

Discrete Mathematics --- Day 34 --- November 15, 2004

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Material for the exam can be found in the text as follows:

Counting Stuff Sections 4.1, 4.3, 4.4, 4.5

Induction Sections 3.3

Probability (5.1-5.3) not on exam

-Experiment which has some set of possible outcomes, one of which will happen each time the experiment is performed.

-Event is some subset of the outcome set.

Ex. Toss a coin

Outcome set (H,T) Probability of [Event] = $\frac{1}{2} = \frac{|\{H\}|}{|\{H,T\}|}$

Event: get heads = {H}

Ex. Toss a coin 3 times

Outcome set {HHH, HHT, HTH, HTT, THH, THT, TTH, TTT}

Event: Get an even # of Heads

{HHT, HTH, THH, TTT} Prob[Event] = $\frac{4}{8} = \frac{1}{2}$

Roll 2 dice

Outcome set: {1 1, 1 2,6 6, }

36 Outcomes

*with dice consider them to be "different" dice so that rolling

1 2 is not considered the same as rolling 2 1

Event: Get sum of 5

= {1 4, 2 3, 3 2, 4 1}

Prob. Event: $\frac{4}{36} = \frac{1}{9}$

Major Idea

If the outcomes in the experiment outcome set are equally likely, then the probability of

an event is the $\frac{|\text{Event}|}{|\text{OutcomeSet}|}$

General Rule-when deciding what to consider your outcome set, try to make elements equally likely. This is usually done by making the outcome set as "literal" as possible (and often as large as possible).

This is what a deck of cards looks like:

4 suits	pic. cards
clubs	♣ 2,3,4,5,6,7,8,9,10,[J,Q,K,]A
diamonds	♦ 2, _____ " _____ A
hearts	♥ 2 _____ " _____ A
spades	♠ 2 _____ " _____ A

A deck has 4 suits, 13 ranks

$$\# \text{ cards} = 4 \cdot 13 = 52$$

H.W. learn the poker hands

(Do not play poker)

Deal 5 cards from deck

What is the probability of 4 Aces?

Outcome set: should this be ordered 5-tuples of cards or unordered sets of cards?

Let's do it with order

2d,3d,4d,5d,6d ≠ 2d,3d,4d,6d,5d

(d,c,h,s= diamonds, clubs, hearts, spades)

Outcome set is all ordered 5-tuples of cards

$$\text{Size} = 52 \cdot 51 \cdot 50 \cdot 49 \cdot 48$$

Have to finish this problem next class day.