

Title

The Euclidean Algorithm

Problem Description

The greatest common factor (gcf) of two positive integers, a and b , is the largest integer that divides a and b without a remainder. For example, $\text{gcf}(5,10) = 5$ and $\text{gcf}(31,8) = 1$. The Euclidean Algorithm is an efficient method for computing the gcf of two integers using the following iterative process:

Given: a, b

Find: $\text{gcf}(a, b)$

subtract the smaller number from the larger number and store the result. The result, along with the original smaller number, gives a new pair of numbers. Repeat this process with the new pair until one of the two numbers is zero. When that occurs, the gcf is the nonzero number.

For example: $\text{gcf}(4, 20)$. The larger number is 20, so we subtract 4 from it and get $20 - 4 = 16$. The new pair of numbers is $(16, 4)$. 16 is the larger number. $16 - 4 = 12$, and the new pair is $(12, 4)$, and so on.

Write a function for computing the gcf of two integers using the Euclidean algorithm. The function should take two integers as input and return an integer that is the gcf. You may assume that the two inputs will always be positive. Write a main program to test your function.

Testing

Test Input	Expected Output
36 18	18
52 0	52
100 10	10
946 382	2
91 13	13

Time Target

- *** less than 5 minutes
- ** 5-15 minutes
- * greater than 15 minutes

Section

functions

