EECS20n, Quiz 1, 9/15/00

The quiz is to provide feedback to you and to me about how well you've followed the material so far. The quiz will take 15 minutes.

Please print your name and your TA's name here:

Last Name _____ First _____ TA's name _____

1. Give one signal from $[Nats_0 \rightarrow Bin]$ and one signal from $[Reals \rightarrow Reals]$.

   The signal $Zero : Nats_0 \rightarrow Bin$ where

   $$\forall n \in Nats_0, \quad Zero(n) = 0,$$

   and the signal $Sinewave : Reals \rightarrow Reals$ where

   $$\forall t \in Reals, \quad Sinewave(t) = \sin 200t$$

   are two examples.

2. For what values of $x \in Reals$ does the following predicate evaluate to true:

   $$[1, x) \cap [1.5, 3] = \{y \in Reals \mid 1.5 \leq y \leq 3\}?$$

   The predicate evaluates to true for all $x \geq 3$.

3. Construct a finite state machine with $Inputs = \{0, 1, absent\}$, $Outputs = \{r, absent\}$, and which outputs r whenever the input signal contains the sequence 000, otherwise it outputs $absent$.

   We'll need to remember the patters 0, 00, 000. So we need three states, as in the figure.