Cheat Sheet

Matrix Representation of Single-Qubit Gates

Gate	Symbol	Matrix Representation
Identity	I	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
Pauli-X	X	$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$
Pauli-Y	Y	$\begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$
Pauli-Z	Z	$\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$
Hadamard	H	$\frac{1}{\sqrt{2}}\begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$
S Gate ($\sqrt{Z}$)	S	$\begin{pmatrix} 1 & 0 \\ 0 & i \end{pmatrix}$
T Gate ($\sqrt{S}$)	T	$\begin{pmatrix} 1 & 0 \\ 0 & e^{i\pi/4} \end{pmatrix}$
Phase Gate	$P(\phi)$	$\begin{pmatrix} 1 & 0 \\ 0 & e^{i\phi} \end{pmatrix}$
Rotation-X	$R_X(\theta)$	$e^{-i\theta X/2} = \begin{pmatrix} \cos\frac{\theta}{2} & -i\sin\frac{\theta}{2} \\ -i\sin\frac{\theta}{2} & \cos\frac{\theta}{2} \end{pmatrix}$
Rotation-Y	$R_Y(\theta)$	$e^{-i\theta Y/2} = \begin{pmatrix} \cos\frac{\theta}{2} & -\sin\frac{\theta}{2} \\ \sin\frac{\theta}{2} & \cos\frac{\theta}{2} \end{pmatrix}$
Rotation-Z	$R_Z(\theta)$	$e^{-i\theta Z/2} = \begin{pmatrix} e^{-i\theta/2} & 0 \\ 0 & e^{i\theta/2} \end{pmatrix}$