Integer Division

DIVIDE(x, y)
// Two n-bit integers x and y, where $y \geq 1$.

1. **if** $x = 0$ **then** return $(q, r) = (0, 0)$
2. $(q, r) = \text{DIVIDE}(\lfloor x/2 \rfloor, y)$
3. $q = 2 \cdot q$, $r = 2 \cdot r$
4. **if** x is odd **then** $r = r + 1$
5. **if** $r \geq y$ **then** $r = r - y$, $q = q + 1$
6. return (q, r)