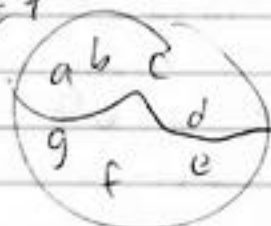


CSC 2259 Notes 2/8/20

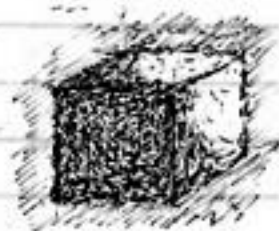
$n=7$



$$A = \{a, b, c, d\}$$

$$S = \{a, b, \dots, g\}$$

\emptyset	$\{a\}$	$\{a, b\}$	$\{a, b, c\}$	$\{a, b, c, d\}$
	$\{b\}$	$\{a, c\}$	$\{a, b, d\}$	
	$\{c\}$	$\{c, d\}$	$\{a, c, d\}$	
	$\{d\}$	$\{b, c\}$	$\{b, c, d\}$	
		$\{b, d\}$		
		$\{c, d\}$		



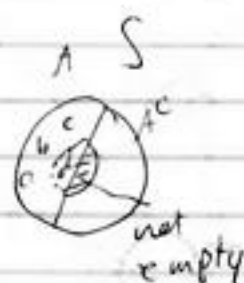
$$A^c = \{e, f, g\}$$

$$\# \text{ of subsets of } A^c = 2^3 = 8$$

of subsets of S but not subset of $A = \{g\}, \{e\}, \{f\} \subseteq A^c$
 $\{g, e\}, \{e, f\}, \{f, g\}$
 $\{g, b, c, d, e\}$ intersects both A and A^c
 $\{e, f, g\}$

$$2^7 - 2^4 = 128 - 16 = 112$$

Same subset of A at least one of A^c
 16 subsets 7 subsets



x : subset of S but not subset of A

$x = x_1 \cup x_2$ disjoint union

$$x_1 \subseteq A, x_2 \subseteq A^c, x_2 \neq \emptyset$$

$$16 \cdot 7 = 112$$

$(4, 0) \times (2^3 - 1)$ exclude \emptyset of A^c

$\# (x \subseteq S \text{ not contained in } A)$

$$C(4, 1) \times (2^3 - 1)$$

$$C(4, 0) + C(4, 1) + \dots + C(4, 4) \times (2^3 - 1)$$

$$= 2^7 - 2^4$$

$$= 128 - 16 = 112$$

$$C(4, 4) \times (2^3 - 1)$$

$$(2^4)(2^3 - 1)$$

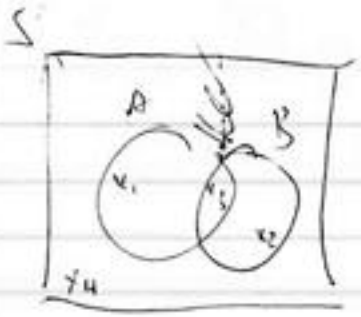
$$2^7 - 2^4 = 112$$

alido

albedofghwjk... ~~scribbles~~

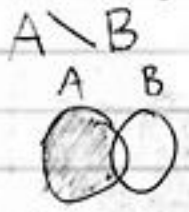
sat

u



- x_1 : item in A but not in B
- x_2 : item in B but not in A
- x_3 : items in ~~A and B~~ A and B
- x_4 : items not in A and not in B
- items neither in A nor in B
- item not in (A or B)
- item not in A and not in B

