

ASSIGNMENTS OF DAY2

q1. Write a program to calculate the Greatest Common Divisor (GCD) and Least Common Multiple (LCM) of corresponding elements from two arrays, ArrayX and ArrayY. The size of the arrays will be provided as an input. Write an algorithm for the above problem statement

ALGORITHM

1. take array size as input from user
2. input elements to array x and array y
3. calculate GCD of corresponding elements
 - 3.1 if $b \neq 0$ then update $a=b$ and $b=a \% b$
 - 3.2 when $b=0$, $GCD=a$
4. find lcm of corresponding elements $lcm(a,b)=a*b/gcd(a,b)$
5. print the gcd and lcm

q2. 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.

ALGORITHM

1. Start
2. Read the temperature value
3. Read the threshold value
4. Compare the temperature value with the threshold value, if it is greater then on the alarm 5. else
6. off the alarm.
7. Repeat it at regular intervals
8. Stop

q3. 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.

ALGORITHM

- 1.Start
- 2.Read the user input for motor speed
- 3.Read the current motor speed
- 4 .If both the values are equal nothing to do, else using pwm increase or decrease the motor speed
- 5.print the current speed
- 6.Stop

q4. 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.

ALGORITHM

1. Get an array of LED from the user
2. Get the timer for controlling blink intervals
- 3.Get the LCD for provide feedback
- 4 Allow users to choose a blink pattern

- 5 Based on user input use the timer to adjust the intervals
- 6 Blink LED according to the pattern
- 7 Display the current blink on LCD
- 8.repeat the process based on input

Q5. Problem Statement 5: 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

ALGORITHM

- 1.Set an Interval for data logging
- 2.Read the data into variables at the specified interval
- 3.Store the data in EEPROM or flash memory
- 4.Display the data when required
- 5.Repeat

Q6. 5.Simple Calculator

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.

- 1.Read num1,num2
- 2.print "select an operator(+,-,*,/)"
- 2.Read op
- 3.Switch(op):
- Case '+':

Result=Num1+num2

Print "Result"

Break

Case'-':

Result=Num1+num2

Print "Result"

break

Case'*':

Result=Num1*num2

Print "Result"

break

Case'/':

If num2!=0

Result=Num1/num2

Print "Result"

Break

Else

Print "Division by zero is not allowed"

Endif

Break

Default:

Print "Invalid operation"

Break

End switch

Q7. 6. 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.

Answer

Read num1

```
if num1>0:
    For i=0 to n
        Set fact=fact*i
    End for
    Display the fact
Else
    Print "Invalid number has entered"
```

Q8. Factorial by recursion

Pseudocode

Function Fact(n):

 If n == 0:

 Return 1

 Else:

 Return n * Fact(n - 1)

In the Main function:

 Read the number from the user, n

 Final = Factorial(n)

 Print Final

Q9. 7. 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 outline... by Abhinav Karan (Unverified)Abhinav Karan (Unverified)04:44 pm

Deliverables:

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

has context menu

Smart irrigation system

pseudocode

1.Get the current soil moisture represented by a

2.Get the threshold value rep as thresh

3.Get the daytime

4.check If daytime ≥ 6 && dayime < 18 :

5.If a $<$ thresh:

Print "Pump=on."

6. Else:

Print "Soil moisture is sufficient and no need for watering and pump=off." 7.print

a

8. Print messages about watering status and pump activation.

9.stop

Flowchart

