

Exercises 1

Let \mathbf{F} be a boolean function on n boolean variables. This means \mathbf{F} takes n boolean inputs (zeros and ones) and returns a single boolean output. It is often more convenient to regard \mathbf{F} as a function which takes only a single (non-boolean) input. Using binary numbers, describe a natural way we can think of \mathbf{F} as a function on the set of integers between 0 and $2^n - 1$.

How many boolean functions are there on n variables?

How many boolean functions \mathbf{F} on n variables satisfy the equation $\mathbf{F}(\overline{x_1}, \overline{x_2}, \dots, \overline{x_n}) = \mathbf{F}(x_1, x_2, \dots, x_n)$ for all possible inputs?