$b=2 \quad (\langle x_i, x_j \rangle + 1)^2$

$= \langle x_i, x_j \rangle^2 + 2\langle x_i, x_j \rangle + 1$

$\left(\sum_k x_i^{(k)} x_j^{(k)} \right)^2$

$= \sum_k \sum_{k'} x_i^{(k)} x_j^{(k)} x_i^{(k')} x_j^{(k')}$

$= \sum_k \sum_{k'} x_i^k x_i^{k'} x_j^k x_j^{k'}$

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

$k(x_i, x_j) = (\langle x_i, x_j \rangle + 1)^2$

$= \langle \phi(x_i), \phi(x_j) \rangle$