Homework Day #32
COMP 2230
Spring 2024
Prof. Stucki

1) Prove that the number of strings over an alphabet is countably infinite. In other words, provide a 1-1 correspondence between the set of all possible strings and the natural numbers.

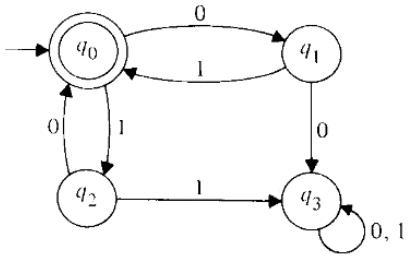
2) Draw an FSA state diagram for the following formal definition:

$\Sigma = \{p, q, r\}$ $K = \{1, 2, 3, 4\}$ $F = \{2, 4\}$ $s = 1$

$\delta =$

	p	*q*	*r*
1	1	3	2
2	4	4	2
3	2	3	4
4	1	2	3

3) For the following Finite State Machine state diagram write the formal definition (identify Σ, K, F, s, & δ)



4) Construct a finite state machine for each of the following languages $\Sigma = \{a, b\}$.

a) $\{w : w$ has an even length$\}$
b) $\{w : w$ contains the substring *abbb*$\}$
c) $\{w : w$ begins and ends with the same symbol$\}$
d) $\{w : |w| < 3\}$
e) $\{w :$ w contains no b's$\}$
f) $\{baba\}$