ASSIGNMENT -7TH NOV 2014

1.Program to calculate GCD and LCM of corresponding elements from two arrays ,arrayx and array y . size of array will be provided as an input .write an algorithm.

Step1;Take array size as input from user

Step2:input elements to arrayx and array

Step3: calculate GCD of corresponding elements

Let a and b be the elements

If b!=0 then update a=temp

b=a%b

a=b

else if b=0 then GCD=a

step4: calculate LCM of corresponding elements

LCM=a*b/GCD(a,b)

Step5: print LCM and GCD

2. Problem Statement 1: Temperature Monitoring System Objective: Design a temperature monitoring system that reads temperature data from a sensor and triggers an alarm if the temperature exceeds a predefined threshold. Requirements: Read temperature data from a temperature sensor at regular intervals. Compare the read temperature with a predefined threshold. If the temperature exceeds the threshold, activate an alarm (e.g., LED or buzzer). Include functionality to reset the alarm. write an algorithm.

Step1: Intialize the system

1.1 set a threshold temperature value
1.2 intialize sensor to read data
1.3 intialize alarm to OFF

Step2:Read the temperature

Step3: Compare the value

If read temperature>threshold

Then Goto step4

Else continue reading temperature

Step4:Activate the alarm

Then reset the alarm and system to intial state

Step5: continue from step1

3. Problem Statement 2: Motor Control System Objective: Implement a motor control system that adjusts the speed of a DC motor based on user input. Requirements: Use a potentiometer to read user input for desired motor speed. Control the motor speed using PWM (Pulse Width Modulation). Display the current speed on an LCD. give me an algorithm.

Step1:initialize the system

Step2:read user input using a potentiometer

Step3:Control the motor speed using PWM

Step4: display the current speed on an LCD

Step5:repeat

4. Problem Statement 3: LED Blinking Pattern Objective: Create an embedded system that controls an array of LEDs to blink in a specific pattern based on user-defined settings. Requirements: Allow users to define blink patterns (e.g., fast, slow). Implement different patterns using timers and interrupts. Provide feedback through an LCD or serial monitor. give an algorithm.

Step1:initialize the system

Step2create a variable to store the blink pattern

Step3:allow the user to select a blink pattern

Step4:set up timer for generating interrupts

Step5:display feedback using LCD or serial monitor

Step6:repeat

5. Problem Statement 4: Data Logger Objective: Develop a data logger that collects sensor data over time and stores it in non-volatile memory. Requirements: Read data from sensors (e.g., temperature, humidity) at specified intervals. Store collected data in EEPROM or flash memory. Implement functionality to retrieve and display logged data give an algorithm.

Step1:initialize the system

Step2:collect data from sensor

Step3:store the data in a nonvolatile memory

Step4;read the stored data

Step5:display the data

6. Problem Statement: Write a program that functions as a simple calculator. It should be able to perform addition, subtraction, multiplication, and division based on user input. Requirements: 1. Prompt the user to enter two numbers. 2. Ask the user to select an operation

(addition, subtraction, multiplication, division). 3. Perform the selected operation and display the result. 4. Handle division by zero appropriately. give me a pseudocode.

step1: get two numbers num1,num2 as user input

step2:select an operation:

1.addition

2.subtract

3.multiply

4.division

step3: switch(operation):

case1:

result=num1+num2

print result

case2:

result=num2-num3

print result

case3:

result=num1*num2

print result

case4:

if(num2==0)

print error

else

result=num1/num2

print result

break;

default:

print choose a valid operation

7. Factorial Calculation Problem Statement: Write a program to calculate the factorial of a given non-negative integer. Requirements: 1. Prompt the user to enter a non-negative integer. 2. Calculate the factorial using a loop. 3. Display the factorial of the number. c code

step1:get a non negative number from user,num

step2:intialize factorial=1

step3:for(i=1;i<=num;i++)

factorial=factorial*i

step4:print the factorial

USING RECURSION

calculatefact(num)

fact=1

for(i=1;i<=num;i++)

factorial=factorial*i

return factorial

enter num,

if num<0

print enter a valid number

else

result=calculatefact(num)

print result

8. **Problem Statement: Smart Irrigation System**

Objective: Design a smart irrigation system that automatically waters plants based on soil moisture levels and environmental conditions. The system should monitor soil moisture and activate the water pump when the moisture level falls below a predefined threshold.

Requirements:

1. Inputs:
2. Outputs:
3. Conditions:
    - The pump should only activate if the soil moisture is below the threshold and it is daytime (e.g., between 6 AM and 6 PM).
    - If the soil moisture is adequate, the system should display a message indicating that watering is not needed.

- Activate the water pump when the soil moisture is below the threshold.
- Display the current soil moisture level and whether the pump is activated or not.
- Soil moisture sensor reading (percentage).
- User-defined threshold for soil moisture (percentage).
- Time of day (to prevent watering during rain or at night).

