CS 381 Assignment 1 due Friday, Sept. 1, 2006

1. a) Prove that $\{0,1\}^*$ is countably infinite.

b) Prove that the set of all subsets of $\{0,1\}^*$ is not countably infinite.

c) Can we assign a unique name to each subset of $\{0,1\}^*$? Explain your answer.

2. a) List the three shortest strings in $\left\{0^n 10^{2n} 1 \mid n \geq 1\right\}$.

b) Describe the set of strings denoted by $\left\{0^n 10^{2n} 1 \mid n \geq 1\right\}^*$. How many strings are there of length less than or equal to 15?

3. 2.2.4

4. 2.2.5a and d