Stat 19:Fiat Lux, Holdem or Foldem, Probability and Poker

Outline for the day:

1. Addiction
2. Syllabus, etc. NO CLASS TUE APR9!
3. Wasicka/Gold/Binger Example
4. Meaning of Probability
5. Axioms of probability.

♠ ♣ ♥ ♦

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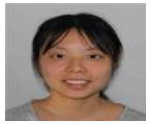

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For next class,

(i) Learn the rules of Texas Hold'em.

(see http://www.fulltiltpoker.net/holdem.php

and http://www.fulltiltpoker.net/handRankHigh.php)

(ii) Read addiction handout and legality handout at course website http://www.stat.ucla.edu/~frederic/19/F19 .

Sometime in the next few weeks

(iii) Download R and try it out.

(http://cran.stat.ucla.edu)

Wasicka/Gold/Binger Example

Wasicka/Gold/Binger Example, Continued

Gold: 4♠ 3♣. Binger: A♦ 10♦. Wasicka: 8♠ 7♠.
Flop: 10♣ 6♠ 5♠. (Turn: 7♣. River: Q♠.)

Wasicka folded?!? ♠ ♣ ♥ ♦

He had **8♠ 7♠** and the flop was **10♣ 6♠ 5♠**.
Worst case scenario: suppose he were up against

9♠ 4♠ and **9♥ 9♦**. How could Wasicka win?

88 (3: 8 ♣8♦, 8♣ 8♥, 8♦ 8♥)
77 (3)
44 (3)

[Let "X" = non-49, "Y" = A2378JQK, and "n" = non-🂠]

4n Xn (3 x 32)
9♣ 4n (3)
9♣ Yn (24). **Total: 132 out of 903 = 14.62%.**

Meaning of Probability.

Notation: "P(A) = 60%". A is an *event*.
Not "P(60%)".

Definition of probability:

Frequentist: If repeated independently under the same conditions millions and millions of times, A would happen 60% of the times.

Bayesian: Subjective feeling about how likely something seems.

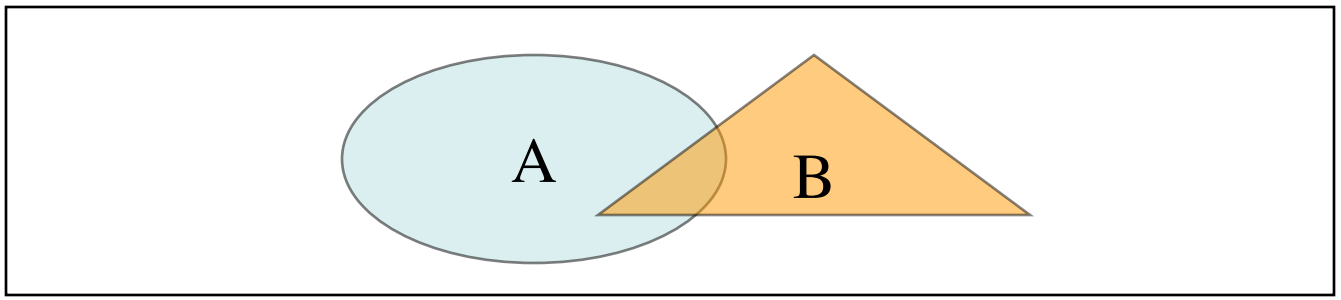
P(A *or* B) means P(A or B or both)
Mutually exclusive: P(A and B) = 0.
Independent: P(A given B) [written "P(A|B)"] = P(A).
$P(A^c)$ means P(not A).

2. Axioms (initial assumptions/rules) of probability:

1) $P(A) \geq 0$.
2) $P(A) + P(A^c) = 1$.
3) If $A_1, A_2, A_3, \ldots$ are mutually exclusive, then
   $P(A_1 \text{ or } A_2 \text{ or } A_3 \text{ or } \ldots) = P(A_1) + P(A_2) + P(A_3) + \ldots$

(#3 is sometimes called the *addition rule*)

Probability <=> Area. Measure theory, Venn diagrams



P(A or B) = P(A) + P(B) - P(A and B).