## Answer

Take *Input* to be $\{n_1, \ldots, n_k\}$. The correctness of algorithm *SetEuclid* implies that it has some reachable state in which the gcd of *Input* is an element of $S$. Since an invariant is true for all reachable states, the result follows from this invariant: Every element of $S$ equals $i_1 * n_1 + \ldots + i_k * n_k$, for some integers $i_1, \ldots, i_k$. It's easy to show that this is an invariant of the algorithm.

CLOSE