

25 (9.1)

$\lfloor n/2 \rfloor \dots n$

n is odd

$$\left\lfloor \frac{2k+1}{2} \right\rfloor$$

$$\left\lfloor k + \frac{1}{2} \right\rfloor$$

k

n	k
n	2
n	3
$2k+1$	k
n	$n-1$

Subset Sum input

read n items

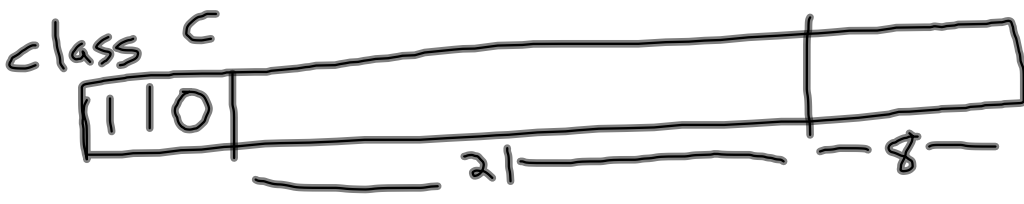
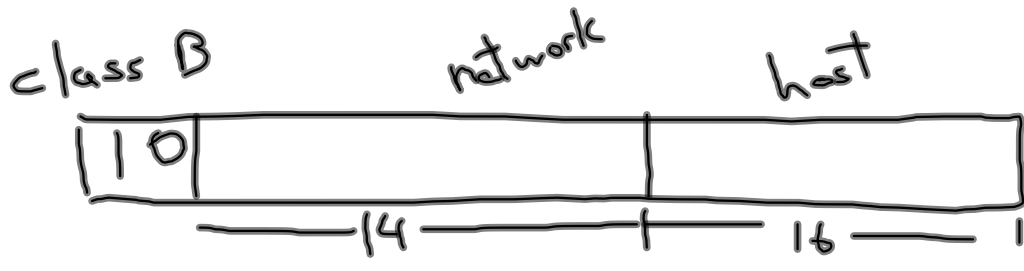
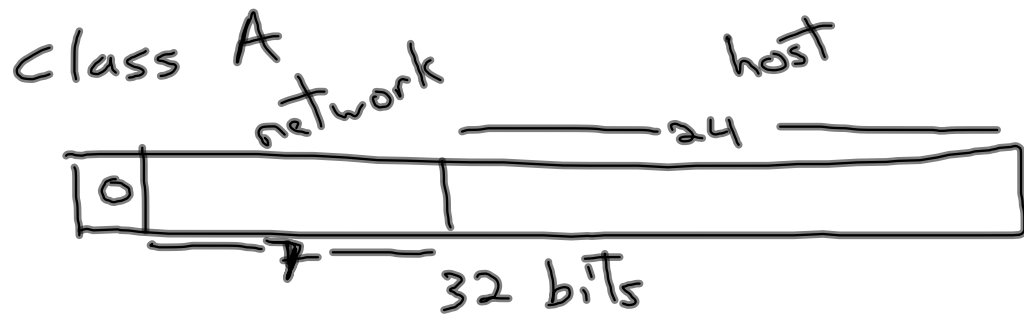
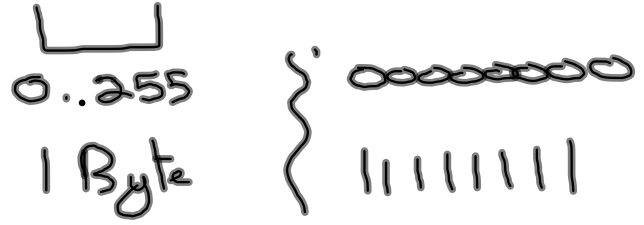
counting [ask for n
for ($i=0..n-1$)
ask for item

sentinel

keep asking until
you get a
special "stop"
value.

