

MORE BINOMIAL PROBABILITY

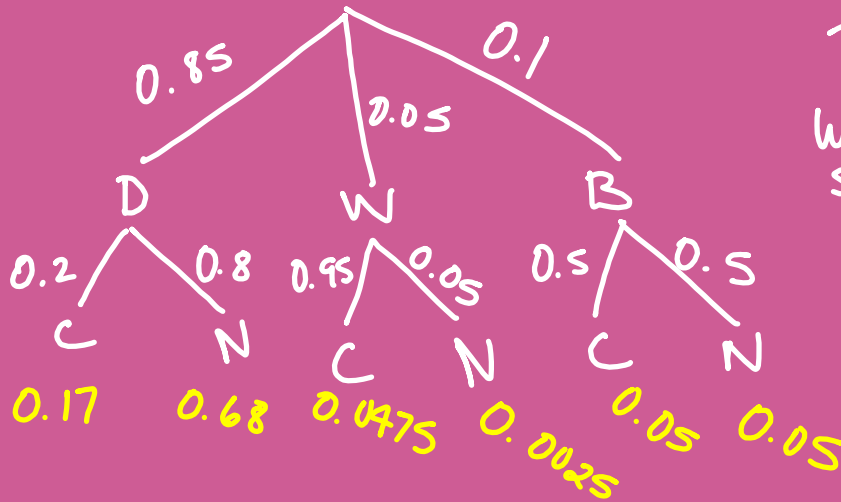
Prob (ticket when pulled over in Nevada County) = 0.75

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

$$\begin{aligned}
 & {}^5C_2 T^3 N^2 \text{ or } {}^5C_1 T^4 N^1 \text{ or } {}^5C_0 T^5 N^0 \\
 & {}^5C_2 (0.75)^3 (0.25)^2 + {}^5C_1 (0.75)^4 (0.25)^1 + (0.75)^5 \\
 & \approx 0.896
 \end{aligned}$$

* repeat the action multiple times given a prob.

PROBABILITY TREES + CONDITIONAL PROBABILITY



Temp under 50°
 What is prob of selecting a bus rider wearing a coat?

$$P(BC) = 0.1 \times 0.5 = 0.05$$

$$P(DN) = 0.68$$

$$P(WC) = 0.0475$$

$$P(C) = DC \text{ OR } WC \text{ OR } BC$$

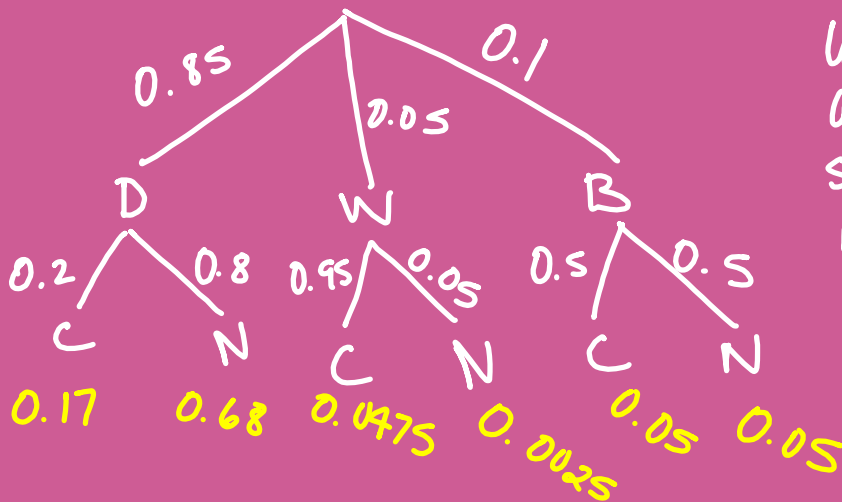
$$0.17 + 0.0475 + 0.05 = 0.2675$$

CONDITIONAL PROBABILITY ^(IF) *prob when there is a known fact about the situation.*

1) IF a student wearing a coat is randomly selected, what is the prob he/she rode a bus?

Find \rightarrow $P(A|B)$ \leftarrow Know
 given

$$P(B|C) = \frac{P(BC)}{P(C)} = \frac{0.05}{0.17 + 0.0475 + 0.05} = \frac{0.05}{0.2675} = 0.187$$



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

$$P(D|N) = \frac{P(DN)}{P(N)}$$

find know

$$= \frac{0.68}{0.68 + 0.0025 + 0.05}$$

$$= 0.928$$

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

EXPECTED VALUE

- result from doing an action 1000s of times
 - gives the gain/loss per time



yellow Win \$10

Pay \$1 to play.

Blue Lose \$20

Green Lose \$15

White Win \$50

$$\text{Expected Value} = (\text{prob})(\text{gain/loss})$$

Event	yellow	blue	green	white
prob	$\frac{3}{8}$	$\frac{2}{8} = \frac{1}{4}$	$\frac{2}{8} = \frac{1}{4}$	$\frac{1}{8}$
gain/loss	$10-1 = 9$	$-20-1 = -21$	$-15-1 = -16$	$50-1 = 49$

$$E.V. = \left(\frac{3}{8}\right)(9) + \left(\frac{1}{4}\right)(-21) + \frac{1}{4}(-16) + \frac{1}{8}(49) = \text{Gain } 0.25 \text{ per play}$$

add blue
remove yellow =

$$\left(\frac{2}{8}\right)(9) + \left(\frac{3}{8}\right)(-21) + \frac{1}{4}(-16) + \frac{1}{8}(49) =$$

$$\frac{18}{8} - \frac{63}{8} + \frac{-32}{8} + \frac{49}{8} = \frac{-28}{8} = \frac{-7}{2} = -3.5 \text{ per play}$$