$$\text{Repeat for all } \vec{\gamma}$$

$$q : |0\rangle^{\otimes N} \quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad \sigma_{\vec{\gamma}}$$

$$\tilde{q} : |0\rangle^{\otimes 2N} \quad \boxed{\text{Create the 2N qubits state } \sum_{\vec{\gamma}} b_{\vec{\gamma}} |\vec{\gamma}\rangle} \quad |\vec{\gamma}\rangle$$