EECS 2001

Homework Assignment #1Due: September 15, 2016 at 4:00 p.m.

When you submit your solution to Assignment 1, you should also hand in the declaration on academic honesty. Without this declaration, your assignment will not be marked. Please do not staple the declaration to your solutions.

- 1. Choose a random number between 150 and 250. Write it down (in ordinary decimal notation). Then write the number's binary representation.
- 2. For each of the following sets, determine whether the set is finite or infinite. If the set is finite, write down an explicit list of all the elements in the set. If the set is infinite, say so and list five elements of the set. (IN denotes the set of non-negative integers.)
 - (a) $A = \{n \in \mathbb{N} : \exists m \in \mathbb{N} \text{ such that } 2m = n\}.$
 - (b) $B = \{n \in \mathbb{N} : \forall m \in \mathbb{N}, 2m = n\}.$
 - (c) $C = \{1, 2, 3\} \times \{4, 5\}.$
 - (d) $D = \{S : S \subseteq \{1, 2, 3\} \text{ and } 1 \notin S\}.$
- **3.** Define a sequence of strings inductively as follows.

$$s_0 = 0$$

$$s_1 = 1$$

$$s_n = s_{n-1}s_{n-2}, \text{ for } n \ge 2$$

- (a) What is s_5 ?
- (b) What is the length of s_{12} ?
- (c) Prove that for all $i \ge 0$, s_i does not contain three consecutive 1's.