ECE374 Assignment 2

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Because the order is inverse, so we need to jump the "y" to find the appropriate "x", and then go back to get "y".
So, at first, we need to jump, which means need to use ξ-transition after s'

$\delta'(s', \xi) = (q, q, before)$, where q $\in$ Q
s' is the starting status of Q'.the first q is used to remember the guessed "y". The second q is used to calculate subsequent calculation, or say to represent "y?" to find the appropriate x to make "yx" $\in$ A. "before" and "after" is used to distinguish the first status and the accepting status, or say when find the appropriate x. it changes from "before" to "after".

Once it finds the "yx" $\in$ A, it can use ξ-transition to be "after" status. Becuase maybe "x?" also can make "yx?" $\in$ A, so it is not necessary to be the end.

$\delta'((q, p, before), \xi) = (q, s, after)$, if p $\in$ A and where q,p $\in$ Q
s is the starting status of Q. The reason why clean p to s is to go back to get "y", which means once the s become q after some operations, we get back the "y" we jump. Previously we find the "x" when change the "before-after" status, then we get back the "y", so we successfully inverse the order.

So, to change the second value in general.

$\delta'((q, p, a), b) = (q, \delta(p, b), a)$ where a $\in$ {before,after}, b $\in$ Σ
This will change the second value to find the appropriate "x" when in the "before" status, to get back the "y" when in the "after" status.

So the accepting status is

A'={(q,q,after)}
which it has found the appropriate "x" to change the "before-after" and has got the jumpped "y"

All in all, in formally define:

L:{Q,s,Σ,δ,A }

cycle(L):{Q',s',Σ,δ',A' }

Q'= {s'} $\bigcup$ Q X Q X {before,after}

$\delta'(s', \xi) = (q, q, before)$
$\delta'((q, p, before), \xi) = (q, s, after)$, if p $\in$ A
$\delta'((q, p, a), b) = (q, \delta(p, b), a)$

A'={(q,q,after)}

where q,p $\in$ Q, a $\in$ {before,after}, b $\in$ Σ