EECS20n, Quiz 1, 9/7/04

The quiz will take 15 minutes. Write your reponse on the sheet.

Print your name and lab time here:

Last Name ———————— First ———————— Lab time ————————

1. For each expression indicate whether the expression is well-formed; if it is well-formed, indicate whether it is an assertion; if it is an assertion, indicate its truth value True or False.

Expression	Well-formed (Y or N)	Assertion (Y or N)	Truth value (T or F)
$x \geq 4 \implies x \geq 3$			
$x \geq 5 \land y \leq 6$			
$5 \land x$			
$\exists x, x > 3$			
$\forall x, x > 3$			

2. Indicate whether the following statements are **true** or **false**. Put a box around your answer.

   (a) There exists a function $f : [0,1] \rightarrow [0,1]$ whose graph is $\text{graph}(f) = \{(x,x) \mid x \in [0,1]\}$

   (b) Let $f:Reals \rightarrow Reals$ and $g:Reals \rightarrow Reals$. Define the functions $f + g$ by $\forall x \in Reals$, $(f + g)(x) = f(x) + g(x)$, and $g \circ f$ by $\forall x \in Reals$, $(g \circ f)(x) = f(g(x))$. Then

$$f + g = g + f$$
$$f \circ g = g \circ f$$

3. The following figure represents an interconnection of three systems: a modulator (mod) that transforms a binary sequence into a sound-like voltage, a telephone network that transmits voltage waveforms, and a demodulator that transforms sound-like voltage into a binary sequence.

binary sequence   voltage signal   binary sequence
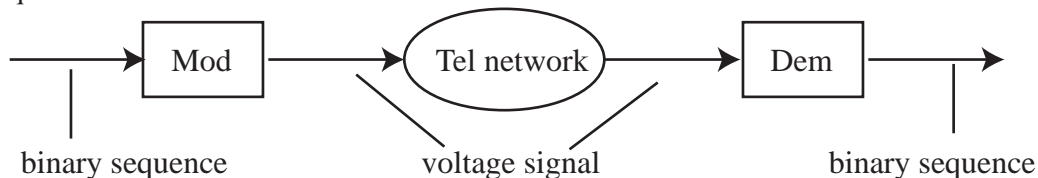
Define appropriate signal spaces of binary sequences and voltage signals in the form $[Domain \rightarrow Range]$:

Binary Sequences =

Voltage Signals =