CL - Tutorial 3

Exercise 1

a = diligent student   a = eagle

b = ignorant student   b = pig

c = are successful.   c = can fly

$$\frac{a \vDash c \qquad b \vDash \neg c}{a \nvDash \neg b}$$

$$\frac{a \vDash c \qquad b \nvDash c}{b \nvDash a}$$

counter example
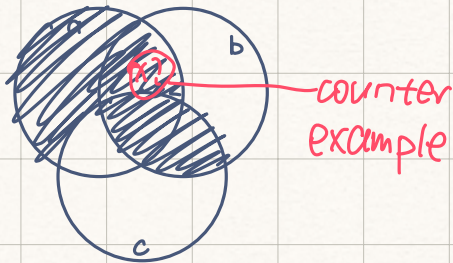
No a is b.

so this argument is not sound.
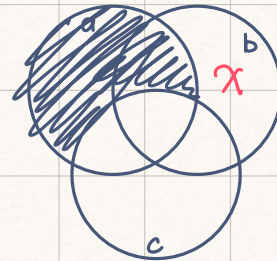
It's sound because there is some b is not a.

$$\frac{a \vDash b \quad b \vDash c}{a \vDash c} \Rightarrow \frac{a \vDash c \quad b \nvDash c}{b \nvDash a}$$

Exercise 2

a = animals

b = unicorns

c = horses.

$$\frac{a \vDash \neg b \quad b \vDash c}{c \nvDash a}$$
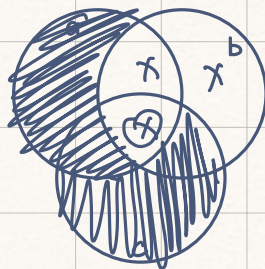$$\times \quad \times \quad \times \quad \times$$
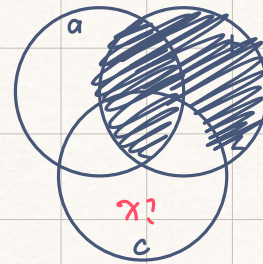
we don't know whether or not

some c is not a, so it is not sound.

Therefore, the number of the "$\nvDash$" and "$\neg$" are always even

Exercise 3

(a)

$$\frac{a \vDash b \quad c \nvDash a}{c \nvDash \neg b} \qquad (x \nvDash \neg x)$$

so it's sound

(b)

$$\frac{a \vDash b \quad c \vDash a}{c \vDash b} \Rightarrow \frac{c \vDash b \quad c \nvDash \neg c}{b \nvDash \neg c} \Rightarrow \frac{b \nvDash \neg c}{c \nvDash \neg b}$$

$$\Rightarrow \frac{a \vDash b \quad c \vDash a}{c \nvDash \neg b}$$

Exercise 5

1. isBig, isAmber $\vDash$ hasThinBorder = False

2. isSmall $\nvDash$ ¬ isDisc = True

3. isSmall, isSquare $\nvDash$ ¬isAmber = False