green & Yellow

$P(A) = \frac{|A|}{|\Omega|}$ if $\forall w\ P(\{w\}) = \frac{1}{(\Omega)}$ 9/1

$\Omega' = \Omega^2$ $|2^{\Omega}|$

$[H, T]$

B: At least one T

A: at least one H

$|\Omega'|$

Ω'	
<H,H>	<H,T>
<T,H>	<T,T>

$P(\{\langle H,H\rangle\}) = P(HH) = \frac{1}{4}$ ← elements ← power sets

$P(A) = \frac{|A|}{|\Omega|} = \frac{|4|}{4} = \frac{|\{\langle H,T\rangle, \langle T,H\rangle, \langle H,H\rangle\}|}{4} = \frac{3}{4}$

all the same

P(A and B), P(A∩B), P(A, B), P(AB)

$P(B) = \frac{|\{\langle T,T\rangle, \langle H,T\rangle, \langle T,H\rangle\}|}{4} = \frac{3}{4}$

$P(A \cup B) = \frac{4}{4}$?

$P(A \cap B) = \frac{|\{\langle T,H\rangle, \langle H,T\rangle\}|}{4} = \frac{1}{2}$

$2^4 = 16$

$P(HHHH) = \frac{1}{16} = P(HTHT)$

$\Omega^4 = [H, T]$

$P(2H, 2T)$?

$|\Omega'| = 16$

$\frac{6}{16} = \frac{\{\langle HHTT\rangle, TTHH, HTTH, THHT, HTHT, THTH\}}{16}$

{ ≥1H }

A: at least one H

$P(A) = \frac{|A|}{16}$

$A^c = \{<1H\} = \{$zero H$\}$

$= 1 - P(A^c) = 1 - \frac{1}{16} = \boxed{\frac{15}{16}}$

complement rule

$2^x \approx 1000^{\frac{x}{10}}$ $\qquad |2^{\Omega}| = 2^{1000}$

$x \ln_e = \frac{x}{10} \log_e 1000$

$2 \approx 1000^{\frac{1}{10}} = 1.9953$

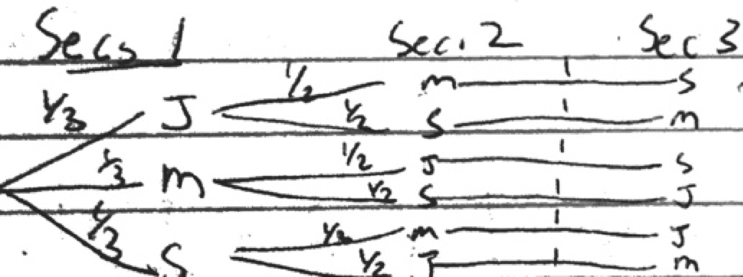
$P(5H, 5T) = \frac{}{2^{10}}$ $\qquad = .24605$

$\Omega = \{J, m, s\}$

H, H, H how many way to order them?

3 chair

$\{\langle J, m, s \rangle, \langle m, J, S \rangle, \langle S, J, m \rangle, \langle S, m, J \rangle, (J, S, m\rangle, (m, S, J\rangle\}$



$|\Omega| = 6$ $\quad |\Omega^3| = 21$

sampling with replacement

sampling with replacement

$5! = 120$

$10! = 3.6m$

$20! = 2.7 \times 10^{32}$

10 ppl 3 chairs

$_{10}P_3$

# of order $= 10 \cdot 9 \cdot 8 = \frac{10!}{7!} = \frac{10!}{(10-3)!}$

$= 10! = {}_{10}P_{10} = \frac{10!}{(10-10)!} = \frac{10!}{0!} = 10!$

$_nP_k = \frac{n!}{(n-k)!}$

Permutation

$0! = 1$

Bob - Jane

Richard - Susane

max - Alice

$P(\text{couple sit together}) = \frac{|A|}{|\Omega|} = \frac{48}{6!}$

order 6 out of 6

$48 = 3! \cdot 2^3 = \frac{3}{\text{sec } 1 \& 2} \quad \frac{2}{\text{sec } 3 \& 4} \quad \frac{1}{\text{sec } 5 \& 6}$

$\cancel{\frac{6}{1} \; \frac{5}{2} \; \frac{4}{3} \; \frac{3}{4} \; \frac{2}{5} \; \frac{1}{6}}$

$\underbrace{\frac{6}{1} \; \frac{1}{2}}_{\text{pair of two}} \; \frac{4}{3} \; \frac{1}{4} \; \frac{2}{5} \; \frac{1}{6} = \frac{48}{6!}$

$P(\text{alternating gender}) = \frac{}{6!}$

$\frac{3}{1} \; \frac{3}{2} \; \frac{2}{3} \; \frac{2}{4} \; \frac{1}{5} \; \frac{1}{6} = (3!)^2 \cdot 2$

$\Downarrow$

$P(BGBGBG)$

$+$

$P(GBGBGB)$

$P(A) = P(A_1) + P(A_2) = P(A_1 \cup A_2)$

of A_1, A_2 not excl.

$P(BJ \text{ sit together}) = \frac{}{6!}$ (A)

$\frac{5}{\text{sec } 1 \& 2} \; \frac{4}{3} \; \frac{3}{4} \; \frac{2}{5} \; \frac{1}{6} = 4! \cdot 2 \cdot 5 = 5! \cdot 2$

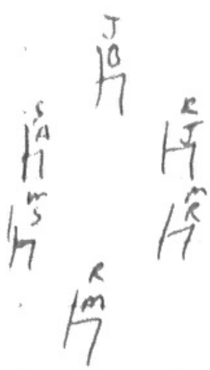
100 balls select 3 without ~~alphabet~~ replace

$$\frac{10,000 \cdot 9,999 \cdot 9,998}{10,000 \quad 10,000 \quad 10,000} = .997$$

$$= \lim_{n\to\infty} \frac{{}_nP_k}{n^k} = \frac{\frac{n!}{(n-k)!}}{n^k} = \frac{\overbrace{n(n-1)(n-2)\cdots(n-k+1)}^{K}}{n\cdot n\cdot n\cdot n\cdots}$$

$$= \lim \frac{n}{n} \cdot \lim \frac{n-1}{n} \cdot \lim \frac{n-2}{n\cdots}$$

$$1\cdot1\cdot1\cdot = 1$$



$\frac{6!}{6}$ ← principle of dividing non-replaceable

"Same" indistinguishable

5 flower	$O_1\ O_2\ O_3\ X_1\ X_2$		think
3 orchids (O)	$O_1\ O_3\ O_2\ X_1\ X_2$	$= \frac{5!}{3!}$	
2 chr (X)	$O_2\ O_1\ O_3\ X_1\ X_2$		
	$O\ O\ O\ X\ X$		