

## 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  $\begin{matrix} & H \\ & / \\ & T \end{matrix}$
2. roll a ~~single~~ single fair die  $\{1, 2, 3, 4, 5, 6\}$

(fair/unbiased)

#### Example

How 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 ~~the~~ 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