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A)) CONCEPTUALIZATION:
The name of the software developed is called ISAPP meaning Irrigation System Application. It is a prototype platform based on easy-to-use hardware and software. It consists of a circuit board, which can be programmed (Crafted to as a microcontroller) and a ready-made software which is used to write and upload the computer code to the physical board.

SPECIFICATION: The modules of the ~~AP~~ ISAPP can be broken down into various modules based on its different functions & They are;
i) The boards are able to read analog or digital input signals from different sensors and turn it into an output as activating a motor, turning LED on/off, connect to the cloud and many other functions
ii) The boards can be controlled by sending a set of instructions to the micro controller on the board via the software
iii) Unlike most previous programmable circuit boards, the ICAPP does not need an extra piece of hardware in order to load a new code onto the system. It can be manually written.
iv) Also, the ISAPP uses a simplified programming language, making it easier
v) The ISAPP has a thermometer sensor which enables the system to read ~~from~~ the temperature of the soil
vi) The ISAPP has a soil moisture sensor to be able to read the soil moisture.
vii) The Actuation system is ~~ab~~ linked with the ISAPP which helps to implement all the instruction Given.
viii) It has an alarm system

B) SOFTWARE FEATURES:
The Irrigation system Application (ISAPP) has a micro controller board based on the AT mega328. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power Jack, an ICSP header, and a reset button. The power to the board (ISAPP) can be provided by connecting USB with the laptop, computer or either by using battery, ~~I~~ The ESP 8266 Wi-fi module integrated TCP/IP protocol which has an ability to give the micro~~pro~~ ~~controll~~ controller to access WI-FI network which makes it possible for the board of the software to be controlled on the laptop or phone. It is cost effective with the huge growing community. It can host an application or offload all WI-FI function from other application. This module has powerful enough onboard processing and storage capacity that allows it to be integrated with the sensor and other applications through GPIO with the minimal runtime. It transforms the module into an IoT solution. Also the ~~software~~ system has the ability to
✓ Read the temperature of the soil using the temperature sensor
✓ Determine the moisture content of the soil.
✓ Configure time interval for the water system
· Trigger an alarm if there is no sufficient water
✓ Enabled password for the system.

HARDWARE FEATURES.
SOIL MOISTURE SENSOR: Soil moisture Sensor has a comparator (LM393) which helps in converting analog data to digital data easy for the processing purpose. Two probes of 5cm are responsible for collecting the data and to transfer when it is immersed in the soil. The voltage output from the Sensor corresponds to the conductivity of the soil. The moisture content ~~of~~ in the soil is determined by the type of the soil and is given as change in resistance value

Algorithms

Step 1: START
2: Read password
3: If Password == brisgwags
~~ELSE~~ Print "Access granted"
ELSE
Print "Access denied.
4): Read all Sensor value
5 ): Assign output in pat 3
6: If ADC value > 40
Print "Temp high"
ELSE:
Print "TampLow"
7) If sensor 2 ADC value < 50
Print "fo"
ELSE:
Print "f1"
8) If sensor 3 ADC value > 50
print "Moistare high"
ELSE:
~~Start pin~~ Measure the soil water tension
If Measured value > starting point of irrigation
Turn solenoid valve on
Turn pump on
ELSE:
Turn solenoid valve off
Turn pump off

