QINTRO - TD 7

Ex.6

Alice : $x_1, x_2 \in \{0,1\}$ and output two bits a_1, a_2
Bob : $y_1, y_2 \in \{0,1\}$ ——— b_1, b_2

Win : $a_1 \oplus b_1 = x_1 \wedge y_1$, $a_2 \oplus b_2 = x_2 \wedge y_2$

1) We first sum the optimal quantum storategy on inputs (x_1, y_1), winning the first game with probability $\cos^2(\pi/8)$. We then independently sum the storategy again on inputs (x_2, y_2), winning again with probability of $\cos^2(\pi/8)$

$$\cos^2(\pi/8) \times \cos^2(\pi/8) = \cos^4(\pi/8)$$

2) let : $f_A(x_1, x_2) = (a_1, a_2)$
$f_B(y_1, y_2) = (b_1, b_2)$

the strategy function of A and B

For win with probability 1.

$$f_A(0,0) \oplus f_B(0,0) = (0,0)$$
$$f_A(0,0) \oplus f_B(0,1) = (0,0)$$
$$f_A(0,0) \oplus f_B(1,0) = (0,0)$$
$$f_A(0,0) \oplus f_B(1,1) = (0,0)$$

$$\left.\begin{aligned}
f_A(0,1) \oplus f_B(0,0) &= (0,0)\\
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f_A(0,1) \oplus f_B(1,1) &= (0,1)
\end{aligned}\right| \quad 2$$

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f_A(1,1) \oplus f_B(1,1) &= (1,1)
\end{aligned}\right| \quad 1$$

$$f_A(00) = f_A(10) = f_A(11) = 11$$
$$f_A(01) = 10$$

$$f_B(00) = f_B(01) = f_B(11) = 11$$
$$f_B(10) = 01$$