

Reminders

1. HW 3.3, 3.4 due 03/04 11:59 pm
2. Mid-Semester write up due 03/15 11:59 pm
3. Exam #2 on 03/29
4. Exam #2 Study guide on course page on D2L
5. Mid-Semester Survey due Friday 03/04

Chap 10: Counting Methods

10.1 (worst way to count)

Counting by systematic listing

One part task

1. tossing a single fair coin $\begin{cases} H \\ T \end{cases}$
2. roll a ~~fair~~ ^{fair} single die $\{1, 2, 3, 4, 5, 6\}$

(fair / unbiased)

Example

How many ways can five friends choose to pay for dinner
ans (5 ways)

Two-part task

Here we will need some strategy

1. Product table

Example

How many ways can a president and treasurer be chosen from 3 friends $\{ \text{Alan, Bill, Cathy} \}$ (each friend can only hold one position)

$$\{ A, B, C \}$$

		Treasurer		
		A	B	C
President	A	X	AB	AC
	B	BA	X	BC
	C	CA	CB	X

6 ways

$$\{ AB, AC, BA, BC, CA, CB \}$$

Determine the # of different possible results when two fair dice are rolled

		Second die					
		1	2	3	4	5	6
First die	1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
	2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
	3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
	4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
	5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
	6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

Exercise

$$N = \{ \text{Alan, Bill, Cathy, David, Evelyn} \}$$

$\{A, B, C, D, E\}$

Cathy & Evelyn are women, others are men
(no one can hold ~~two~~ two office)

How many ways can we do the following

- (a) choose a president and treasurer
- (b) a president and treasurer if president must be a woman
- (c) a president, secretary, and treasurer if president and treasurer must be women

Multiple part task (tree diagram)

Exercise

1. Construct a tree diagram show all possible results when 3 fair coins are tossed

(a) at least two heads

at least 2 - (2 or greater than 2)

(b) more than two heads

at most 2 - (less or equal to 2)

(c) no more than two heads

Quiz problem

- (1) $\{A, B, C, D\}$ four friends have tickets for four reserved

(1) $\{A, B, C, D\}$ four friends have tickets for four reserved seats in a row at a concert. In how many ways can they seat themselves so that A,B sit next to each other (list all possible ways)
(use tree-diagram for 1 & 2)

- (2) $\{A, B, C, D, E\}$ C,E are women, others are men
we want to choose a committee of 3
- (a) choose 3 with no restriction (list all possible ways)
 - (b) The committee must include more men than women
(list all possible ways)
 - (c) The committee must include more women than men