1. Show that if $u > v$ then $(u \mod v) \leq u/2$.

2. Use the previous result to prove that in Algorithm A, Step A2 is executed no more than $1 + 2 \log_2 u$ times. (In particular, it follows that the Euclidean Algorithm is polynomial-time in the input size which is $\log_2 u + \log_2 v$.)

3. Implement Algorithm X verbatim (i.e., name your variables the same way and use comments to label the steps X1, X2, and X3). Use it to find an integer $x$ such that

$$171x \equiv 1 \pmod{10000000000001}.$$