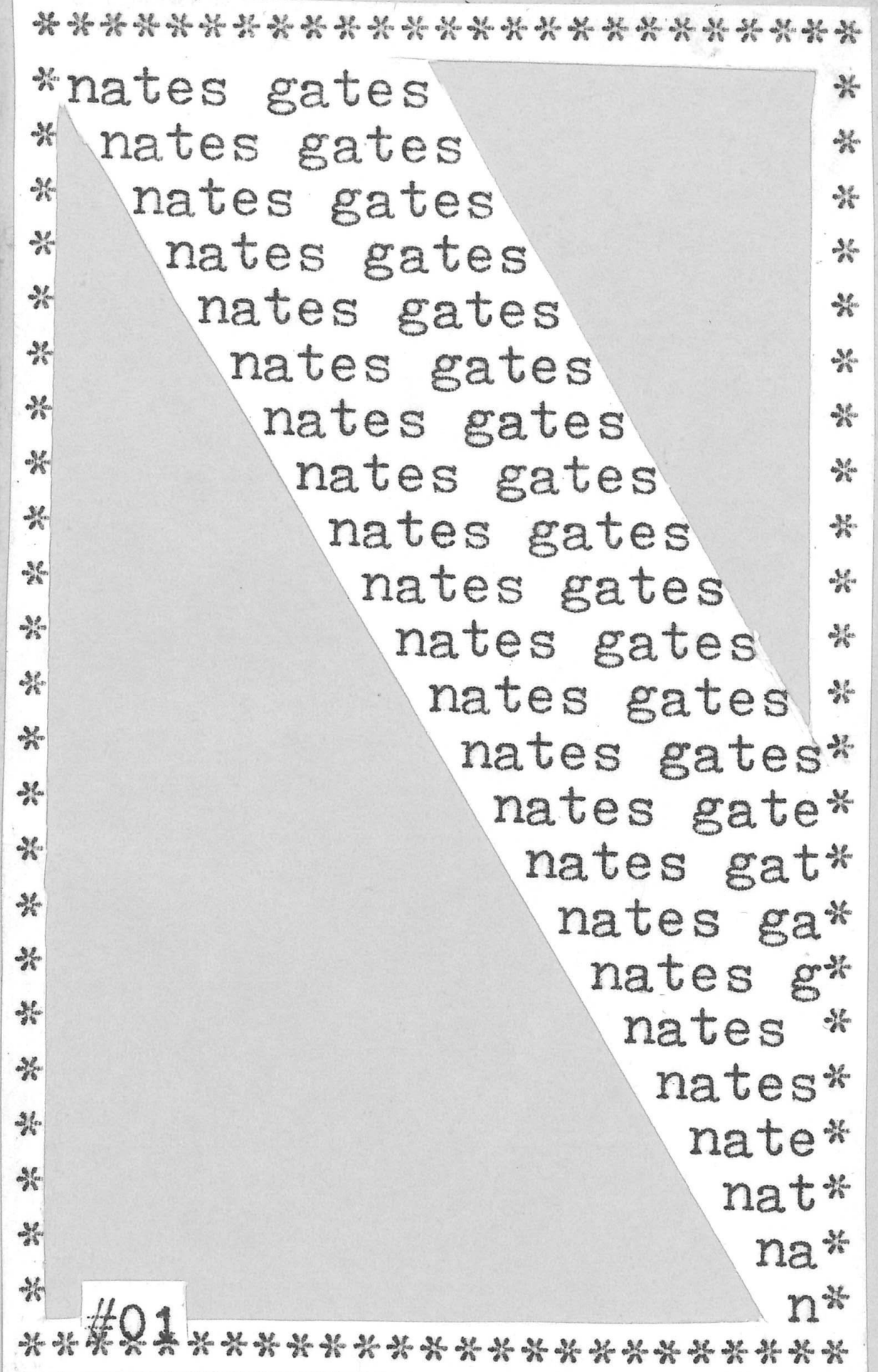
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This zine introduces my favorite gates.

@@@@@@@@@@@@@@@@@@@@@@@@@@

Learn about more gates
@
https://gate.directory

Enjoy

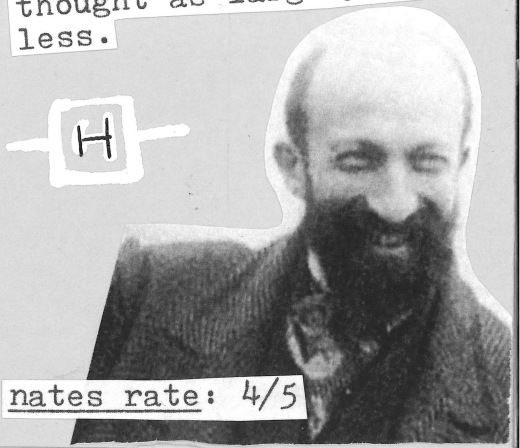
NOTE: nate does not claim any ownership of the gates contained herein.

