil is dry or not, it will then relay the message back to the microcontrollers which is in charge of running the entire the system
6. Control Unit; everything is being controlled by the microcontroller unit and a comparator.
7. Display Systems; the use of an LCD (liquid-crystal display) which is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. Lcds are available to display arbitrary images, such as preset words, digits, and 7-segment displays as in a digital clock.

SOFTWARE FEATURES;

- **Aduino IDE**; The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures.
This enables automation of the microcontroller, Arduino codes can be found online.
- **Microsoft Visual Basics(VB)**; Visual Basic was derived from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using Data Access Objects, Remote Data Objects, or ActiveX Data Objects, and creation of ActiveX controls and objects. This helps create a sort of graphical exchange and is used to password the entire system.
- Using a google handy tool called **app inventor** surface features like creating your own interphase.

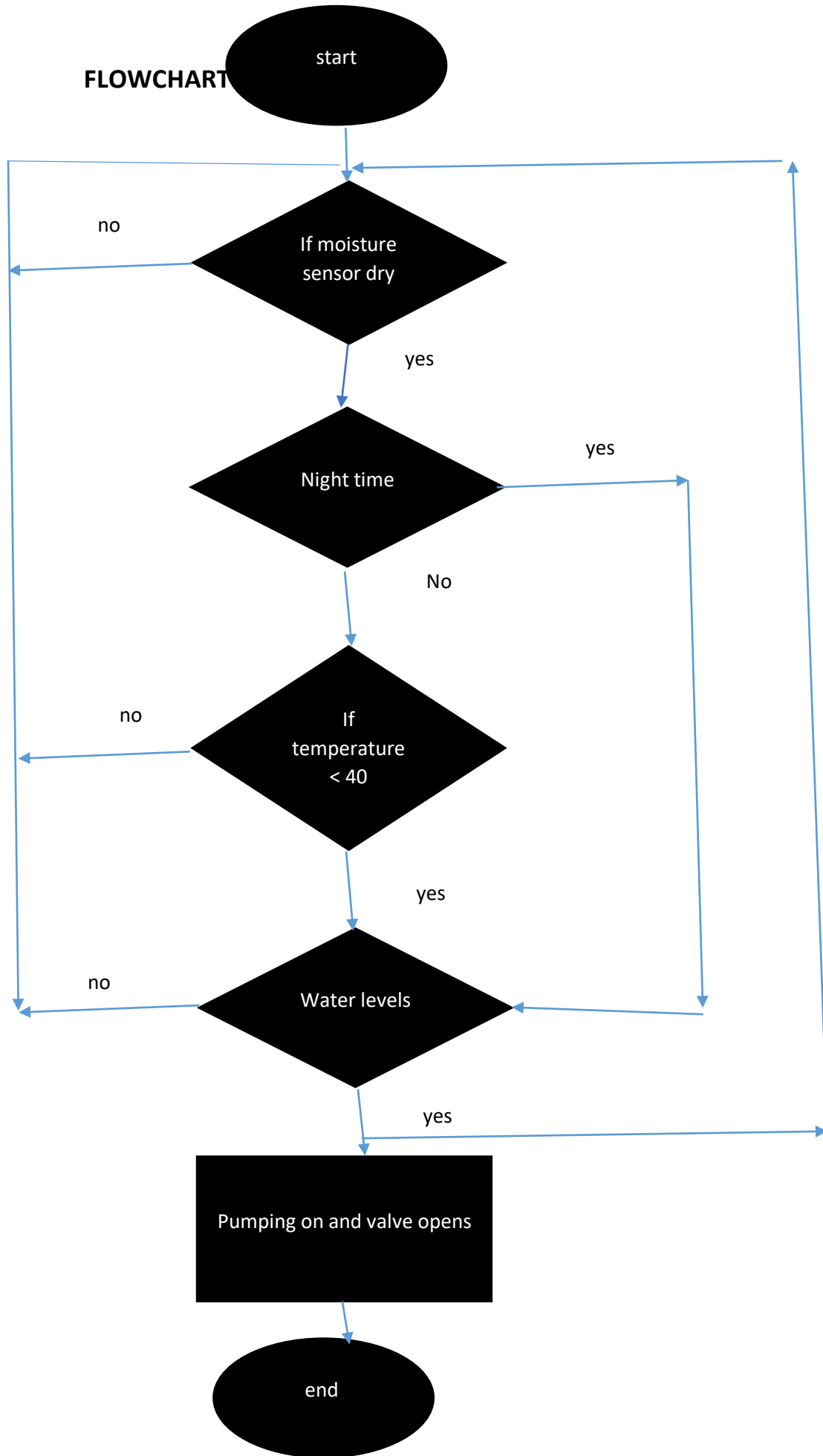
THE CODING AND IMPLEMENTATION;

