

Event	Formula	Probability
First bag ( $P_X(0)$ )	None	0.5
Second bag ( $P_X(1)$ )	None	0.5
Red ball from First bag ( $P(Y = 0 \mid X = 0)$ )	$\frac{4}{4+4}$	0.5
Red ball from Second bag ( $P(Y = 0 \mid X = 1)$ )	$\frac{2}{2+6}$	0.25
Red ball from either bag ( $P_Y(0)$ )	$(0.5 \times 0.5) + (0.5 \times 0.25)$	0.375