

# Learning Parity

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## 1 Problem Brief

Given an unknown parity function

$$f : \{0, 1\}^n \rightarrow 0, 1,$$

we want to find a function  $g$  that behaves closely to  $f$ .

### 1.1 Application

Modeling for finding "revelant" subsets.

## 2 Information Theory Perspective

Given the input bitstring is " $x = x_1x_2 \cdots x_n$ ", and the parity function is

$$f(x) = x_{i_1} + x_{i_2} + \cdots + x_{i_k} \pmod{2}.$$

(Short notice that we actually substitute " $k$ " for " $n$ " in the original problem brief).

Let  $B = \{x_{i_1}, x_{i_2}, \cdots, x_{i_k}\}$