CS 2102 - DMT1 - Fall 2019 — Luther Tychonievich
Administered in class friday september 20, 2019

Quiz 03

PROBLEM 1 *Symbolizing*

For each of the following, convert from text to symbolic logic. The first one is done for you.

- No G are F. All H are G. So: No H are F

    $\nexists x . G(x) \wedge F(x)$

    $\forall x . H(x) \rightarrow G(x)$

    $\therefore \quad \nexists x . H(x) \wedge F(x)$

    Because of a typo in this example on the printed copy, we are accepting $\nexists \dots A \rightarrow B$ everywhere that $\nexists \dots A \wedge B$ is correct

- No G are F. Everything is F. So: Nothing is G

    $\nexists x . G(x) \wedge F(x) \quad or \quad \forall x . G(x) \rightarrow \neg F(x) \quad or \quad \forall x . \neg\big(G(x) \wedge F(x)\big)$

    $\forall x . F(x) \qquad or \quad \nexists x . \neg F(x)$

    $\therefore \quad \nexists x . G(x) \qquad or \quad \forall x . \neg G(x)$

- All G are F. Something is G. So: Some G is F

    $\forall x . G(x) \rightarrow F(x) \quad or \quad \nexists x . G(x) \wedge \neg F(x) \quad or \quad \forall x . \neg G(x) \vee F(x)$

    $\exists x . G(x)$

    $\therefore \quad \exists x . G(x) \wedge F(x)$

PROBLEM 2 *Symbolizing with a Key*

Using this symbolization key:
 domain: all animals
  $A(x)$: ____$_x$ is an alligator
  $M(x)$: ____$_x$ is a monkey
  $Z(x)$: ____$_x$ lives at the zoo
 $L(x,y)$: ____$_x$ loves ____$_y$
   a: Artist
   b: Bouncer
   c: Champion
 Symbolize each of the following sentences; the first one is done for you.

If both Bouncer and Champion are alligators, then Artist loves them both.

$$\big(A(b) \wedge A(c)\big) \rightarrow \big(L(a,b) \wedge L(a,c)\big)$$

There are no monkeys at the zoo.

$\forall x . Z(x) \rightarrow \neg M(x)$
  — *or* —
$\nexists x . Z(x) \wedge M(x)$

Bouncer loves every animal that loves Bouncer.

$\forall x . L(x,b) \rightarrow L(b,x)$

Artist and Champion don't love any of the same animals.

$\forall x . \neg L(a,x) \vee \neg L(c,x)$
  — *or* —
$\forall x . L(a,x) \rightarrow \neg L(c,x)$
  — *or* —
$\nexists x . L(a,x) \wedge L(c,x)$