Subset of A and disjoint from B



all of A nothing of B

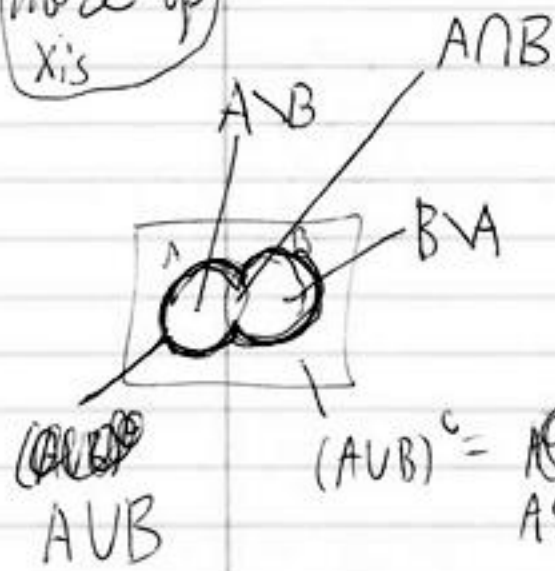
one or more of x_i s

x_1	x_2	x_3	x_4
Y	N	N	N

subset of B and disjoint from A

N	Y	N	N
Y	Y	N	N

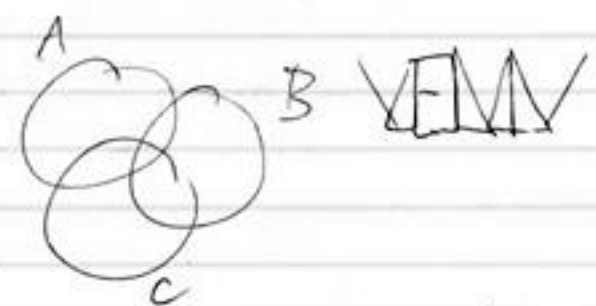
subset of $(A \setminus B) \cup (B \setminus A)$
 nonempty part nonempty part



$|A \cup B| = |A| + |B| - |A \cap B|$ (demorgan's law)

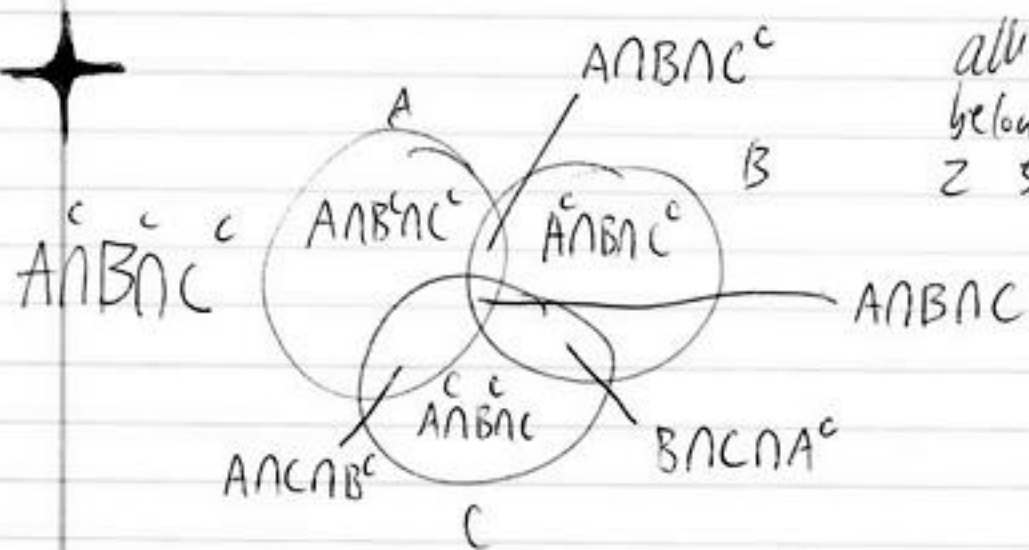
$(A \cup B)^c = A^c \cap B^c$

$(A \cap B)^c = A^c \cup B^c$

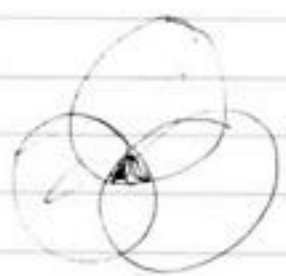
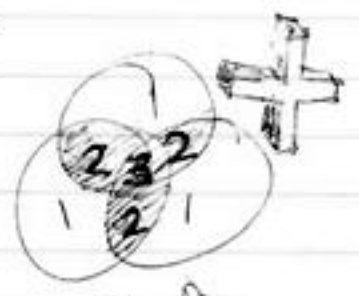


$|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C| + |A \cap B \cap C|$

VENN VENN DIAGRAM



all items that
belong to at least
2 subsets among
A, B, C



items
that belong to
exactly 2



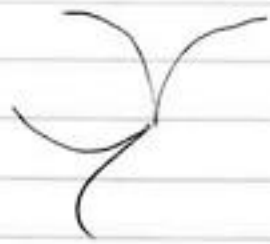
x2



x3

items that belong
to exactly three

A ∩ B



$$X_1 \cup X_2 \cup X_3 = A \cup B \cup C$$

disjoint
union

