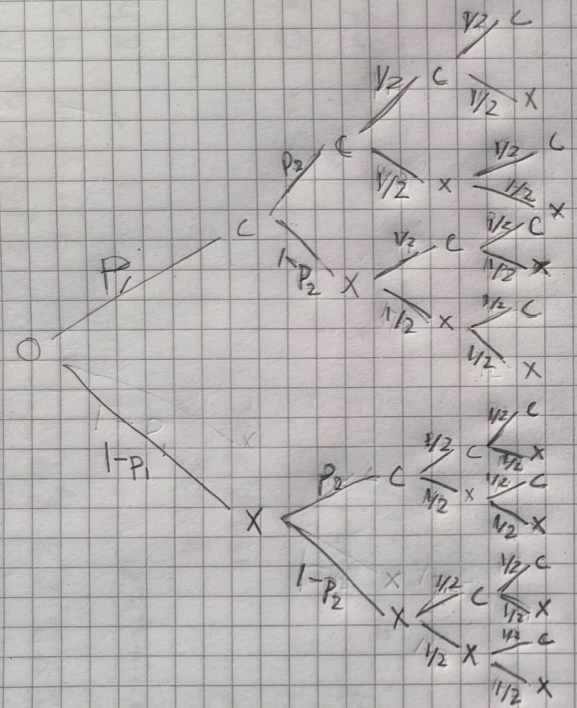

$P(CCXX) = P(CXCX) = P(XCCX)$

$P(XXCC) = P(XCXC) = P(CXXC)$

$P(A) = P(CCXX) + P(XXCC) + P(CXCX) + P(XCXC) + P(XCCX) + P(CXXC)$

$P(A) = \left(\frac{P_1P_2}{4}\right) + \left(\frac{(1-P_1)(1-P_2)}{4}\right) + \left(\frac{P_1(1-P_2)}{4}\right) + \left(\frac{P_2(1-P_1)}{4}\right) + \left(\frac{(1-P_1)P_2}{4}\right) + \left(\frac{P_1(1-P_2)}{4}\right)$

$P(A) = \left(\frac{P_1P_2}{4}\right) + \left(\frac{(1-P_1)(1-P_2)}{4}\right) + 2\left(\frac{P_1(1-P_2)}{2}\right) + 2\left(\frac{P_2(1-P_1)}{2}\right)$

$P(A) = \frac{P_1P_2}{4} + \frac{1}{4}(1-P_2-P_1+P_1P_2) + \frac{1}{2}(P_1-P_1P_2) + \frac{1}{2}(P_2-P_1P_2)$

$$\boxed{P(A) = \frac{1}{4} + \frac{1}{4}P_2 + \frac{1}{4}P_1 - \frac{1}{2}P_1P_2}$$

Note