Read 4.5.2 up to and including Algorithm A. Then do the following:

1. Write a function $\text{gcd}(u,v)$ which computes and returns the gcd of two integers using Algorithm A.

2. Determine the average number of times Step A2 is executed when computing the gcd of $a$ and $b$:
   - For all $a, b$ in the range $1 \leq a \leq 100, 1 \leq b \leq 100$,
   - For all $a, b$ in the range $1 \leq a \leq 200, 1 \leq b \leq 200$,
   - For all $a, b$ in the range $1 \leq a \leq 400, 1 \leq b \leq 400$,
   - For all $a, b$ in the range $1 \leq a \leq 800, 1 \leq b \leq 800$,
   - For all $a, b$ in the range $1 \leq a \leq 1600, 1 \leq b \leq 1600$,

Make a conjecture about this average in general.