Week3 friday

Theorem: For an alphabet Σ , For each language L over Σ ,

L is recognized by some DFA iff L is recognized by some NFA iff L is described by some regular expression

If (any, hence all) these conditions apply, L is called **regular**.

Prove or Disprove: There is some alphabet Σ for which there is some language recognized by an NFA but not by any DFA.

Prove or Disprove: There is some alphabet Σ for which there is some finite language not described by any regular expression over Σ .

Prove or Disprove: If a language is recognized by an NFA then the complement of this language is not recognized by any DFA.

Set	Cardinality
$\{0,1\}$	
$\{0,1\}^*$	
$\mathcal{P}(\{0,1\})$	
The set of all languages over $\{0,1\}$	
The set of all regular expressions over $\{0,1\}$	
The set of all regular languages over $\{0,1\}$	

Pumping Lemma (Sipser Theorem 1.70): If A is a regular language, then there is a number p (a pumping length) where, if s is any string in A of length at least p, then s may be divided into three pieces, s = xyz such that

- |y| > 0
- for each $i \ge 0$, $xy^iz \in A$
- $|xy| \leq p$.

True or False: A pumping length for $A = \{0, 1\}^*$ is p = 5.

True or False: A pumping length for $A = \{1, 01, 001, 0001, 00001\}$ is p = 4.

True or False: A pumping length for $A = \{0^j 1 \mid j \ge 0\}$ is p = 3.

True or False: For any language A, if p is a pumping length for A and p' > p, then p' is also a pumping length for A.