GATE 001: Hadamard

Symbol: H

Matrix: $\begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}/\sqrt{2}$

Fact: named after French mathematician Jacques Hadamard (1865-1963) who described his mathematical thought as largely wordless.



nates rate: 4/5

GATE 002: Phase

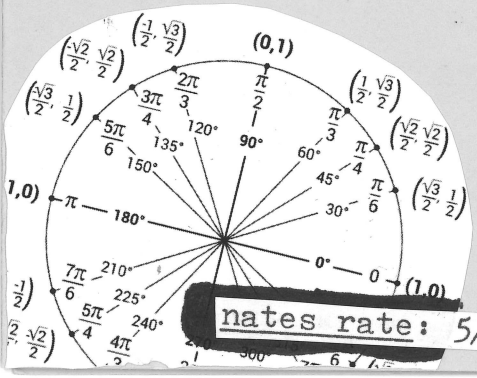
(SHIFT)

Symbol: P

Matrix: $\begin{pmatrix} 1 & 0 \\ 0 & e^{i\varphi} \end{pmatrix}$

Fact: Many more well known gates are instances of P:

- $P(\pi) = Z$
- $P(\pi/2) = \sqrt{Z} = S$
- $P(\pi/4) = \sqrt[4]{Z} = \sqrt{S} = T$



nates rate: 5/5

GATE 003: Controlled-Z

Symbol: CZ

Matrix: $\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix}$

Fact: Despite being a controlled gate, the CZ is symmetrix!

nates rate: 3/5

GATE 004: Magic

Symbol: M

Matrix: $\frac{1}{\sqrt{2}}\begin{pmatrix} 1 & i & 0 & 0 \\ 0 & 0 & i & 1 \\ 0 & 0 & i & -1 \\ 1 & -i & 0 & 0 \end{pmatrix}$

Fact: Locally equivalent to CX

nates rate: 2/5

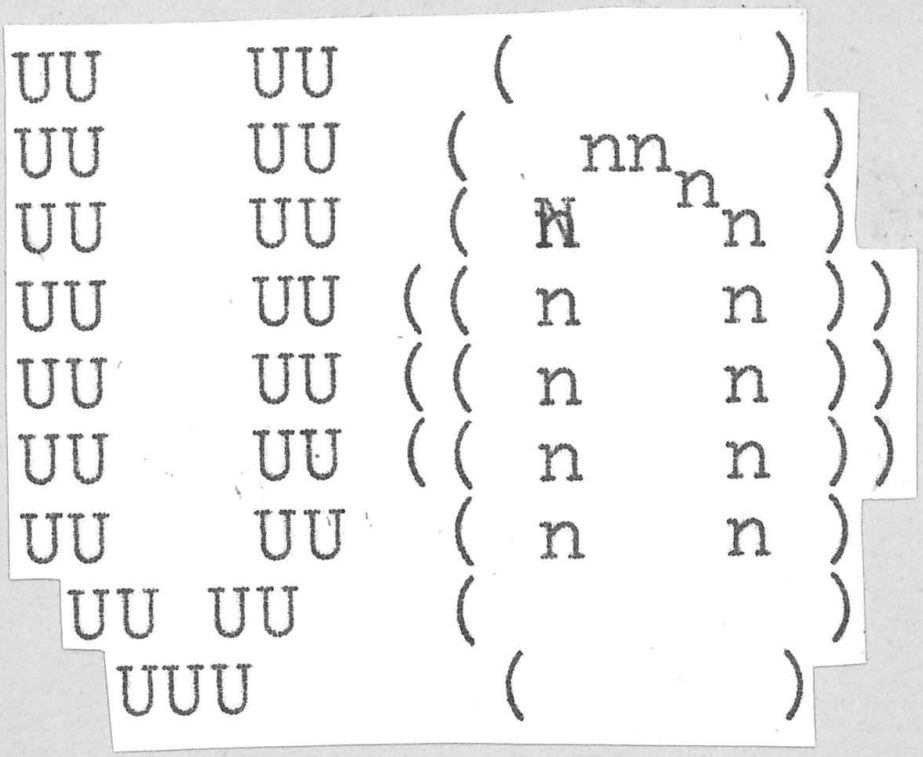
GATE 005: iSWAP

Symbol: look up

Matrix: $\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & i & 0 \\ 0 & i & 0 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$

Fact: Introduced in 2003 as a 2-qubit gate for the XY interaction which is easier to implement than CX.

nates rate: 4/5



APPRECIATION CLUB

https://gate.directory

AUG 29 2025

github.com/natestemen/gate.directory