

$$\begin{aligned}
b=2 \quad & (\langle x_i, x_j \rangle + 1)^2 \\
& = \underbrace{\langle x_i, x_j \rangle^2}_{\left(\sum_k x_i^{(k)} x_j^{(k)} \right)^2} + \underbrace{2 \langle x_i, x_j \rangle + 1}_{\sum_k \sum_{k'} x_i^{(k)} x_j^{(k)} x_i^{(k')} x_j^{(k')}} \\
& = \sum_k \sum_{k'} \underbrace{x_i^{(k)} x_i^{(k')}}_{\text{}} \underbrace{x_j^{(k)} x_j^{(k')}}_{\text{}}
\end{aligned}$$

$$\phi(x) = [\forall_{k, k'} x^{(k)} x^{(k')}, \sqrt{2} x^{(k)} \forall_k, 1]$$

$$\begin{aligned}
k(x_i, x_j) &= (\langle x_i, x_j \rangle + 1)^2 \\
&= \langle \phi(x_i), \phi(x_j) \rangle
\end{aligned}$$

