Experiment No. 3

Aim: Apply the concept of functions to incorporate modularity

Common Programs :

1.Write a function to find the sum of the proper divisors of a given number ‘n’. The proper divisors of a number ‘n’ are the numbers less than n that divide it; they do not include n itself.
e.g. n=12 sum =1+2+3+4+6=16

2. Write a function which takes a range as input. Print all the numbers in the range with ‘*’ in front of prime numbers only.
Example:
Print a table as follows
1* 2* 3* 4 5* ... 10
11* 12 13* 14 15 ... 20
upto 100. All primes are starred.

3. Write a function which takes as parameters two positive integers and returns TRUE if the numbers are amicable and FALSE otherwise. A pair of numbers is said to be amicable if the sum of divisors of each of the numbers (excluding the no. itself) is equal to the other number. Ex. 1184 and 1210 are amicable.

Batch 1: Write a function that prints the sum of the series (1!/1+2!/2+3!/3+....+n!/n). Take n as the input and return sum of series as the output. (3! = 3*2*1).

Batch 2: Write a function to find out whether given numbers are relatively prime or not. A number is relatively prime if the ‘1’ is the only common factor between the two numbers. For example: 9 and 8 are relatively prime. (9 =1x3x3 and 8=1x2x2x2).

Batch 3: A common method of evaluating powers is merely to perform repeated multiplications. A more efficient method of evaluating XN is possible:
Initialize PRODUCT to 1, POWER to X and M to N.
While M is non-zero repeat the following task:
If M is odd then
Replace PRODUCT by PRODUCT * POWER
End If;
Replace M by M/2;

Replace POWER by POWER * POWER
End task.
The required result is then in POWER.
Write a function which represents this procedure for calculating XN.

Batch 4: The Mobius function M (N) is defined as
M (N) = 1
if N=1
= 0
if any prime factor is contained in N more than once
= (-1) P
if N is the product of p different prime factors
Thus, for example
M (78) = -1 [78 = 2 * 3 * 13]
M (34) = 1 [34 = 2 * 17]
M (45) = 0 [45 = 3 * 3 * 5]
Write a function MOBIUS as specified above.