Deliverables:

- Write pseudocode that outlines the algorithm for the smart irrigation system.
- Create a flowchart that visually represents the logic of your pseudocode.

Pseudocode

Get threshold value from user

Get Soilmoisture from sensor

Get timestamp

If soilmoisture>=threshold

Display ‘water not needed’

Set pump_status=notactivated

Else

Check the timestamp

If 6<= timestamp<18

Set pump_status=activated

Display ‘watering needed’

Else

Set pump_status=not activated

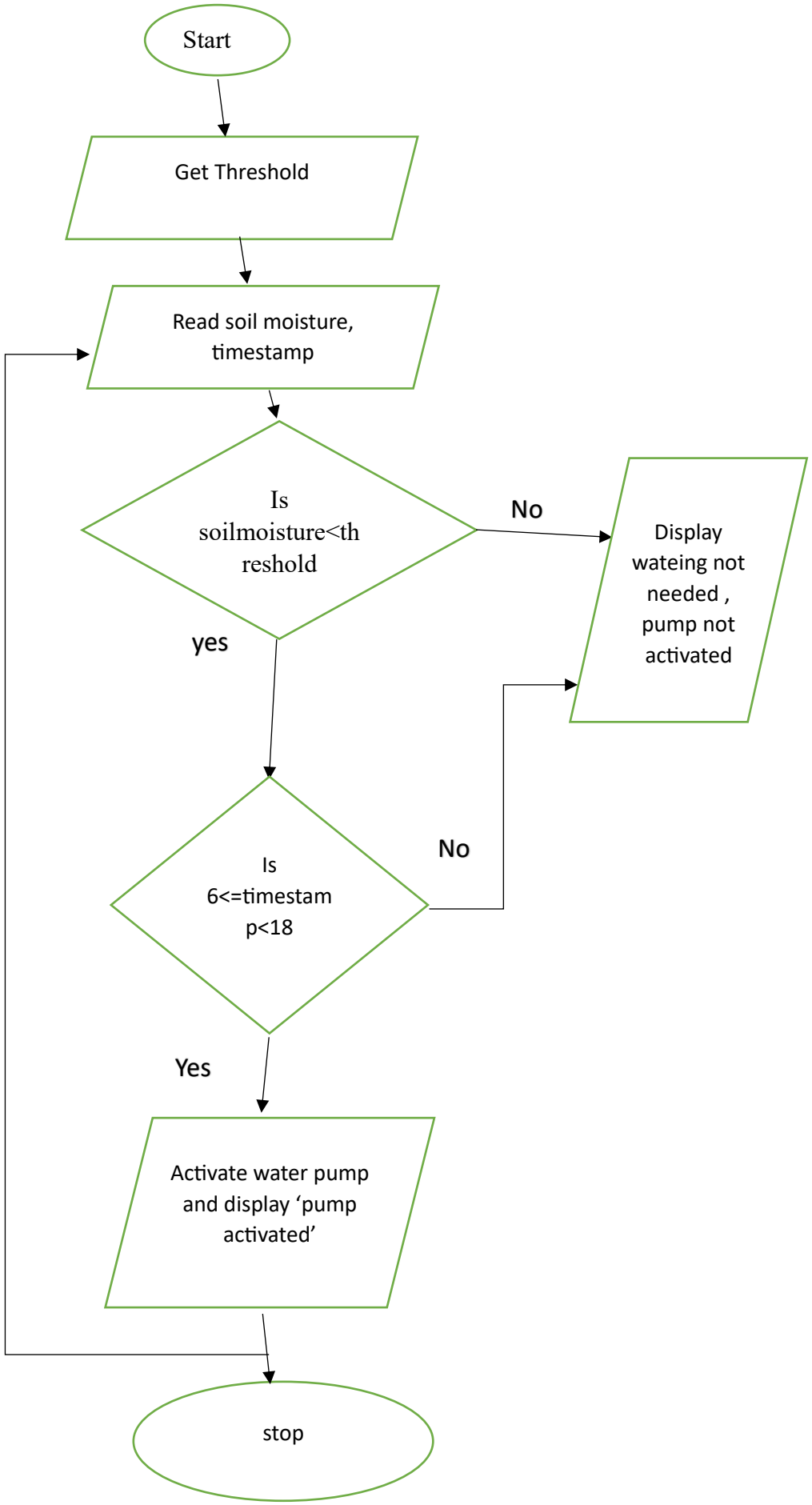
Display ‘watering not needed

Display soilmoisture

Display pump_status

Repeat

Flowchart


Start
Get Threshold
Read soil moisture, timestamp
Is soilmoisture<threshold
No
Display wateing not needed , pump not activated
yes
Is 6<=timestamp<18
No
Yes
Activate water pump and display 'pump activated'
stop