

Week 4:

Lecture 2

Boolean Algebra:

- (1) Commutativity
- (2) Associativity
- (3) Distributivity

D:

$$\textcircled{1} A + (B \times c)$$

$$= (A + B) \times (A + c)$$

$$\textcircled{2} A \times (B + c)$$

$$= (A \times B) + (A \times c)$$

I want either a male
domestic cat which is white
or ginger O_h

a female cat undomesticated
anything but white-

$X \rightarrow (\text{And})$, $+ \rightarrow (\text{OR})$

$$\{M \times D \times (N + G)\} +$$

$$\{F \times VD \times (G + 0 + B)\}$$

$N, G, 0, B$

'1'

'0'

↓
Universal!

$$1 + X = 1$$

$$1 \times X = X$$

$$\overline{\overline{X}} = 1 - X$$

$$X + \overline{X} = 1$$

$$x + xy = x$$

$$= x \times 1 + x \times y$$

$$x \cdot (1 + y)$$

$$x \cdot 1 = x$$

$$x \cdot (x + y)$$

$$= x \cdot x + x \cdot y$$

$$= x + x \cdot y$$

$$= x$$

$$\overline{(\overline{x})}$$

$$= \overline{(1-x)}$$

$$= 1 - (1-x)$$

$$= x$$

Truth Table

$X, Y, \alpha, \beta, A \dots$

$\{0, 1\}$

$X \cdot Y \quad \{ \quad X \text{ AND } Y \}$

x	y	$x \cdot y$
0	0	0
0	1	0
1	0	0
1	1	1

$$X + Y$$

x	y	$x + y$
0	1	1
1	0	1
1	1	1
0	0	0

$$X + Y$$

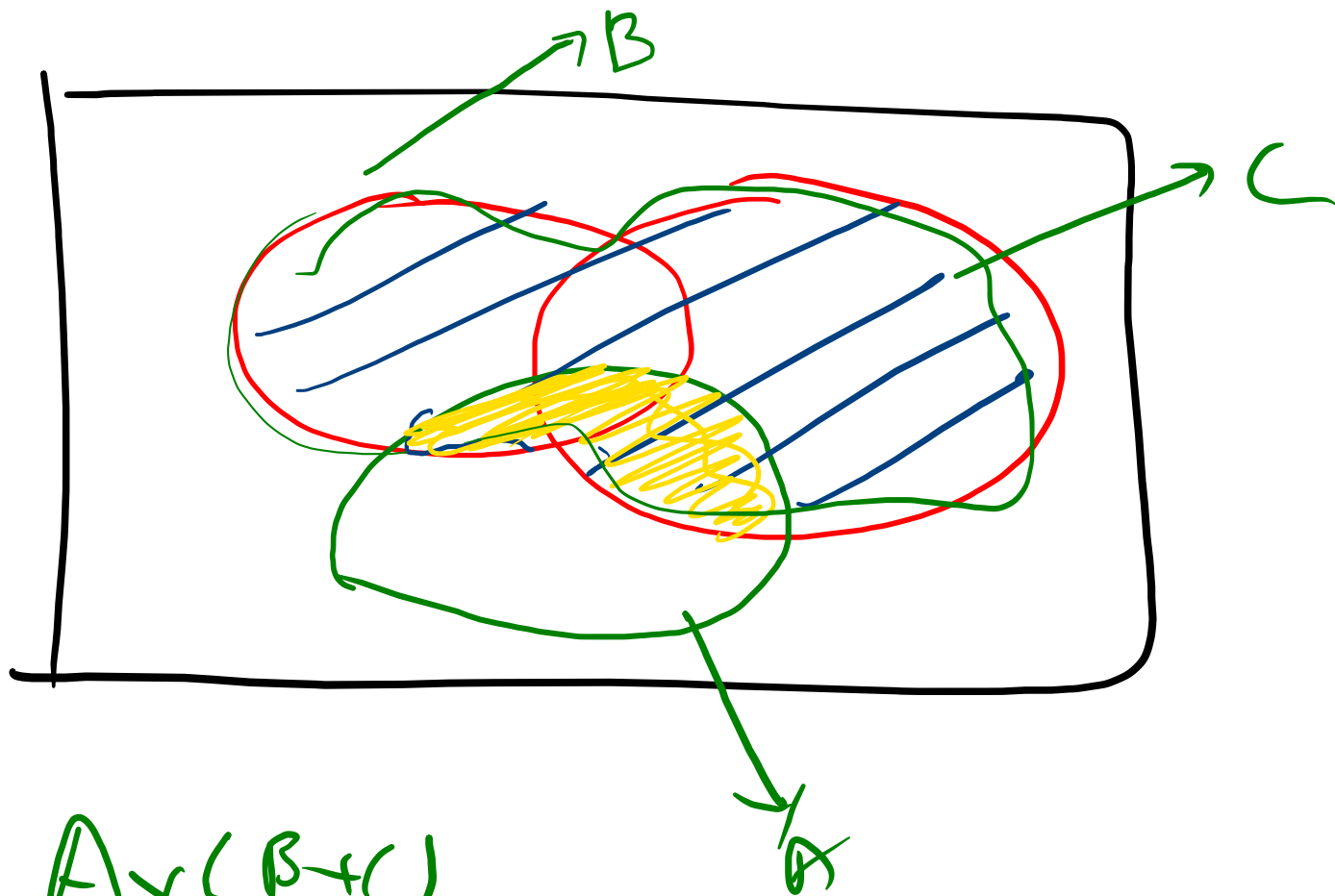
x	y	$x + y$
0	1	1
1	0	1
1	1	1
0	0	0

$$X + 0 = X$$

$$X \times 0 = 0$$

$$X^2 = X$$

$$X + X = X$$



$$A \times (B \cup C) = A \times B + A \times C.$$