

ENG 224 Assignment

1. ABUAD has hired me to help them ease their trouble during times of dry season to help them design a smart machine which will help them water and nurture their crops to ensure they have plenty for the community and members for ABUAD.

Concept: The smart machine I would be designing for the ABUAD farm is going to distribute water throughout the farm to ensure all crops are receiving enough water supply and not being dehydrated due to the humidity of the atmosphere. It is going to function by the aid of some important sensors which are going to :

A) Check temperature of the soil, if it is hot and needs water.

B) Check moisture content of the soil, this would be to ensure crops aren't dry and dehydrated.

C) A self maintenance check protocol will be put in place so it can alarm the user which would operate it, if it lacks important things like oil, water or even power.

Specs: Graphical User Interface {GUI}

Thermosensors

Tensionmeters

Biometrics interface

The above are some components to aid the programme that will run the machine.

All programmes written concerning the project undertaken will be written in a high level language specifically C ++, because it is commonly used and for easy access in case external agents are called upon to work on the system if I won't be available.

STEPS TAKEN TO DEVELOP THE SOFTWARE{GENERIC}

- 1.} Develop an algorithm and pictorial presentation of the algorithm{flow chart}.
- 2.} Idealize the code and implement my program on a suitable integrated development environment.
- 3.} Study the ranges of the sensors from the lowest marker to the highest and modify it in the program.
- 4.}Test the program for effective run and analyzing the program for bugs.
- 5.}Implement the program with the machine and observe the effective operations.

B} Hardware and software features

Software features: This is the mind of the computer that will control the operations of the smart Agric machine.

- i. Input /Output Operations :These features deals with the entry and delivery of the information put into the result that will be performed.
- ii. Security operation: This feature ensures that the system is highly protected from unauthorized users who will be trying to operate the smart system, also it will protect the software for different malware with the aid of efficient anti-virus operations, scanner management tools like NIKTO, High Protection is guaranteed.
- iii. Manipulation of file systems: Programs written and important information that will be useful to the user can be store in the databases{files}, the manipulation of these file systems will be used for creating, categorizing and deleting files.
- iv. Specially Designed Simple GUI: A far from complex GUI will provide a platform which the user will be able to see what task they want the system to perform, monitor the levels of the system for proper maintenance. Generally, this is just for smooth interaction between the user and the system by virtue of visuals.
- v. Radio Frequency Identification: This is used in Automatic Identification and data capture when introduced with the software. It will help in a number of purposes such as allowing the system know the progress it has made.

Hardware Features

- i. Thermometer: This will be used to measure the temperature of the soil to check if it is too hot, so that water can be poured out for the crops to be able to thrive in it.
- ii. Alarm System: This alarm system is to alert the user for any problems with regards to the machine and for potential danger for the overall safety of the machine, individual, soil and crops. The alarm will contain buttons on the machine, buttons for oil, water and power ecetera. Which will emit light on any of the buttons, if the machine is lacking in any of these, also a speaker would be provided to voice out the alarms.
- iii. Watering tank and Sprinklers: This machine will contain a reservoir where water is stored which will be connected via pipeline to a borehole for continuous pumping of water. The sprinkler on the machine will be for dispensing of water to the soil and crops.
- iv. Tensionmeter/ Tensiosensors: This will be made able to measure and detect moisture levels of the soil, they measure tension or suction that plant roots must exert to extract water from the soil.
- v. Time {clock} system: Though the time interval will be put into the program. A hardware digital clock will be displayed, which will show the operator the following : last time it was maintained, last time it carried out operations on the farm, future dates and set out work.

Algorithm of irrigation system

Step 1: start system.

Step 2: Read temperature ,moisture content

Step 3: Maximum temperature of soil : value x

Step 4: Maximum moisture content of soil: value y

Step 5: if temperature \geq Maximum temperature & moisture content \leq maximum moisture content

 "print turn on water sprinkler"

Step 6: if temperature \leq maximum temperature & moisture content \leq maximum moisture content | temperature \geq maximum temperature & moisture content \geq maximum moisture content

 "print turn on water sprinkler"

Step 7: else if temperature \leq maximum temperature & moisture content \geq maximum moisture content

 "print turn on water sprinkler"

Step 8: End

N.b: & and | are logical operators included in the algorithm to represent respectively AND and OR.

