

Q. What do you mean by closure properties of regular languages? Define some important Closure properties.

Ans. Closure properties: A set is closed under an operation if applying that operation to any members of the set always yields a member of the set.

Closure under Kleene: The set of regular languages is closed under each Kleene operation. That is, if L1 and L2 are regular languages, then

- $L_1 \cup L_2$ is regular
- L_1L_2 is regular
- L_1^* is regular.

Closure under Complementation: The set of regular languages is closed under complementation.

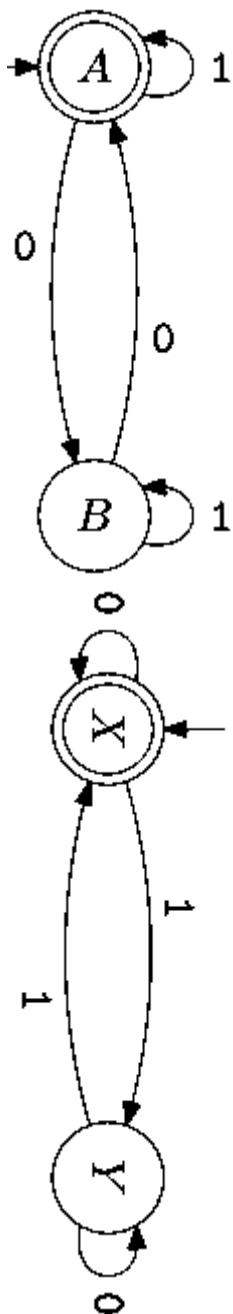
The complement of language L, written L' .

Closure under Intersection: The set of regular languages is closed under intersection.

Closure under Intersection: That is, if L1 and L2 are regular languages, then

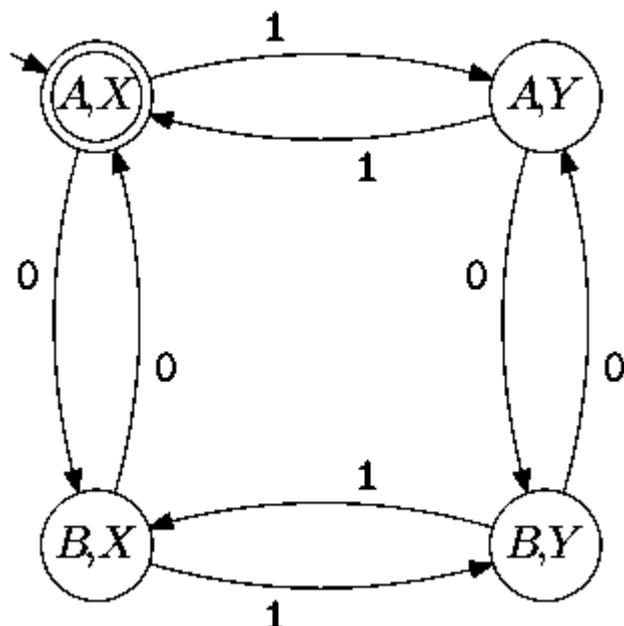
- $L_1 \cap L_2$ is regular

For example: Suppose L1 is the binary strings with an even number of 0's, and L2 the binary strings with an even number of 1's. Then the FAs for these languages both have two states:



And so the FA for $L_1 \cap L_2$ has four states:

Product Construction for Even 0's and 1's



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