office
1.5 hr
Quiz 1

$A = (1^{ST}$ card club$)$
$B = (2^{nd}$ card diamond$)$

STAT 131 (1)
2 Apr 20

(d)

(i) $P(A) = P($win with (i)$)$

(ii) $P(A \text{ or } B) = P($win with (ii)$)$

$$= \underset{\frac{1}{4}}{P(A)} + \underset{\frac{1}{4}}{P(B)} - \underline{P(A \text{ and } B)}$$

here A, B are not mutually exclusive

so $P(A \text{ and } B) = 0$? no

$P(A) = P(1^{ST}$ card club$)$ ELM?

$$= \frac{13}{52} = \frac{1}{4}$$

yes: well-shuffled deck

$P(B) = P(2^{nd}$ card diamond$) = \frac{13}{52} = \frac{1}{4}$

with IID, <u>marginal</u> probability behavior of <u>2nd draw</u> is identical to that of 1st draw (<u>with</u> replacement)

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interestingly, the same is true for SRS, even though the second draw **depends** on 1st (<u>without</u> replacement)

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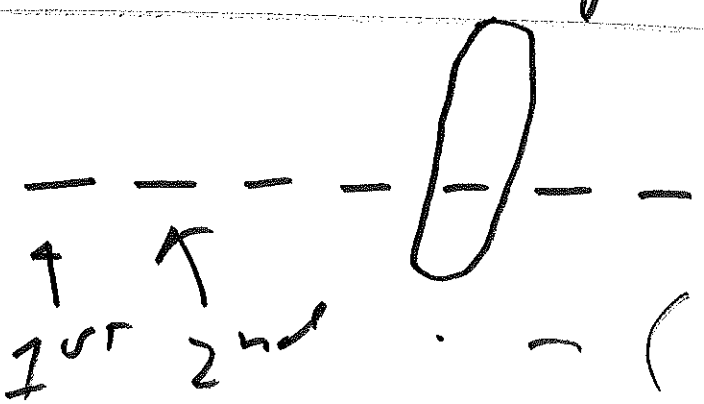
imagine dealing out all <u>52</u> cards (without repl.) from a well-shuffled deck



. . (1 slot per card)

$$P(A \text{ and } B) = P(\overset{1st}{\text{club}} \text{ and } \overset{2nd}{\text{diamond}})$$

$$= \underset{(13/52)}{P(\underline{\overset{1st}{\text{club}}})} \cdot \underset{(13/51)}{P(\overset{2nd}{\text{diamond}} \mid \underline{\overset{1st}{\text{cl.}}})} = \checkmark$$

$P(A)$ marginal (unconditional) probability

$P(A|B)$ conditional probability

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assumptions

$P(C \mid \underline{\underline{A}})$

conclusions

$P(H) = \cancel{?}$ undefined

$P(H \mid \underline{\underline{\text{fair coin-tossing}}}) = \frac{1}{2}$

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if $\underline{\underline{P}}$ then $\underline{\underline{Q}}$

$P \to Q$

false

$P(Q \mid \underline{P})$ = undefined when $P(P) = 0$