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Exercise 2

Task 1 (Fast Fourier Transform)

(a) Compute $(x + 2) \cdot (2x - 1)$ with the FFT.

Task 2
Let $A, B \subseteq \{1, \ldots, 10n\}$ be sets with $|A| = |B| = n$. We want to compute

$$C := \{a + b : a \in A, b \in B\}$$

and the number of possibilities to write $c \in C$ as a sum of elements in A and B. Specify an algorithm that solves the problem in time $\mathcal{O}(n \log n)$.

Task 3
Let x and y be natural numbers in binary representation. Decide in NC, whether $x < y$.