Dhaka International University

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Estd. 7th April, 1995

DEPARTMENT OF CSE

LAB REPORT

COURSE NAME : Structured Programming Language Lab

COURSE CODE : 0613-102

REPORT NO : 07

REPORT ON : GCD and LCM calculator and Sum of the digit of an integer calculator in C Programming.

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DATE OF SUBMISSION : 09 November, 2024

Date of Performance: 26 October, 2024

Title: GCD and LCM calculator & sum of the digits of an integer calculator in c programming.

Objective: The objective of this lab report is to:

- Implement a program in C to calculate the Greatest Common Divisor (GCD) and least common Multiple (LCM) of two numbers using the euclidean algorithm.

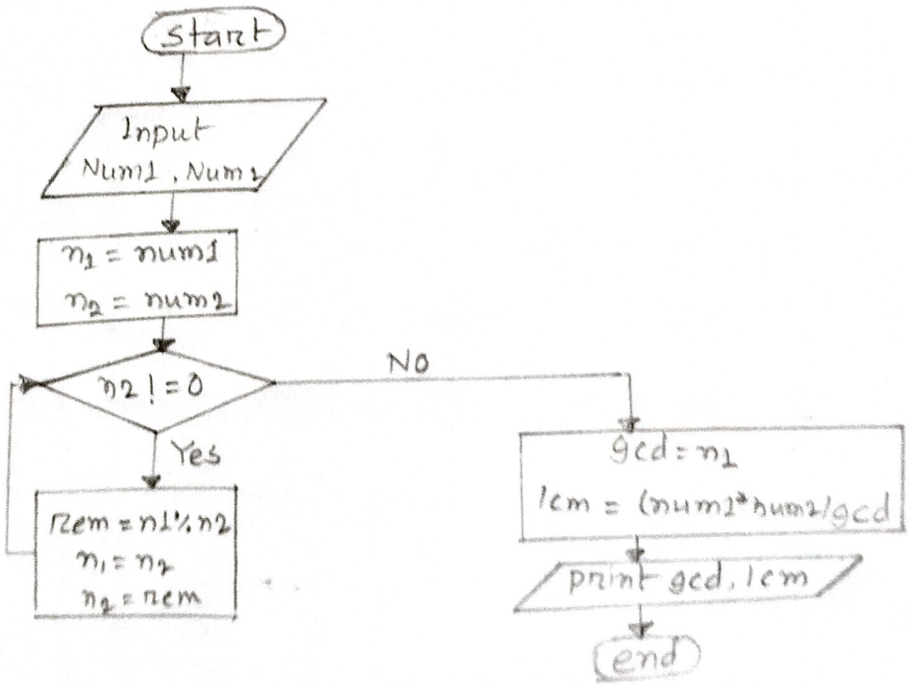
- Develop a program to calculate the sum of the digits of a given number.

Introduction: These programs illustrate the use of loops and basic arithmatic operations in c to achieve calculation like GCD, LCM and sum of digits.

GCD and LCM Calculator:

... Explanation: This program uses the Euclidean algorithm to calculate the GCD of two numbers, then calculates the LCM using the formula - LCM = (num1 * num2) / GCD.

... Flowchart:



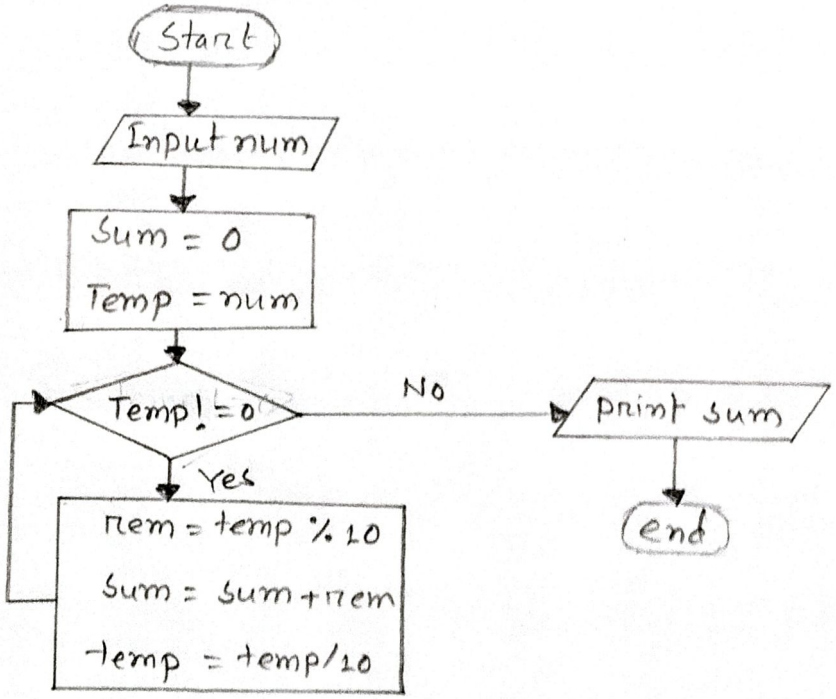
... Algorithm:

1. Start
2. Input num1, num2
3. Set n1 = num1, n2 = num2
4. While (n2 != 0):
   - remainder = n1 % n2
   - n1 = n2
   - n2 = remainder
5. gcd = n1, lcm = (num1 * num2) / gcd
6. print gcd, lcm.
7. end.

Sum of the Digits of an integer:

... Explanation: This program extracts each digit of an integer using the modulus operator %, adds the digit to-gether and prints the result.

... Flowchart:



... Algorithm :

1. start
2. Input a number
3. temp = num, sum = 0
4. while (temp != 0)
   - rem = temp % 10
   - sum = sum + rem
   - temp = temp / 10
5. print sum
6. end

Discussion: In this section we will learn about the presentation of code, output and explanation of code. The shown code will be as in IDE and the output will be as in console.

GCD and LCM of Two Integers :

... code :

```
#include <stdio.h>
int main (){
    int num1, num2, n1, n2, rem, gcd, lcm;
    printf("Enter two numbers : ");
    scanf(" %d %d ", &num1, &num2);
    n1 = num1;
    n2 = num2;
    while (n2 != 0){
        rem = n1 % n2;
        n1 = n2;
        n2 = rem;}
    gcd = n1;
    lcm = (num1*num2) / gcd;
    printf("gcd is : %d \nlcm is : %d \n", gcd, lcm);
    return 0;}
```

... output:

```
Enter two numbers : 60 24
gcd is : 12
lcm is : 120
```

⊞ Sum of the digit of an integer:

... code:

```
#include<stdio.h>
int main (){
  int num, sum=0, temp, rem;
  printf("Enter a number : ");
  scanf(" %d ", &num);
  temp = num;
  while (temp!=0){
    rem = temp % 10;
    sum = sum+rem;
    temp = temp/10; }
  printf(" The sum of the integer %d is %d \n", num, sum);
  return 0;
}
```

... output:

```
Enter a number : 123456
The sum of the integer 123456 is 21.
```

⊞ Conclusion: These program demonstrate how loops and arithmetic operators can be used in c programming to calculate the gcd, lcm and sum of digits. While The GCD/LCM is limited to positive integers and the sum of digits program works only for non-negative integers,

both provide a structured apporch to problem-solving that is applicable in numerous mathematical and computational contexts.

References:

- C standard library documentation
- github.com
- free code camp.org.