9) Write the values of the values of LCD

10) END

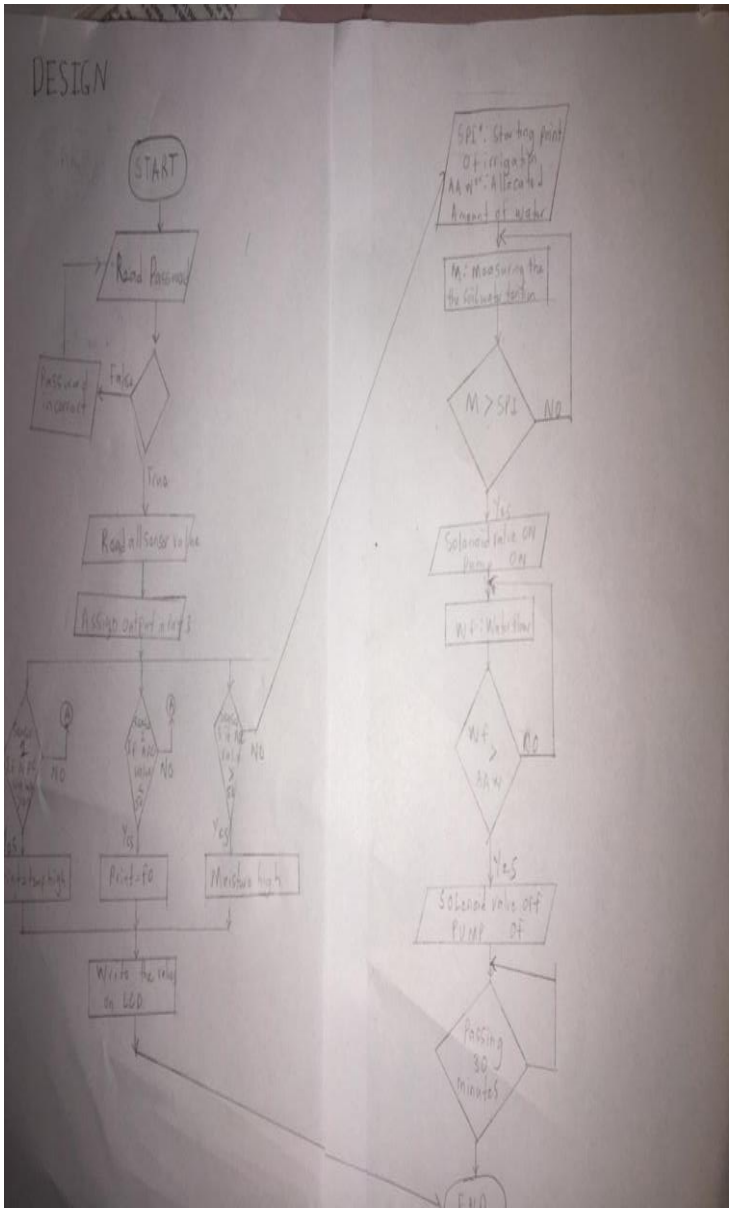
~~C) DESIGN:~~

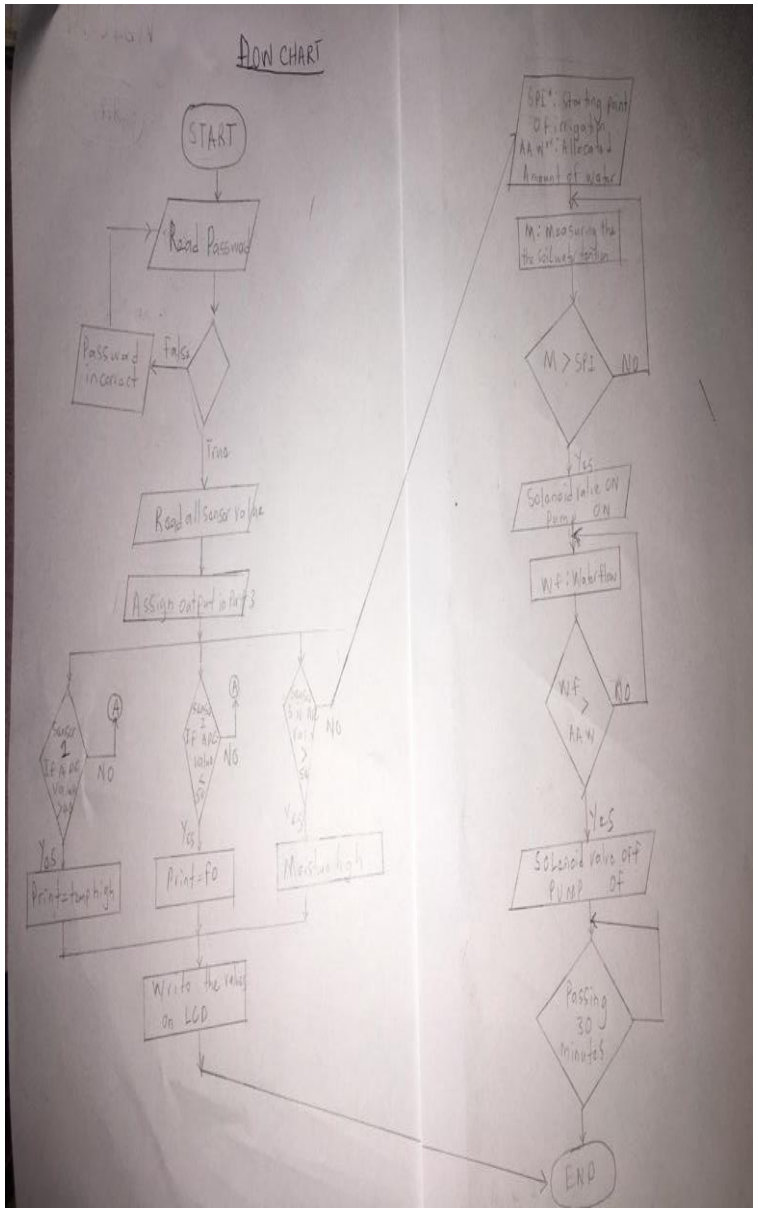
D) IMPLEMENTATION: It was designed in order to work with mobile phones and laptops. The software was created using codes from C++ programming and it is similar to ~~the~~ Arduino. And the programming language is easier to understand.

