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II Semester B. Tech. CSE- Discrete Mathematics-23MAT116

Lab Exercise-3-Recursive algorithms

**Write a program in MATLAB to do the following:**

1. To find the factorial of a positive integer using the inbuilt function ‘factorial’ and using the recursion technique. Compare the two results and report if there is a bug in your recursive technique.

What happens if user inputs 0 ? Alter the above code suitably so that 0 is accepted as input and the program finds factorial (0) as 1.

1. To find the GCD of two positive integers using the inbuilt function ‘gcd’ and using the recursion technique. Compare the 2 results and reports if there is a bug in your recursive technique. Also, include a few lines of code to find and print the LCM of the given numbers if the gcd obtained from both methods matches.

Ensure that the output for LCM of two numbers obtained from your program is correct by using ‘lcm’ command at the command prompt for the following pairs of numbers :

* + 1. 6, 36 b) 4, 14 c) 5, 46 d) 7, 25 e) 120, 58

1. To compute an, for non-zero real ‘a’ and a positive integer ‘n’ using recursion. The program should also find the difference in the output obtained from the recursive program and the ‘power’ command of MATLAB. What difference do you notice in the following problems? Why?

a) a = 2, n = 100 b) a = 2.3, n = 100

1. Write a recursive program for modular exponentiation.
2. Write a recursive program to find the nth Fibonacci number.
3. Write a recursive program to find the nth term of the sequence which is defined as follows:

* 1. Write a recursive program to compute