

**MATH 113: DISCRETE STRUCTURES**  
**HOMEWORK FOR MONDAY 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  $a \geq F_k$  and  $b \geq F_{k+1}$ .

*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.)