CTA - Practice Homework - Recursion

Work these out on paper, and then program an implementation. Doubtless the answers exist on-line so if you don't want to learn you can Google them but then you will never learn how to think like a programmer and that will be very sad.

All of these questions should be solved using **recursion**. However, if you are struggling then solve them iteratively, then return to recursion.

Questions

Write an algorithm that....

1. returns the reverse of a given string.
2. reverses an array in-place (i.e changes what is stored at each index), assume the input array contains numbers.
3. checks whether an element occurs in an array, assume unsorted.
4. computes the sum of an array of numbers.
5. calculates the n^{th} number in the Fibonacci sequence. Assume the sequence begins 0,1,1,2....
6. checks whether a string is a palindrome (a palindrome is a string that's the same when reads forwards and backwards.)
7. given a number and a power, will compute the result of the number raised to that power. For example $2^3 = 8$.
8. given a string and a substring will compute how many times the substring appears in the string. For example "he" appears twice in the string "her and herself".