

# RECURSION PROBLEM

1. Write a recursive implementation of the factorial function. Recall that  $n! = 1 \times 2 \times \dots \times n$ , with the special case that  $0! = 1$ .
2. Write a recursive function that, given a number  $n$ , returns the sum of the digits of the number  $n$ .
3. Write a recursive function that, given a string  $s$ , prints the characters of  $s$  in reverse order.
4. Write a recursive function that checks whether a string is a palindrome (a palindrome is a string that's the same when reads forwards and backwards.)
5. Write a recursive function that, given a pointer to the root of a binary search tree, prints out the elements in that tree in sorted order.
6. Write a recursive function that, given two strings, returns whether the first string is a subsequence of the second. For example, given `hac` and `cathartic`, you should return `true`, but given `bat` and `table`, you should return `false`.
7. A shrinkable word is a word that can be reduced down to the empty string by deleting one letter at a time such that, at each stage, the remaining string is a word. For example, the word “startling” is shirnkable because of this sequence of words:  
startling starting staring string sting sing sin in i  $\rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow$  (empty)  
Write a function that accepts as input a string and a set of all the words in English, then reports whether the input word is shrinkable.