

$$4a. \quad P(M) = P(M|J)P(J) + P(M|\bar{J})P(\bar{J})$$

$$P(1 \text{ match}) = B(100, 1, P(M))$$

$$P(J|M) = \frac{P(M|J)P(J)}{P(M)}$$

$$P(1 \text{ correct match}) = P(1 \text{ match}) * P(J|M)$$

$$4b. \quad P(\bar{J}|M) = \frac{P(M|\bar{J}) * P(\bar{J})}{P(M)}$$

$$P(1 \text{ incorrect match}) = P(1 \text{ match}) * P(\bar{J}|M)$$

$$4c. \quad P(0 \text{ matches}) = B(100, 0, P(M))$$