



Kolmogorov complexity function

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The (plain) complexity $C(x)$ of a binary string x is the length of a shortest program p such that $U(p) = x$, i.e. the (plain) universal Turing machine on input p , outputs x and halts. The lexicographically least such p is denoted x^* . The prefix complexity $K(x)$ is defined similarly in terms of the prefix universal machine. When clear from context, x^* is also used to denote the lexicographically least prefix program for x .

Plain and prefix conditional complexities $C(x|y)$, $K(x|y)$ are defined similarly but with $U(x|y) = x$, i.e. the universal machine starts out with y written on its worktape.

Subscripting these functions with a Turing machine M , as in $K_M(x|y)$, denotes the corresponding complexity in which we use machine M in place of the universal machine U .