

MORE BINOMIAL PROBABILITY

Prob (ticket when pulled over in Nevada County) = $\frac{1}{3}$

What is the prob of a teen getting at ticket
at least 3 of the next 5 times he/she is
 pulled over?

$${}^5C_2 T^3 N^2 \text{ OR } {}^5C_1 T^4 N^1 \text{ OR } \cancel{{}^5C_0 T^5}$$

$${}^5C_2 \left(\frac{1}{3}\right)^3 \left(\frac{2}{3}\right)^2 + {}^5C_1 \left(\frac{1}{3}\right)^4 \left(\frac{2}{3}\right)^1 + \left(\frac{1}{3}\right)^5$$

$$10 \cdot \frac{4}{243} \quad 5 \cdot \frac{1 \cdot 2}{243} \quad + \frac{1}{243}$$

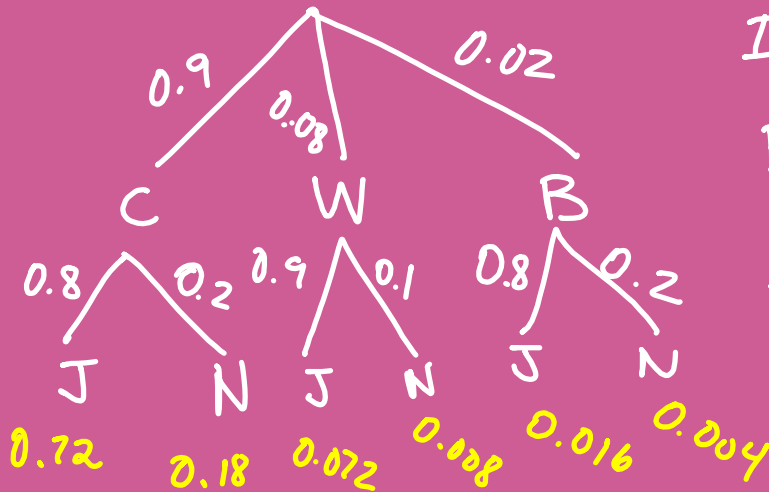
$$\frac{40}{243} + \frac{10}{243} + \frac{1}{243} = \frac{51}{243} = \frac{17}{81} \quad \text{odds } \frac{17}{64}$$

0.210

$$\text{prob} = \frac{0.25}{1} \frac{\text{suc}}{\text{total}}$$

$$\text{odds} = \frac{0.25}{0.75} \frac{\text{suc}}{\text{fail}}$$

PROBABILITY TREES + CONDITIONAL PROBABILITY



If temp is under 50°

$$P(BJ) = (0.02)(0.8) = 0.016$$

$$P(CN) = 0.18$$

$$P(J) =$$

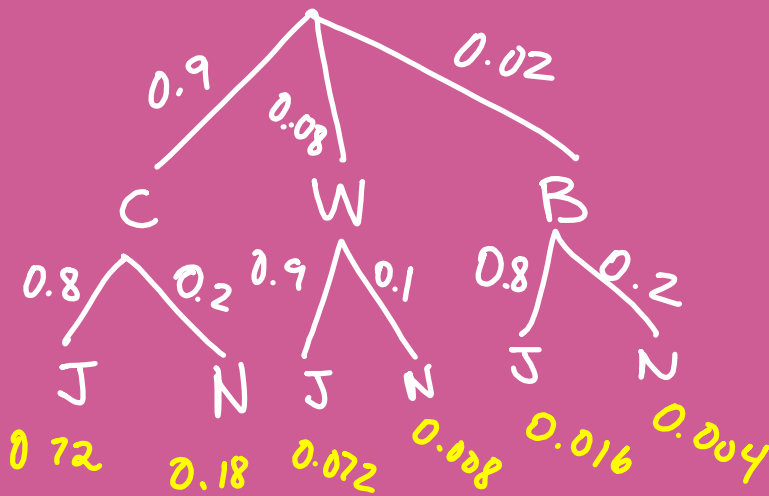
$$CJ \text{ OR } WJ \text{ OR } BJ \\ 0.72 + 0.072 + 0.016 = 0.808$$

CONDITIONAL PROBABILITY — prob with a known fact about the situation

- 1) If a student wearing a jacket is randomly selected, what is the prob he/she rode a bus?

$$P(B|J) = \frac{P(BJ)}{P(J)} = \frac{0.016}{0.72 + 0.072 + 0.016} = \frac{0.016}{0.808} \approx 0.0198$$

$$P(A|B) = \frac{P(AB)}{P(B)}$$



What is the prob of
a student driving to
school when someone
not wearing a coat is
Selected?

$$P(\underbrace{C}_{\text{Prob?}} \mid \underbrace{N}_{\text{Know}})$$

$$= \frac{P(CN)}{P(N)} = \frac{0.18}{0.18 + 0.008 + 0.004}$$

$$= \frac{0.18}{0.192} \approx 0.938$$

EXPECTED VALUE

result from performing an activity many times
gives the gain/loss per time



yellow Win \$10

Blue Lose \$20

Green Lose \$15

White Win \$50

Pay \$1 to play

$$\text{Expected Value} = (\text{Probability})(\text{Gain/Loss})$$

	yellow	blue	Green	white
Gain/Loss	10-1 = 9	-20-1 = -21	-15-1 = -16	50-1 = 49
Prob	$\frac{3}{8}$	$\frac{2}{8} = \frac{1}{4}$	$\frac{2}{8} = \frac{1}{4}$	$\frac{1}{8}$

$$E.V = (9)\left(\frac{3}{8}\right) = \frac{27}{8}$$

$$(-21)\left(\frac{1}{4}\right) = -\frac{21}{4}$$

$$(-16)\left(\frac{1}{4}\right) = -4$$

$$(49)\left(\frac{1}{8}\right) = \frac{49}{8}$$

$$= \$0.25$$

↑ Win \$0.25 per game