

## Week 16

### Recursion

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#### Lab 14 - Solving Problems with Recursion

Solve the following critical thinking problems by using recursive functions.

##### Recursive gcd function

There is a recursive method for finding the greatest common divisor (gcd) of two numbers.

Using Euclid's algorithm, the gcd of two positive integers, x and y, is

$$\begin{aligned} \text{gcd}(x,y) &= y && \text{if } y \text{ divides } x \text{ with no remainder} \\ \text{gcd}(x,y) &= \text{gcd}(y, \text{remainder of } x/y) && \text{otherwise} \end{aligned}$$

##### **Expected Output:**

Enter two integers:

49

28

The greatest common divisor of 49 and 28 is 7

##### Reverse the string

Given a string write a recursive function for printing the string backwards.

Begin by making changes to the *frequency()* function from the notes. In some cases a recursive function may have the void return type.

##### **Expected Output:**

The unaltered string is:

*stressed*

The string backwards is:

*desserts*

### **Determine if the string is a palindrome**

We can easily check for a palindromic string in-place without using extra string and without iterating through the complete string. The idea is to take the first and last chars of the string and start comparing them. First iteration will check if the first and last characters are the same and the next iteration will compare the next pair and so on.. If a mismatch happens at any point, then we can say that the given string is not palindrome.

#### **Expected Output:**

the string XYBZBYX is a Palindrome

the string XYBYYYX is Not a Palindrome