Programing Problems

(1) Implement a Fortran 90 program which reads two positive integers n and k and calculates and displays the number and the sum of the numbers in the interval [1,n], which are powers of k.

(2) Implement a Fortran 90 program which reads a CHARACTER string called *MyString* of length less than or equal to 100 and calculates and displays the number of letters in MyString which are of the form "a" or "A".

(3) Implement a Fortran 90 program which reads a CHARACTER string called *MyString* of length less than or equal to 100 and displays whether "ia" is a part of *MyString* or not.

(4) Implement a Fortran 90 program which reads an integer n greater than or equal to 2 and which calculates and displays the number of prime numbers which are greater than or equal to 2 and less than or equal to $n-1$.

(5) Implement a Fortran 90 program which reads two integers and calculates their greatest common divisor. *Do not use any Fortran built in functions or subroutines.*

(6) Implement a Fortran 90 program which reads a positive integer n and returns a random number greater than or equal to 0 and less than n. *Do not use any Fortran built in functions or procedures, except the subroutine RANDOM_NUMBER() which returns a random number in the interval [0,n).*

(7) Implement a Fortran 90 program which reads a positive integer n and calculates and displays the number of numbers whose last digit is 5 and which lie in the interval (-|n|,|n|).

(8) Implement a Fortran 90 program which reads a positive integer n and calculates and displays the sum of the odd integers which lie in the interval (n, n^2).

(9) Implement a Fortran 90 program which reads a positive integer n and returns how many 4's are there in n (i.e. how many times the digit 4 shows up in the number n.)