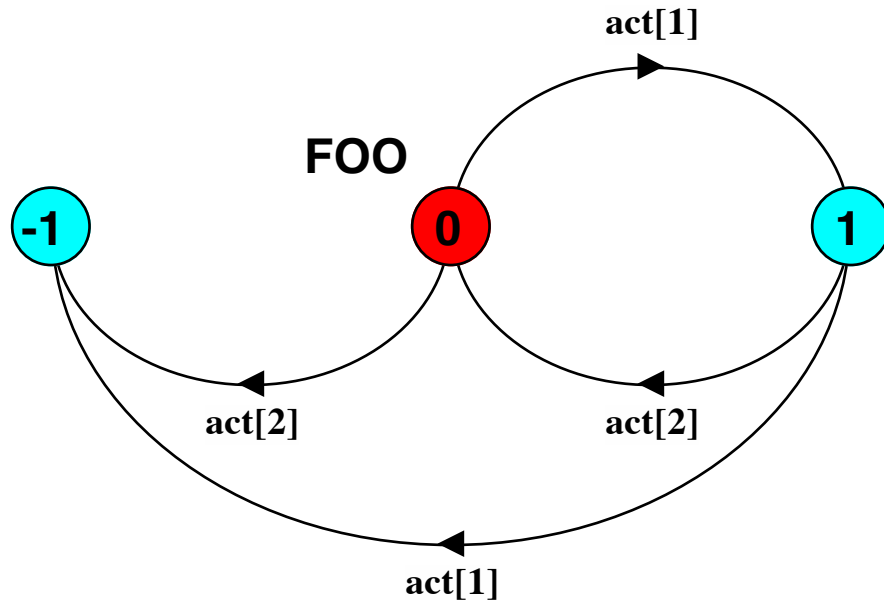


TEST = ( act[ 1 ]  $\rightarrow$  act[ 2 ]  $\rightarrow$  TEST |  
act[ 3 ]  $\rightarrow$  TEST2 ),  
TEST2 = ( act[ 4 ]  $\rightarrow$  act[ 5 ]  $\rightarrow$  TEST2 ).

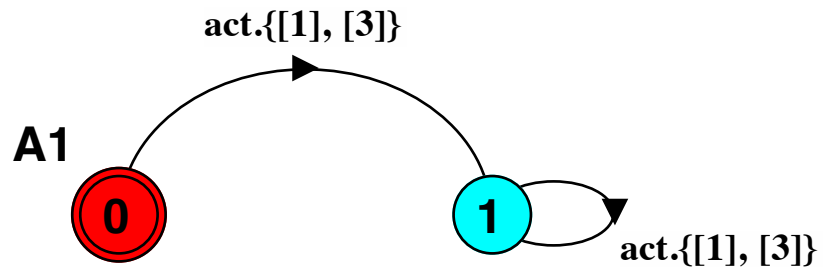
property FOO = ( act[ 1 ]  $\rightarrow$  act[ 2 ]  $\rightarrow$  FOO ).

There is a hidden \*  
transition on every state,  
where \* are all actions  
excluding act[1] and act[2].



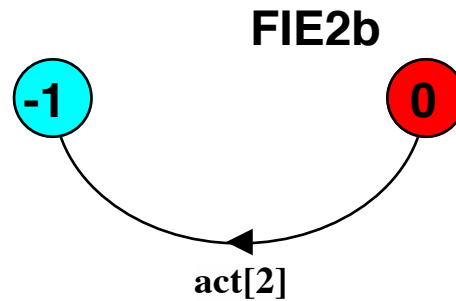
$$\begin{aligned} \text{TEST} &= ( \text{act}[1] \rightarrow \text{act}[2] \rightarrow \text{TEST} \mid \\ &\quad \text{act}[3] \rightarrow \text{TEST2} ), \\ \text{TEST2} &= ( \text{act}[4] \rightarrow \text{act}[5] \rightarrow \text{TEST2} ). \end{aligned}$$
$$\text{assert A1} = ( \langle \rangle \text{act}[1] \mid \mid \langle \rangle \text{act}[3] )$$

A Buchi automata. Double circle is accepting state(s). Goal is to stay out of accepting states.