The Microsoft visual basic helps to create a form of graphical interface to input the password and the code goes as;



```
Private Sub Cmd1_Click()  
Dim Password As String  
Dim Msg, Style, Title, Response As String  
Msg = "ERROR!!! WRONG PASSWORD INPUT CORRECT  
PASSWORD"  
Style = vbOKAYonly  
Title = "Prjgrade"  
Password = "abuadfarm67"  
If Txt1.Text = "abuadfarm67" Then  
Lbl1.Caption = "SYSTEM UNLOCKED"  
Else  
Response = MsgBox(Msg, Style, Title)  
If Txt1.Text = "abuadfarm67" Then  
Cmd2.Caption = "CONTINUE"  
Else  
Cmd2.Caption = "ERROR"  
End If  
End If  
End Sub
```

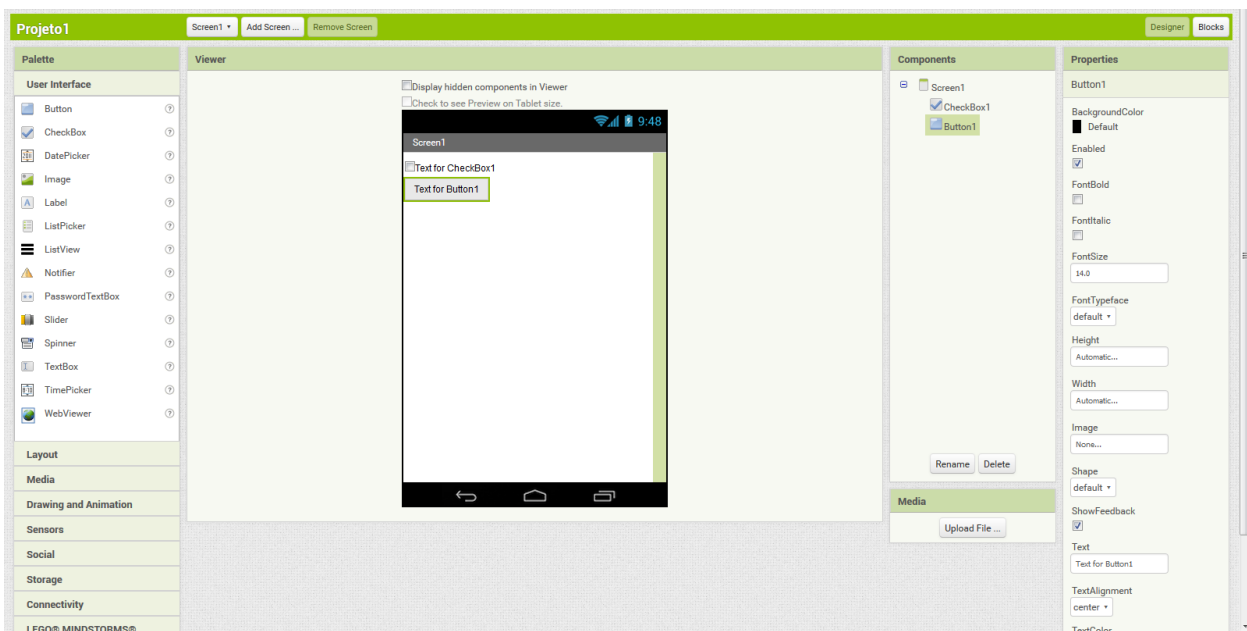
FLOWCHART



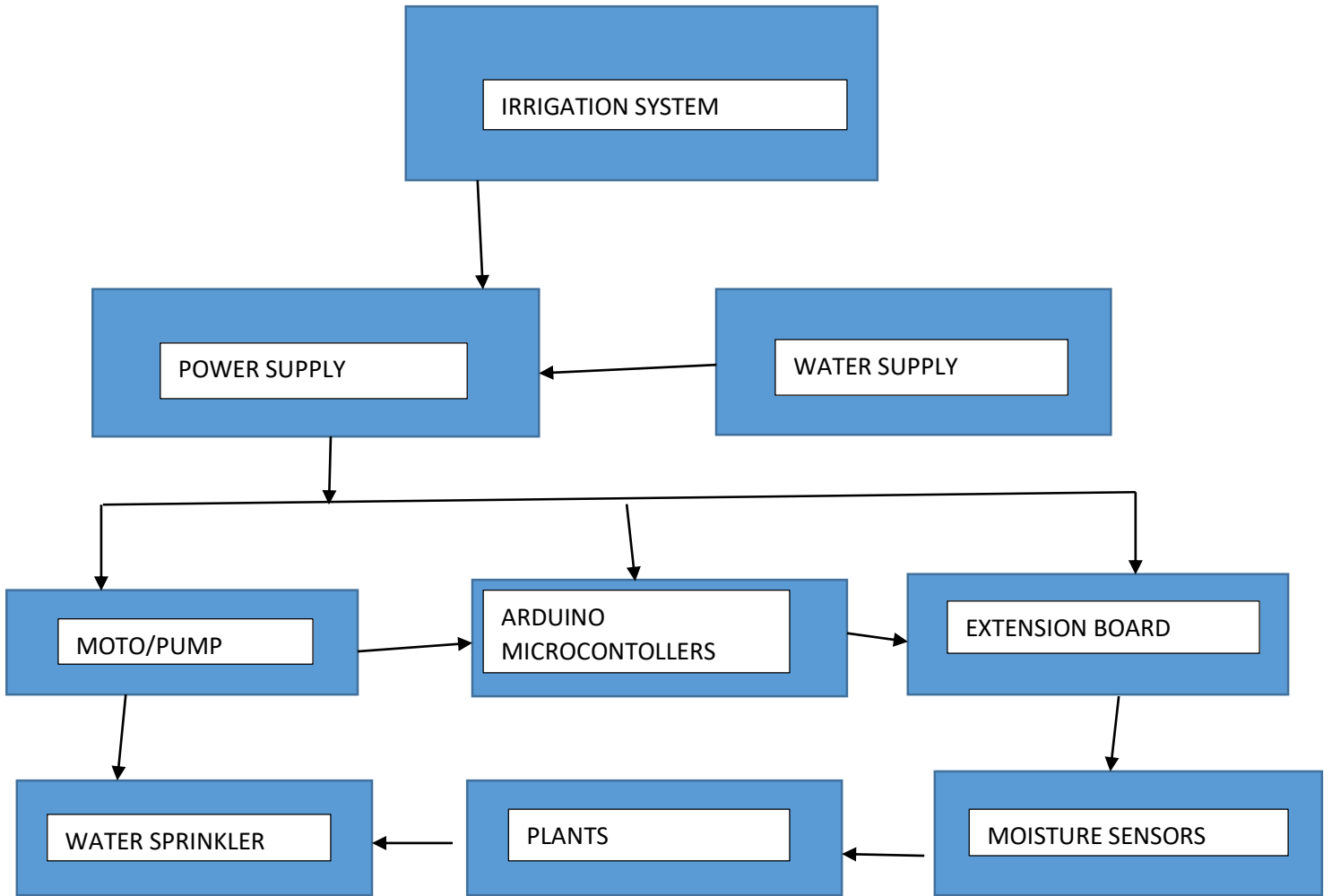
```
start;
if moisture sensor == "dry"
    display(ON)
else
    NULL
if night time && water level at desired level;
    stop water flow
if temperature < 40;
    trigger water system
end
```

note: temperature levels are shown and monitored using an LCD.

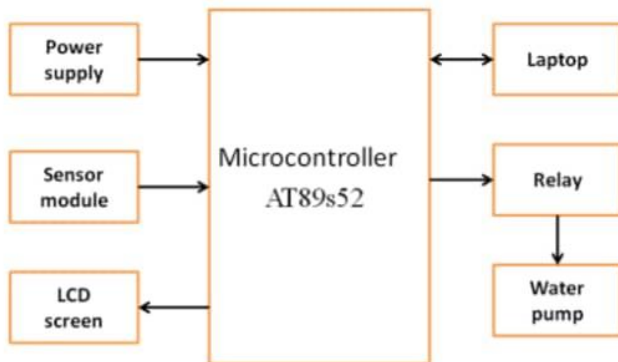
Integrating the system with the app inventor via a Bluetooth client system.



GRAPHICAL REPRESENTATION;



PICTORAIL REPRENTA



TOP TO BOTTOM PRESENTATION ITS APPLICATION

APPLICATION FOR THE IRRIGATION SYSTEM

