Prove that if a language L is regular then so is the language prefix(L).

Example Proof:

(The tools and assumptions we need)

Assume **L** is regular. Then there exists a DFA **M**=(Q,Σ,δ,q_0,*F*) such that **L** is accepted by **M**. Also *u* is a prefix of *uv* ϵ **L** if and only if there is a path in **M** from q_0 (start state) to δ(q_0 ,u) (state after processing the prefix *u*) and there is a path in **M** from δ(q_0 ,u) to a state in *F.* (an accepting state)

(Using the tools and assumption we established)

Let *T* be the set containing all states *q* such that there is a path in **M** from q_0 to *q* and there is a path in **M** from *q* to a state in *F*. The language prefix(L) is accepted by the DFA **M'** = ((Q,Σ,δ,q_0,*F* ∪ *T*) by the definition of prefix above and therefore prefix(L) is regular.