Algorithm programmed in C language

```
int t,mc,maxt,maxmc;  
printf("enter t\n");  
scanf("%d",&t);  
printf("enter mc\n");  
scanf("%d",&mc);  
maxt =200;  
maxmc =300;  
if ((t>maxt) & (mc<maxmc))  
{  
  printf("turn on sprinkler\n");  
  else if ((t<maxt) & (mc>maxmc))  
  {  
    printf("turn off sprinkler\n");  
  }  
if ((t<maxt) & (mc<maxmc) | (t>maxt) & (mc>maxmc))  
{  
  printf("turn on sprinkler\n");  
}  
return 0;
```

Flow chart of irrigation system

Start



Read
temp, MC



Max mc = value x



Max temp =
value y



If temp
 \geq max
temp &
mc $>$
= max

false

Print turn
off sprinkler

true

Print turn
of
sprinkler



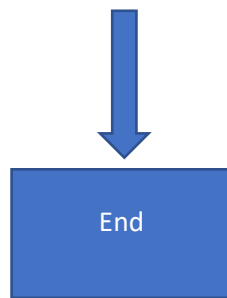
else if temp \leq
max temp &
mc \leq max mc |
temp \geq max
temp & mc \geq
max temp

false

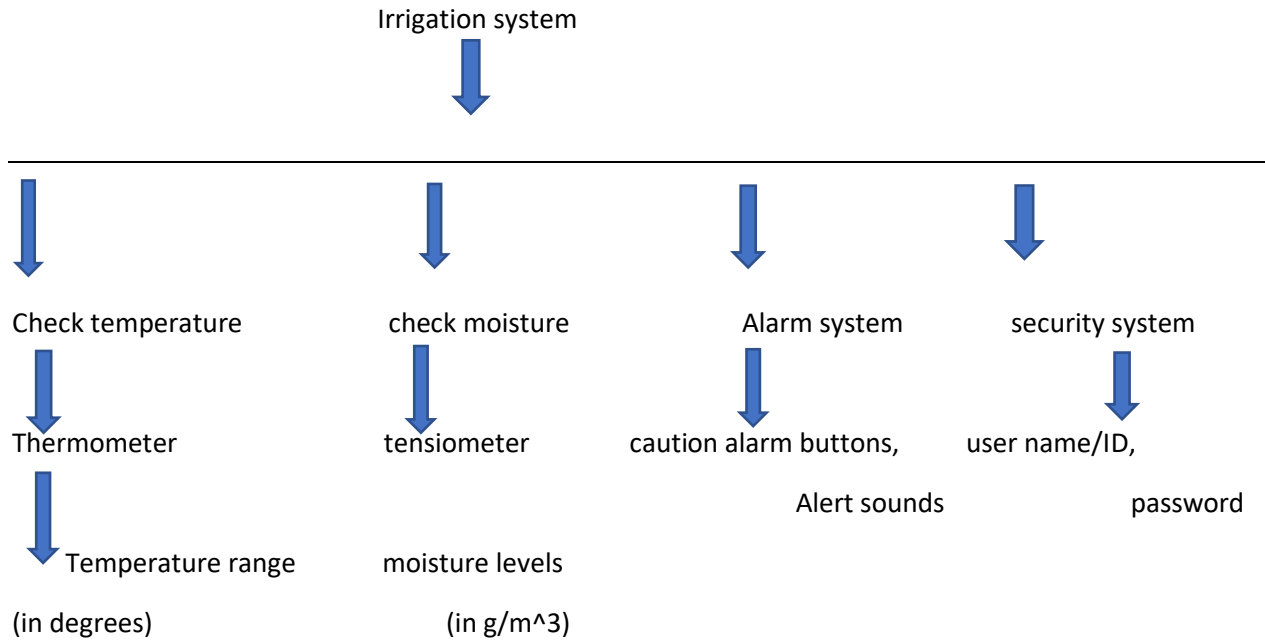
Print
turn off
sprinkle
r

true

Print turn on
sprinkler



Top-down approach of the irrigation system



Visual display of algorithm in c programming language

```
4   int main()
5   {
6       int t,mc,maxt,maxmc;
7       printf("enter t\n");
8       scanf("%d",&t);
9       printf("enter mc\n");
10      scanf("%d",&mc);
11      maxt =200;
12      maxmc =300;
13      if ((t>maxt) & (mc<maxmc))
14      {
15          printf("turn on sprinkler\n");}
16      else if ((t<maxt) & (mc>maxmc))
17      {
18          printf("turn off sprinkler\n");
19      }
20      if ((t<maxt) & (mc<maxmc) | (t>maxt) & (mc>maxmc))
21      {
22          printf("turn on sprinkler\n");
23      }
24      return 0;
```

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Code::Blocks

Search results

Cccc

Build log

Build me

----- Run: Debug in pacl (compiler: GNU GCC Compiler)-----
ing for existence: C:\Users\TIPU\...

