1. Suppose we wish to compute the modified Fibonacci numbers $F_0 = 0$, $F_1 = 1$, $F_2 = 1$, and $F_{i+1} = F_i + F_{i-2}$, for $i \geq 2$.

Write down an iterative algorithm to compute $F_n$; your algorithm should store only the fewest number of function values $F_j$ needed to compute each intermediate value $F_{i+1}$. How many operations does your algorithm require? Count each statement executed in the loop body as an operation. (The answer should be precise, not a big Oh estimate.)

2. Use the Euclidean algorithm to compute

(a) gcd(279, 123);
(b) gcd 111, 81.

3. Give a recursive definition of the sequence $\{a_n\}$: (i.e., express $a_n$ in terms of some of the earlier terms $a_{n-1}, a_{n-2}, \ldots, a_1$.)

(a) $a_n = n^2$
(b) $a_n = n^2 + n$

4. Consider the set of strings $S$ on the alphabet $\{0, 1\}$ defined by the rules:
   (1) $\lambda \in S$; ($\lambda$ is the empty string)
   (2) if $w \in S$, then $0w0 \in S$ and $1w1 \in S$.

Describe the strings included in $S$. (It is not sufficient to list some of the strings in $S$; you must specify a property that strings in $S$ possess.)