

## Part 1. Closure properties

- Let language  $A = \{aa,bb,ab\}$  and language  $B = \{aaa,b,ab,bbb\}$  be languages over alphabet  $\{a,b\}$  then compute the following
  - The reversal of A and B
  - The complement of B  
(restricted to strings of length  $\leq 3$ )
  - The Intersection of A and B
  - The union of A and B
  - $A^*$   
(restricted to strings of length  $< 7$ )
- Construct NFA for the following (the transition diagram)
- A and B are the languages of question 1. above.
  - AB
  - $A^*$
  - $\{x \in \{m,n\}^* \mid \text{length}(x) = 3 \text{ or } \text{length}(x) = 2\}$
- Give an NFA (or NFAs) over the alphabet  $\{0,1\}$  with the specified number of states
  - $\{w \mid w \text{ ends in } 00\}$     3 states
  - $\{\epsilon\}$     1 state
  - $\{\epsilon\}$     3 states

- Given the NFAs to the right. Give an equivalent NFA with no epsilon transitions.