~~E~~ TESTING:
1) Connect one end of the wire to A0 part.
2) Connect the other end to GND part.
3) Analog 0 in the serial monitor should now read 0.0 volts
4) Remove the wire from GND and connect it to 5V.
5) Analog 0 should now read approximately 5.0 volts.
6) Remove the wire from 5V and connect it to 3.3

DEBUGGING:
1) Write a test case that reproduces the Bug.
2) Know your codes
3) pair program your way out of it.
4) fix the problem

RELEASE AND UPDATE:


DESIGN
START
Read Password
Password incorrect
False
True
Read all sensor value
Assign output relay
NO
YES
Print=Temp high
Print=FO
Moisture high
Write the value on LCD
SPI: Starting point of irrigation
AA W: Allocated Amount of water
M: Measuring the the soil wetness portion
M > SPI
NO
YES
Solenoid valve ON Pump ON
WF: Water flow
WF > AA W
NO
YES
Solenoid valve off PUMP OF
Passing 30 minutes
END


FLOW CHART
START
Read Password
Password incorrect
False
True
Read all sensor value
Assign output relay 3
NO
YES
Print=Temp high
Print=FO
Moisture high
Write the value on LCD
SPI: Starting point of irrigation
AA W: Allocated Amount of water
M: Measuring the the soil wetness portion
M > SPI
NO
YES
Solenoid valve ON Pump ON
WF: Water flow
WF > AA W
NO
YES
Solenoid valve off PUMP OF
Passing 30 minutes
END

of the sensor. The resistance across soil probes can vary from infinity (for completely dry soil) to a very little resistance (for 100% moisture in soil). This variation in resistance across the pickles (CRS) leads to variation in forward bias voltage.

TEMPERATURE SENSOR: An NTC temperature sensor. A thermistor is a variable resister. The resistance changes with the change in temperature. These sensors are made of semiconductive materials composed of ceramics & polymers to provide larger changes in the resistance with just small changes in temperature. The term "NTC" means "Negative Temperature Coefficient", Works on the principle that the resistance decreases with the increase of the temperature.

THE TANK: The tank is a reservoir which is used to store water received from a river nearby the farm. The tank is made using hard plastic, It is durable and cost effective. And also the tank has an attached alarm system which helps to alarm us if there isn't enough water in the tank. The Alarm is connected to the ISAPP, the alarm can be controlled with the Application System.

SOLENOID VALVE: SOLENOID VALVE:
Solenoid Valves are electro mechanical valves that are controlled by stepping a running an electrical current through a solenoid, in order to change the state of the valve. A solenoid is a coil of wire that is magnetized when electricity runs through it. The solenoid valve makes use of this solenoid in order to activate a valve thus controlling the water flow, airflow and other things with electricity. There are three types of solenoid valves which are general-purpose type, low pressure steam type and high pressure steam pipe. It also uses a timer to control the water flow.