**MATH 113: DISCRETE STRUCTURES**
**HOMEWORK DUE FRIDAY WEEK 12**

*Problem* 1. Show that the Euclidean algorithm can terminate in two steps for arbitrarily large positive integers with greatest common divisor $1$.

*Problem* 2. Suppose $a < b$ and the Euclidean algorithm applied to $a$ and $b$ takes $k$ steps. Prove that $a \geq F_{k+1}$ and $b \geq F_{k+2}$.

*Problem* 3. Use the Euclidean algorithm to compute the $\gcd$ of $198$ and $168$ and find integers $m$ and $n$ such that

$$\gcd(198, 168) = 198m + 168n.$$

(You should use the procedure described on p.104.)