IP Addresses

138.234.44.9

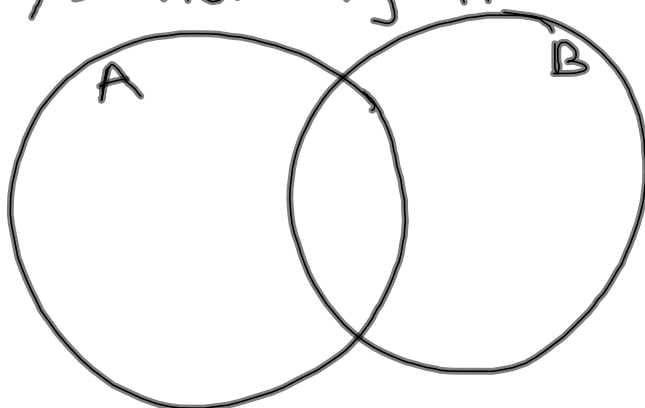


How many hosts on a class B network?
 2^{16}

A, B disjoint sets

$$N(A \cup B) = N(A) + N(B)$$

A, B not disjoint



$$N(A \cup B) = N(A) + N(B) - N(A \cap B)$$

numbers 1..1000

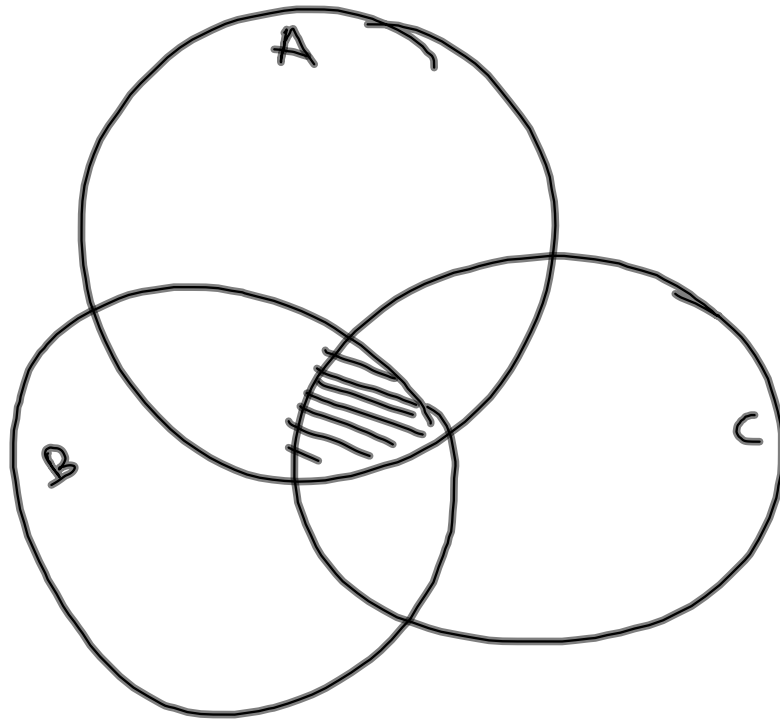
How many are multiples of
3 or 5?

$$N(A) \quad 3 \cdot 1 \dots 3 \cdot 333 = 333$$

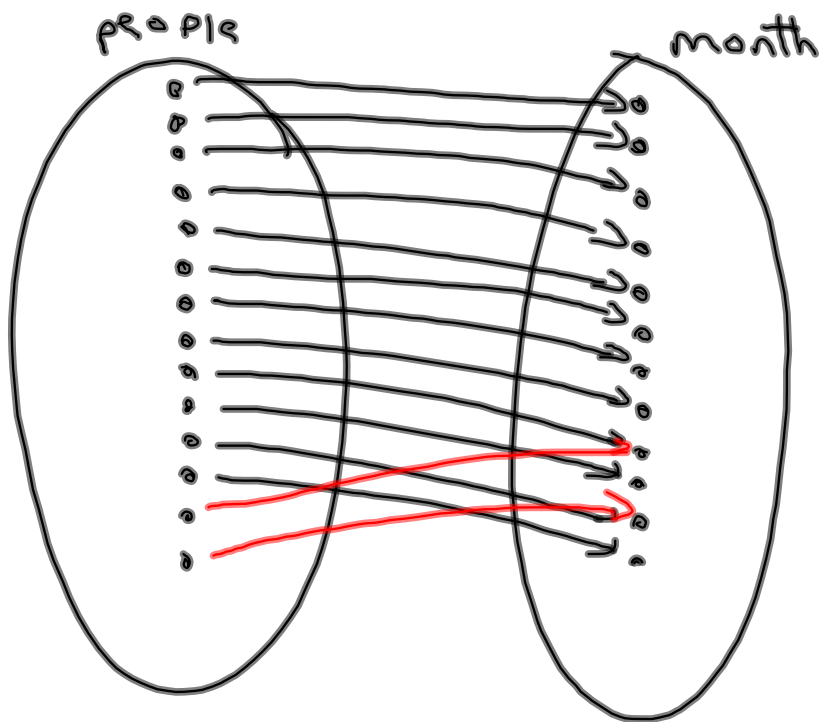
$$N(B) \quad 5 \cdot 1 \dots 5 \cdot 200 = 200$$

$$N(A \cap B) \quad 15 \cdot 1 \dots 15 \cdot 66 = 66$$

$$N(A \cup B) = 333 + 200 - 66 = 467$$



$$\begin{aligned} N(A \cup B \cup C) &= N(A) + N(B) + N(C) \\ &\quad - N(A \cap B) - N(A \cap C) \\ &\quad - N(B \cap C) + N(A \cap B \cap C) \end{aligned}$$



Pigeon Hole Principle

for any function $f: X \rightarrow Y$ and
pos. int k .

if $N(X) > k \cdot N(Y)$ then

there is some $y \in Y$ s.t.
 y is the image of at least

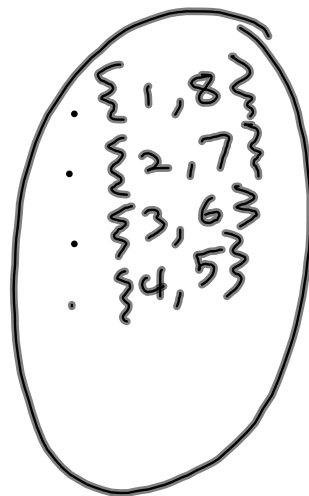
$k+1$ distinct elements of X .

90 people - at least 4 have
the same last initial

$$90 > 3 \cdot 26 \\ = 78$$

$$A = \{1, 2, 3, 4, 5, 6, 7, 8\}$$

select 5 elements from A
must one pair sum to 9?

- 
- {1, 8}
 - {2, 7}
 - {3, 6}
 - {4, 5}