



Quantum Circuit for Black Squares

The circuit has 4 input and output lines, one Hadamard gate and 6 Controlled Not gates. The circuit is capable of transforming a quantum superposition of 2 entangled states to a classical number from 0 to 15, and vice versa as follows:-

$$\frac{1}{\sqrt{2}} (|0000\rangle + |1111\rangle) \longleftrightarrow |0000\rangle$$

$$\frac{1}{\sqrt{2}} (|0000\rangle - |1111\rangle) \longleftrightarrow |1111\rangle$$

$$\frac{1}{\sqrt{2}} (|0111\rangle + |1110\rangle) \longleftrightarrow |0111\rangle$$

$$\frac{1}{\sqrt{2}} (|0111\rangle - |1110\rangle) \longleftrightarrow |1100\rangle$$

and so on for other states also. . . .