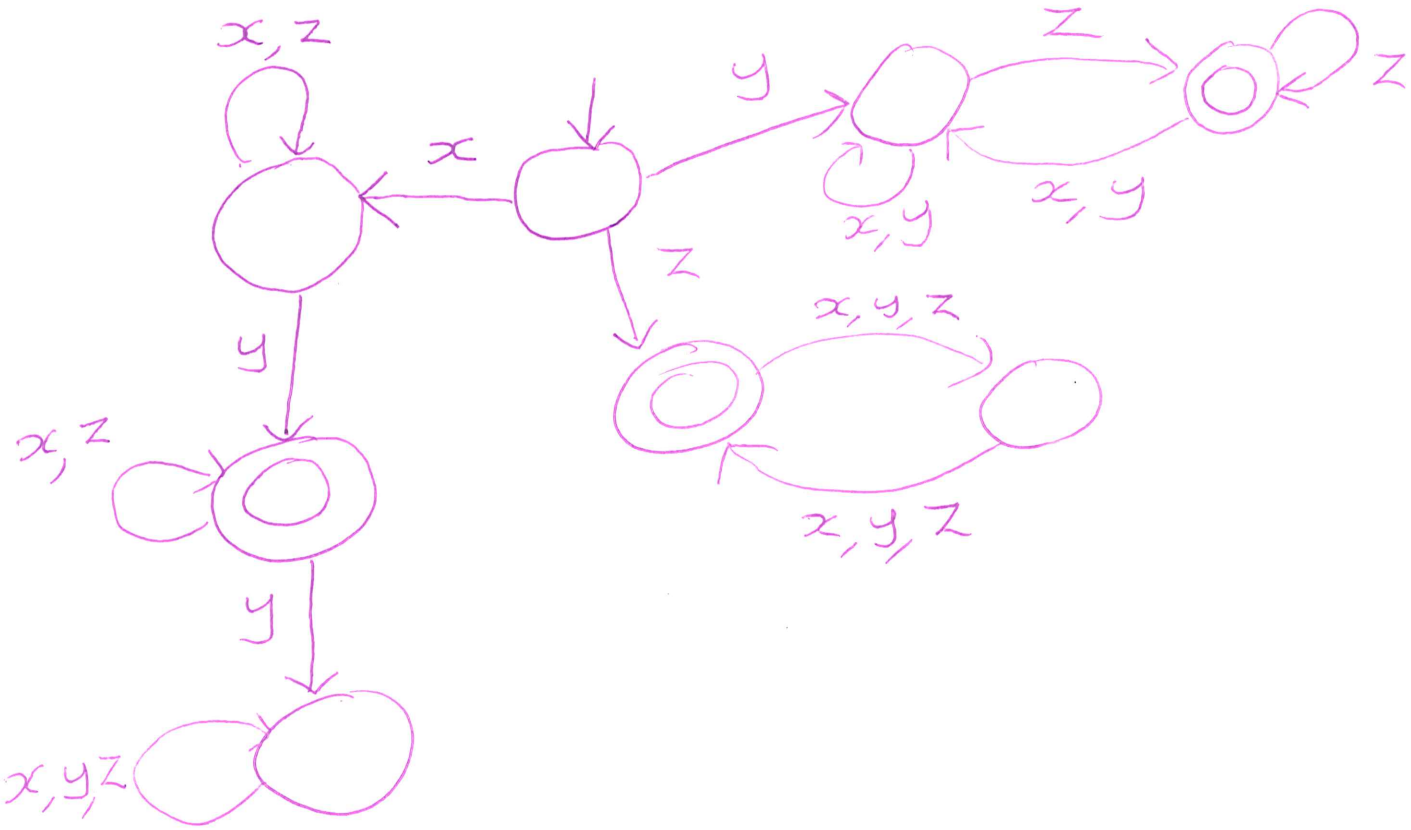
CpSc 3500 — Goddard

Warmup 1: FAs and REs

1. For the alphabet $\{\mathtt{x}, \mathtt{y}, \mathtt{z}\}$,
   let L be the language of nonempty strings w such that
   w starts with the symbol $\mathtt{x}$ and contains exactly one $\mathtt{y}$, or
   w starts with the symbol $\mathtt{y}$ and ends with the symbol $\mathtt{z}$, or
   w starts with the symbol $\mathtt{z}$ and the total length is odd. Give an FA for L.



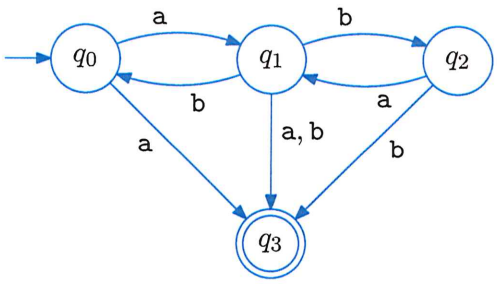
2. Give an RE for the set of all binary strings of odd length whose first and last bits are the same.

$0\Sigma(\Sigma\Sigma)^*0 + 1\Sigma(\Sigma\Sigma)^*1 + 0 + 1$

3. Give an RE for the complement of the language defined by the following RE: $(01)^*$

$1\Sigma^* + \Sigma^*0 + \Sigma^*00\Sigma^* + \Sigma^*11\Sigma^*$

4. Consider the following FA.



(a) Give two strings of length 4 accepted by the FA.

(b) Give two strings of length 4 NOT accepted by the FA.

(c) Describe in succinct-ish English the language of this FA. Be precise.

Alphabet = {a, b}
Must start with a
and except for last symbol must alternate.