

## EECS20n, Quiz 2 Solution, 2/10/03

A channel has input alphabet  $Inputs = \{0, 1\}$  and output alphabet  $Outputs = \{0, 1, \perp\}$ . The channel operates as follows. When the input symbol is 0(1), the channel outputs 0(1) or the erase symbol  $\perp$ . The channel erases *at most three* consecutive input symbols.

1. What is the space of input signals?

$$InputSignals = [Naturals_0 \rightarrow \{0, 1\}].$$

2. What is the space of output signals?

$$OutputSignals = [Naturals_0 \rightarrow \{0, 1, \perp\}].$$

3. What are the possible output signals when the input signal is  $(0, 0, \dots)$ ?

The possible output signals are:  $(0, 0, \dots)$ ,  $(\perp, 0, \dots)$ ,  $(0, \perp, \dots)$ ,  $(\perp, \perp, \dots)$ .

4. Construct a nondeterministic state machine model of the channel. Give your answer as a transition diagram. Note the initial state.

The state machine is given below. The names of the states (zero, one, two, or three) indicate how many consecutive erasures have occurred.

