



$$\sum_k e^{i\pi kx/2^N} |k\rangle$$

$$R_n|0\rangle = |0\rangle \quad R_n|1\rangle = e^{i2\pi/2^n} |1\rangle$$

$$H|0\rangle = (|0\rangle + |1\rangle)/\sqrt{2}$$

$$H|1\rangle = (|0\rangle - |1\rangle)/\sqrt{2}$$