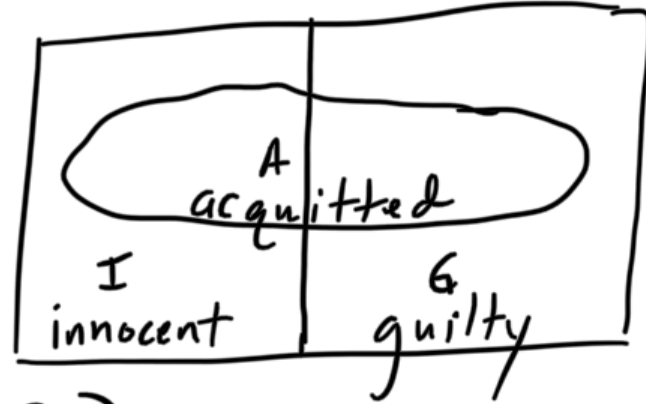


## HW2

### ① Law of Total Probability



$$\begin{aligned}
 P(A) &= P(A \cap I) + P(A \cap G) \\
 &= P(I) \cdot P(A|I) + P(G) \cdot P(A|G) \\
 &= (0.8)(0.9) + (0.2)(0.3)
 \end{aligned}$$

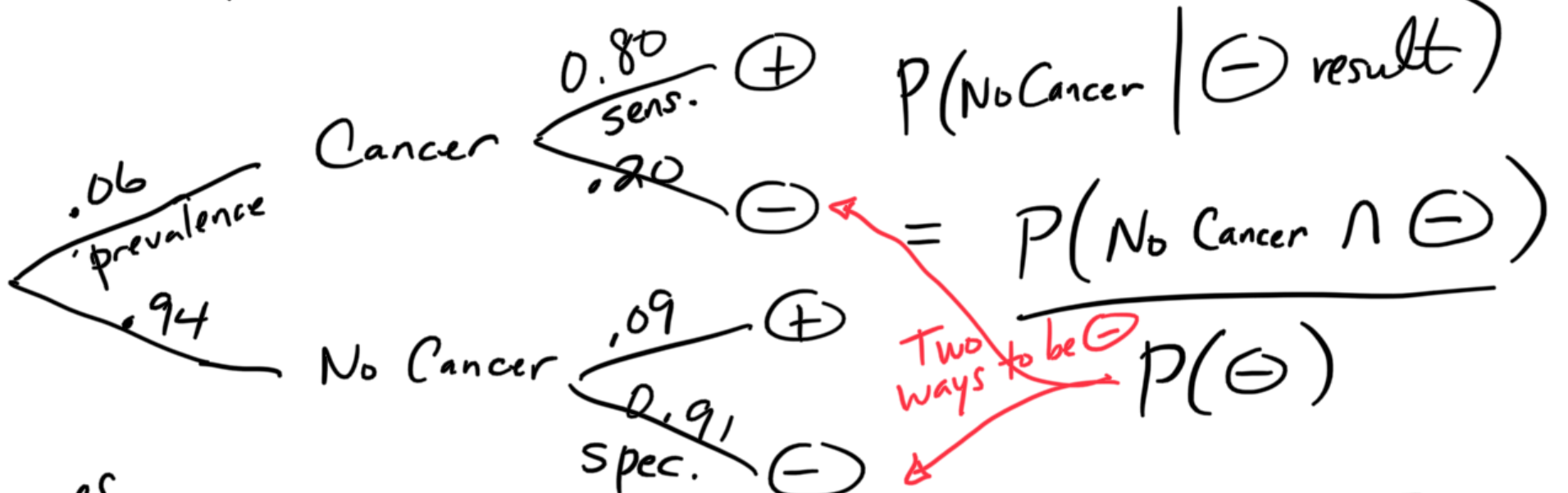
$$\textcircled{2} \quad P(\text{Few} \mid \text{GPA} > 3.0) = \frac{P(\text{Few} \cap \text{GPA} > 3.0)}{P(\text{GPA} > 3.0)} = \frac{265/1000}{270/1000}$$

$$= \frac{265}{270} = \textcircled{0.981}$$

$$\textcircled{3} \quad P(\text{less than 2.0} \mid \text{many}) = \frac{P(< 2.0 \cap \text{many})}{P(\text{many})}$$

$$= \frac{80/1000}{110/1000} = \frac{80}{110} = \textcircled{0.727}$$

⑤



Bayer Rule

$$= \frac{P(\text{No Cancer} \cap \ominus)}{P(\text{Cancer} \cap \ominus) + P(\text{No cancer} \cap \ominus)}$$

$$\boxed{C} = \frac{.91 \times .94}{.20 \times .06 + .91 \times .94}$$

$$(9) \quad \frac{15}{43} \cdot \frac{15}{43} \cdot \frac{14}{42} = (0.0406)$$

(10) Bayes Rule

$$P(Y|W_1) = \frac{P(Y \cap W_1)}{P(W_1)}$$

↗  $W_1$  occurs 3 ways in the tree

$$= \frac{P(Y \cap W_1)}{P(X \cap W_1) + P(Y \cap W_1) + P(Z \cap W_1)}$$

$$= \frac{0.6 \times 0.32}{0.7 \times 0.25 + 0.6 \times 0.32 + 0.5 \times 0.43}$$

$$= (0.330)$$

$$(11) \quad P(c/c++ | R) = \frac{P(c/c++ \cap R)}{P(R)}$$

$$= \frac{0.40}{0.60} = \frac{2}{3} \approx (0.667)$$