Exercise 6.7. Next, Charlie prepares the spins in a different state, called $|T_1\rangle$, where

$$|T_1\rangle = \frac{1}{\sqrt{2}}\left(|ud\rangle + |du\rangle\right)$$

In these examples, T stands for *triplet*. These triplet states are completely different from the states in the coin and die examples. What are the expectation values of the operators $\sigma_z\tau_z$, $\sigma_x\tau_x$, and $\sigma_y\tau_y$?

What a difference a sign can make!

See Eigenmath code.

$$\langle\sigma_z\tau_z\rangle = \langle T_1|\sigma_z\tau_z|T_1\rangle = -1$$

$$\langle\sigma_x\tau_x\rangle = \langle T_1|\sigma_x\tau_x|T_1\rangle = 1$$

$$\langle\sigma_y\tau_y\rangle = \langle T_1|\sigma_y\tau_y|T_1\rangle = 1$$