Notation from book "Classical and quantum computation" by A. Kitaev, A. Shen and M. Vyalyi

Notation

$\vee$	disjunction (logical OR)
$\wedge$	conjunction (logical AND)
$\neg$	negation
$\oplus$	addition modulo 2 (and also the direct sum of linear subspaces)
$\circledast$	controlled NOT gate (p. 62)
$\sqcup$	blank symbol in the alphabet of a Turing machine
$\delta(\cdot,\cdot)$	transition function of a Turing machine
δ_{jk}	Kronecker symbol
$\chi_S(\cdot)$	characteristic function of the set S
$f_\oplus$	invertible function corresponding to the Boolean function f (p. 61)
$\overline{x_{n-1}\cdots x_0}$	number represented by binary digits $x_{n-1},\ldots,x_0$
$\gcd(x,y)$	greatest common divisor of x and y
$a \bmod q$	residue of a modulo q
$\begin{array}{c}\boxed{a}\\ \boxed{b}\end{array}$	representation of the rational number a/b in the form of an irreducible fraction
$a \mid b$	a divides b
$a \equiv b \pmod q$	a is congruent to b modulo q
$A \Rightarrow B$	A implies B
$A \Leftrightarrow B$	A is logically equivalent to B
$L_1 \propto L_2$	Karp reduction of predicates (L_1 can be reduced to L_2 (p. 30))
$\lfloor x \rfloor$	the greatest integer not exceeding x
$\lceil x \rceil$	the least integer not greater than x

A^*	set of all finite words in the alphabet A
E^*	group of characters on the Abelian group E, i.e., $\mathrm{Hom}(E, \mathbf{U}(1))$
z^*	complex conjugate of z
$\mathcal{M}^*$	space of linear functionals on the space $\mathcal{M}$
$\langle\xi\|$	bra-vector (p. 56)
$\|\xi\rangle$	ket-vector (p. 56)
$\langle\xi\|\eta\rangle$	inner product
$A^\dagger$	Hermitian adjoint operator
$\widehat{G}$	unitary operator corresponding to the permutation G (p. 61)
$I_{\mathcal{L}}$	identity operator on the space $\mathcal{L}$
$\Pi_{\mathcal{M}}$	projection (the operator of projecting onto the subspace $\mathcal{M}$)
$\mathrm{Tr}_{\mathcal{F}}\, A$	partial trace of the operator A over the space (tensor factor) $\mathcal{F}$ (p. 96)
$A \cdot B$	superoperator $\rho \mapsto A\rho B$ (p. 108)
$\mathcal{M}^{\otimes n}$	n-th tensor degree of $\mathcal{M}$
$\mathbb{C}(a, b, \dots)$	space generated by the vectors $a, b, \dots$
$\Lambda(U)$	operator U with quantum control (p. 65)
$U[A]$	application of the operator U to a quantum register (set of qubits) A (p. 58)
$\mathcal{E}[A]$, $\mathcal{E}(n,k)$	error spaces (p. 156)
$\sigma(\alpha_1, \beta_1, \dots, \alpha_n, \beta_n)$	basis operators on the space $\mathcal{B}^{\otimes n}$ (p. 162)
$\mathrm{SympCode}(F, \mu)$	symplectic code (p. 168)
$\|\cdot\|$	cardinality of a set or modulus of a number
$\\|\cdot\\|$	norm of a vector (p. 71) or operator norm (p. 71)
$\\|\cdot\\|_{\mathrm{tr}}$	trace norm (p. 98)
$\\|\cdot\\|_{\diamond}$	superoperator norm (p. 110)
$\mathbf{Pr}[A]$	probability of the event A
$\mathbf{P}(\cdot\|\cdot)$	conditional probability (in various contexts)
$\mathbf{P}(\rho, \mathcal{M})$	quantum probability (p. 95)
$f(n) = O(g(n))$	there exist numbers C and n_0 such that $f(n) \le Cg(n)$ for all $n \ge n_0$
$f(n) = \Omega(g(n))$	there exist numbers C and n_0 such that $f(n) \ge Cg(n)$ for all $n \ge n_0$
$f(n) = \Theta(g(n))$	$f(n) = O(g(n))$ and $f(n) = \Omega(g(n))$ at the same time
$f(n) = \mathrm{poly}(n)$	means the same as $f(n) = n^{O(1)}$
$\mathrm{poly}(n, m)$	abbreviation for $\mathrm{poly}(n+m)$

$\mathbb{N}$	set of natural numbers, i.e., $\{0, 1, 2, \dots\}$
$\mathbb{Z}$	set of integers
$\mathbb{R}$	set of real numbers
$\mathbb{C}$	set of complex numbers
$\mathbb{B}$	classical bit (set $\{0, 1\}$)
$\mathcal{B}$	quantum bit (qubit, space $\mathbb{C}^2$ — p. 53)
$\mathbb{F}_q$	finite field of q elements
$\mathbb{Z}/n\mathbb{Z}$	ring of residues modulo n
$\mathbb{Z}_n$	additive group of the ring $\mathbb{Z}/n\mathbb{Z}$
$(\mathbb{Z}/n\mathbb{Z})^*$	multiplicative group of invertible elements of $\mathbb{Z}/n\mathbb{Z}$
$\mathrm{Sp}_2(n)$	symplectic group of order n over the field $\mathbb{F}_2$ (p. 165)
$\mathrm{ESp}_2(n)$	extended symplectic group of order n over the field $\mathbb{F}_2$ (p. 164)
$\mathbf{L}(\mathcal{N})$	space of linear operators on $\mathcal{M}$
$\mathbf{L}(\mathcal{N}, \mathcal{M})$	space of linear operators from $\mathcal{N}$ to $\mathcal{M}$
$\mathbf{U}(\mathcal{M})$	group of unitary operators in the space $\mathcal{M}$
$\mathbf{SU}(\mathcal{M})$	special unitary group in the space $\mathcal{M}$
$\mathbf{SO}(\mathcal{M})$	special orthogonal group in the Euclidean space $\mathcal{M}$

Notation for matrices:

$$H = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}, \qquad K = \begin{pmatrix} 1 & 0 \\ 0 & i \end{pmatrix},$$

Pauli matrices: $\sigma_x = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$, $\sigma_y = \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$, $\sigma_z = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$

Notation for complexity classes:

NC	(p. 23)	NP	(p. 28)	BQP	(p. 91)
P	(p. 14)	MA	(p. 138)	BQNP	(p. 139)
BPP	(p. 36)	Π_k	(p. 46)	PSPACE	(p. 15)
PP	(p. 91)	Σ_k	(p. 46)	EXPTIME	(p. 22)
P/poly	(p. 20)				