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10a. $c_1, c_2, \ldots, c_n$ ← integers

$d_1, d_2, \ldots, d_n$ ← relatively prime positive integers

$$X = \{\text{all } x \mid 0 \le i \le n,\ x \equiv c_i \bmod d_i\}$$

$$D = d_1 \cdot d_2 \cdots d_n \qquad D_i = \frac{D}{d_i}$$

$s_i D_i + t_i d_i = 1$ ⇒ $D_i \equiv 1 \bmod d_i$ $\quad s_i \equiv 1 \bmod d_i$

$D_i \cdot d_i \equiv d_i \bmod d_i$

$D \equiv 0 \bmod d_i$

$$x = kD + \sum_{i=1}^{n} c_i s_i D_i$$

$$x = \underbrace{kD}_{\equiv 0 \bmod d_i} + \underbrace{c_1 s_1 D_1}_{c_1 s_1 \bmod d_1} + \underbrace{c_2 s_2 D_2}_{c_2 s_2 \bmod d_2} + \ldots + \underbrace{c_n s_n D_n}_{c_n s_n \bmod d_n}$$

since $s_i \equiv 1 \bmod d_i$, $\quad c_i s_i \bmod d_i \equiv c_i \bmod d_i$

$$x \equiv \sum_{i=1}^{n} c_n \bmod d_n$$