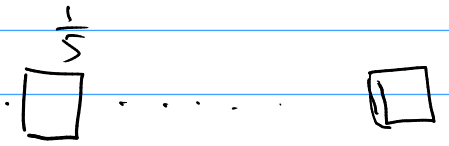
Tutorial 4



Question 1

A B, C, D, E Time = 0 0 0 0 0

Total time to get all 5 tazos –

Time to get Tazo 1 + T(tazo 2) + T(tazo 3) . . + T(tazo 5)

$P(E) = p$ $E[X] = \sum x_i p_i$

$E[\text{num of tries}] = 1(p) + 2p(1-p) + 3p(1-p)^2 + \cdots$

$= p(1 + 2(1-p) + 3(1-p)^2 + \cdots)$

$S = 1 + 2k + 3k^2 + \cdots$ $k = 1-p$

$Sk = k + 2k^2 + \cdots$

$S(1-k) = 1 + k + k^2 + \cdots = \frac{1}{1-k}$

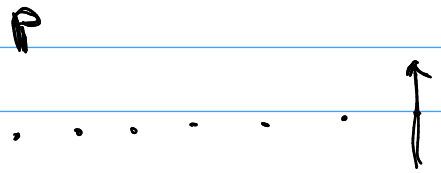
$S = \frac{1}{(1-k)^2}$

1 + –

$\frac{1}{5}$ $\left(\frac{4}{5}\right)$ $P = \frac{4}{5}$ $\frac{1}{p} = \frac{5}{4}$

$\frac{2}{5}$ $\frac{3}{5}$ . . . $\frac{5}{3}$

$\text{Avg.} = \frac{5}{5} + \frac{5}{4} + \frac{5}{3} + \frac{5}{2} + \frac{5}{1}$



$$E(X) = \sum x_i \cdot P(X = x_i)$$

$X = 1$ heads p $\quad E[X] = (1)p$

$X = 0$ tails $1-p$ $\quad + (0)(1-p)$

$= p$

$\$5$ $\quad$ $\$10$ $\quad$ 100 tries

p ~~50%~~ $\quad$ ~~50%~~ $\cdot (1-p)$ $\rightarrow [p \times 5 + (1-p) \times 10] \times 100$

$\$7.5$

$= 50\% \times 5 + 50\% \times 10$

$E = p$ . . . .

Avg. = Val1 P(Val1) + V . . . + Vali (P)

Avg. $= (1)p + (2)(1-p)p + (3)(1-p)^2 p + \cdots$

$= p(1 + 2(1-p) + 3(1-p)^2 + \cdots)$

$= S$

$k = (1-p)$

$S = 1 + 2k + 3k^2 + 4k^3 + \cdots$ — ①

$kS = \quad k + 2k^2 + 3k^3 + \cdots$ — ②

① − ②

Freq & T.P.

$S(1-k) = 1 + k + k^2 + \cdots +$ $\quad p \quad 1/p$

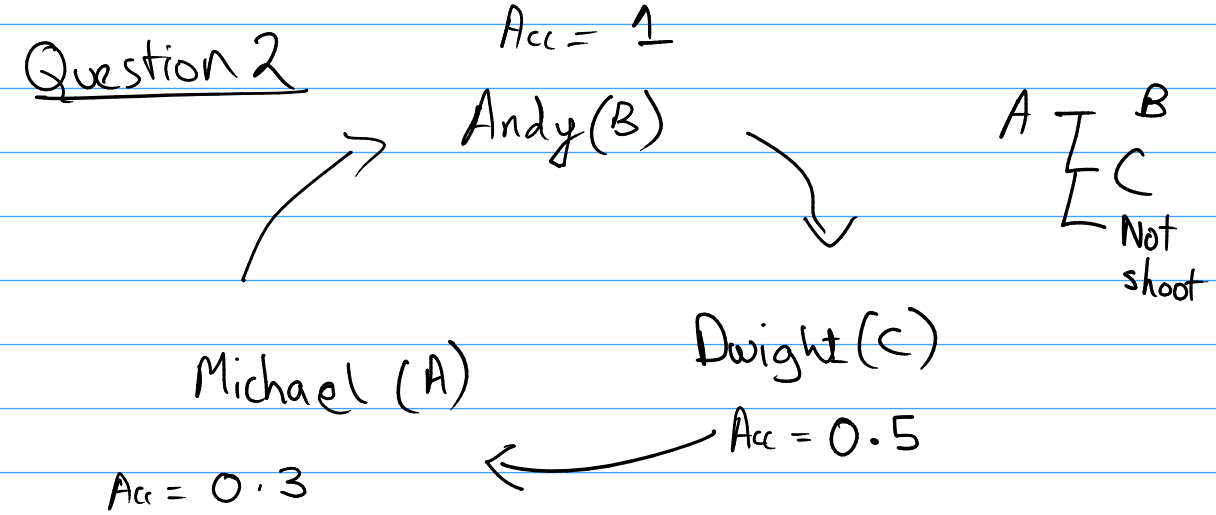
$= \frac{1}{1-k}$

$S = \frac{1}{(1-k)^2} = \frac{1}{p^2}$

Avg. $= pS$

$= \frac{1}{p}$

Question 2



P(A wins in faceoff w/ C & C starts First)

$$= (0.5)(0.3) + (0.5)^3(0.7)(0.3)$$

$$= \frac{(0.5)(0.3)}{1 - 0.35} = \frac{0.15}{0.65} = \frac{3}{13}$$

P(A wins in faceoff w/ B & A starts First)

$$= 0.3$$

Cases -

Ados -

P(A) = 0.3

A shoots at C

A shoots at B

misses?

P(Aw) = 0.3

A kills B

hits?

P(Aw) = 3/13

A, C

0.7

misses?

B

A — C

P(Aw) 0.3

0.3

hits?

P(Aw) = 0

$$P(A\text{wins}) = (0.5)(0.3) + (0.5)(0.7)(0.5)(0.3) + (0.5)^3(0.7)^2(0.3)$$

$$= (0.5)(0.3)(1 + r + r^2) \qquad r = (0.7)(0.5)$$

$$= \frac{0.15}{1-0.35} = \frac{15}{65} = \frac{3}{13}$$

$$P(Aw|B) = 0.7 \times 0.3 + 0.3 \times \frac{3}{13}$$

$$P(Aw|C) = 0.7 \times 0.3 + 0.3 \times 0$$

$$\frac{P(Aw|den) = 0.3}{0.3}$$