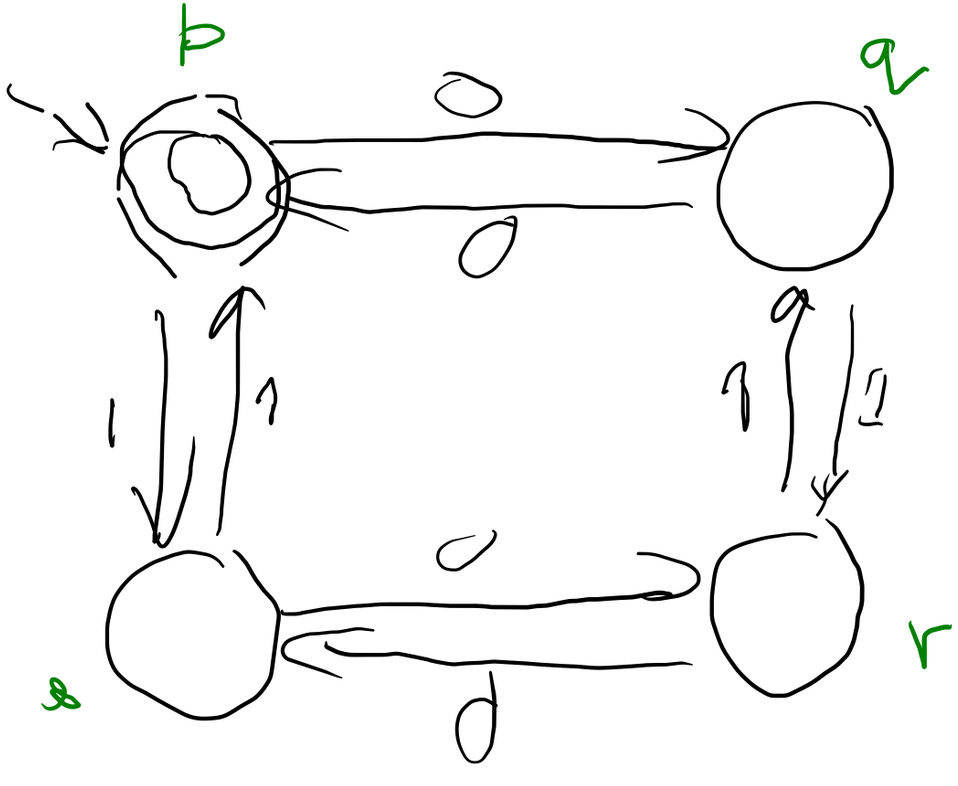
9/1/23

CS704

$\Sigma = \{0, 1\}$. Design a DFA that all words with even # 0's & even # of 1's over Σ.



p = even for 0 & 1

r = odd for 0 & 1

q = odd 0 & even 1

s = odd 1 & even 0

Σ = Finite alphabet

Σ^* = Set of all (finite) words over Σ.

Σ^* is a countably infinite set.

$a < b$

Eg. $\Sigma = \{a, b\}$

$\Sigma^* = \{\epsilon, a, b, aa, ab, ba, bb, aaa, aab, aac \cdots bbb, \ldots\}$

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$\mathbb{N} = \{1, 2, 3, 4, 5, \ldots\}$

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Σ - finite alphabet

$|\Sigma|$ - no. of letters in Σ.

# of words over Σ of length $n = |\Sigma|^n$

" " " " " " $n+1 = |\Sigma|^{n+1}$

Let $f(n) = |\Sigma|^n$

$|\Sigma^*| = f(0) + f(1) + f(2) + \cdots$

Regular languages

- Model (m|c) is DFA

- Regular languages are robust with respect to closure properties

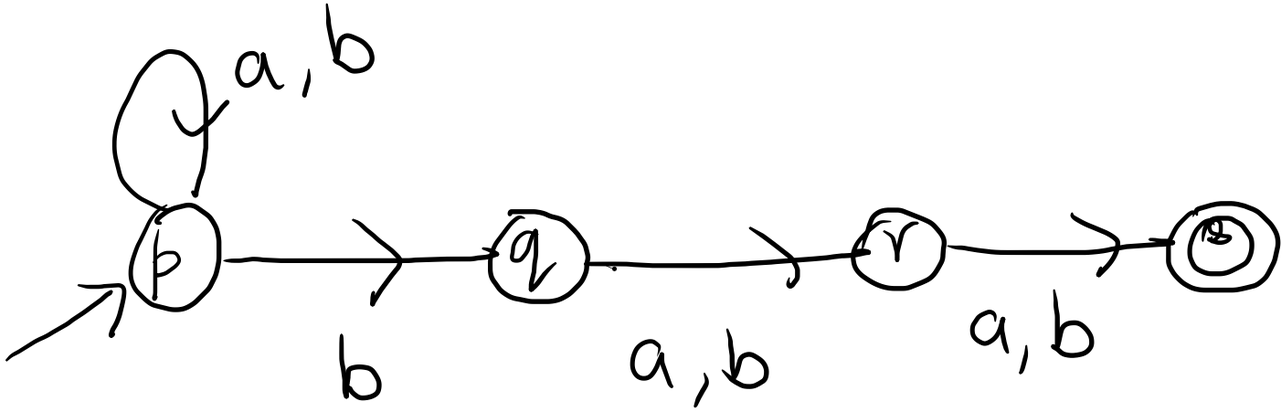
L_1 - M_1 DFA for L_1

L_2 - M_2 DFA for L_2

		Complexity (size)
union	closed	$\|M_1\| \times \|M_2\|$
intersection	closed	$\|M_1\| \times \|M_2\|$
complement	closed	Worst case $2^{\|M\|}$
concatenation	closed	$\|M_1\| + \|M_2\|$
Kleene star	closed	
set difference	closed	$\|M_1\| \times \|M_2\|$

$\Sigma = \{a, b\}$

$L = \{ w \in \Sigma^* \mid$ Third last letter from the right is a 'b' $\}$



NFA, NFA $\equiv$ DFA

ϵ-NFA