Unstructured search problem

- N items $\{1, 2, ..., N\}$
- One "marked item" w represents the solution
- Query: "is $w = x$?" is a black box function

$$f(x) = \begin{cases} 0 & x \neq w \\ 1 & x = w \end{cases}$$

- **Classical**: $O(N)$