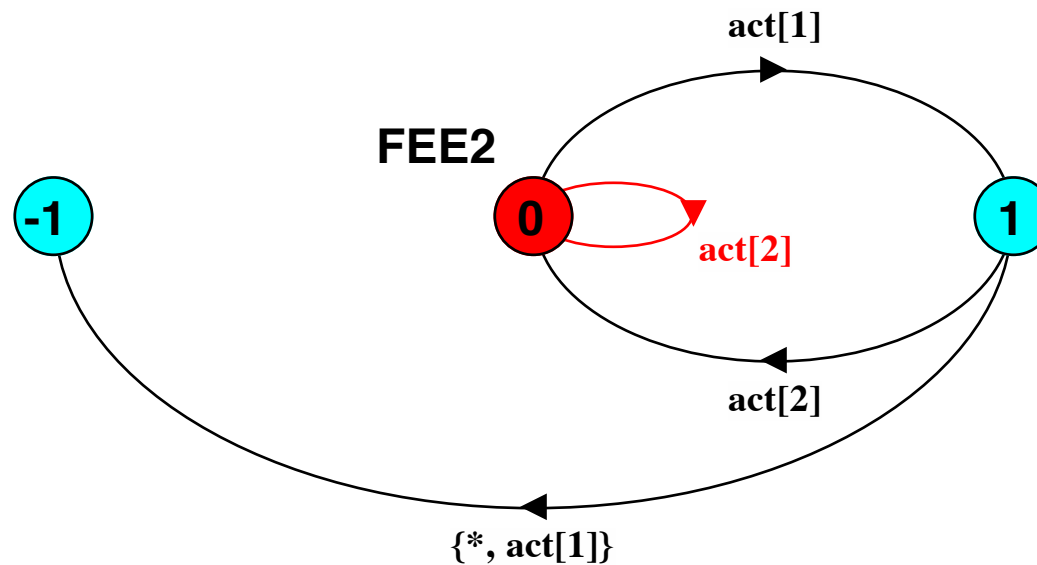
TEST = ( act[ 1 ]  $\rightarrow$  act[ 2 ]  $\rightarrow$  TEST |  
          act[ 3 ]  $\rightarrow$  TEST2 ),  
TEST2 = ( act[ 4 ]  $\rightarrow$  act[ 5 ]  $\rightarrow$  TEST2 ).

assert FIE2b = [ ]! act[ 2 ]



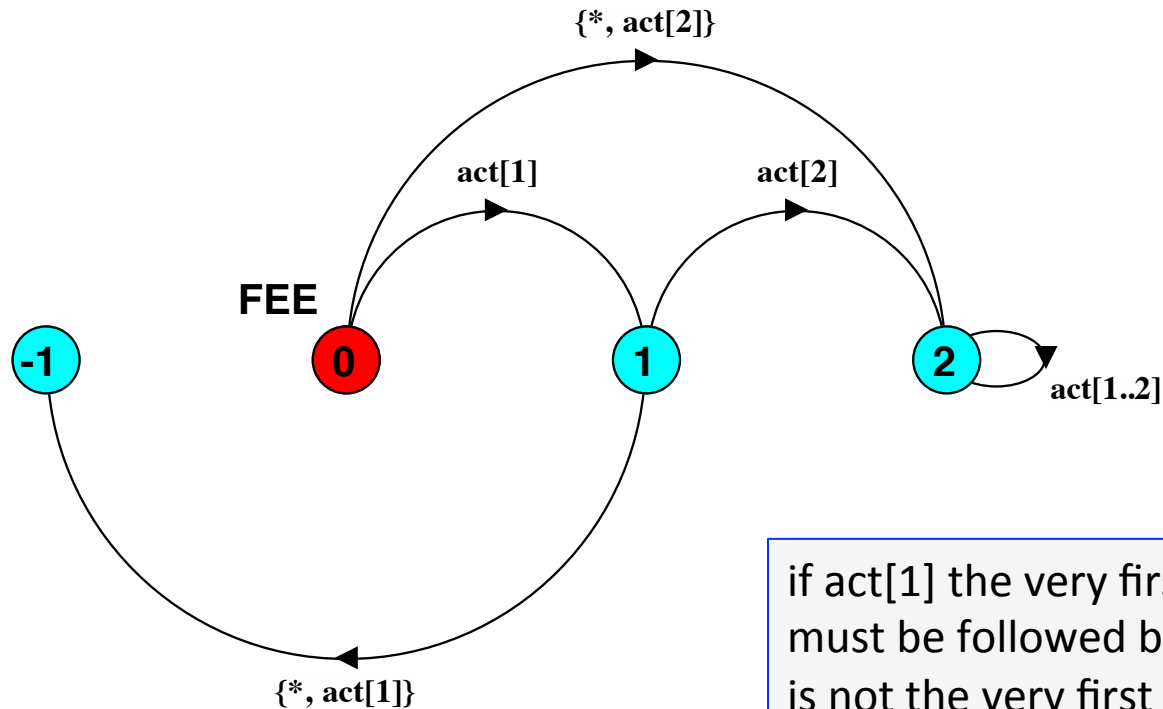
$\text{TEST} = ( \text{act}[1] \rightarrow \text{act}[2] \rightarrow \text{TEST} \mid$   
 $\text{act}[3] \rightarrow \text{TEST2} ),$   
 $\text{TEST2} = ( \text{act}[4] \rightarrow \text{act}[5] \rightarrow \text{TEST2} ).$

assert FEE2 = [ ] ( act[1]  $\rightarrow$  X act[2] )



$\text{TEST} = ( \text{act}[1] \rightarrow \text{act}[2] \rightarrow \text{TEST} \mid$   
 $\text{act}[3] \rightarrow \text{TEST2} ),$   
 $\text{TEST2} = ( \text{act}[4] \rightarrow \text{act}[5] \rightarrow \text{TEST2} ).$

$\text{assert FEE} = ( \text{act}[1] \rightarrow \text{X act}[2] )$

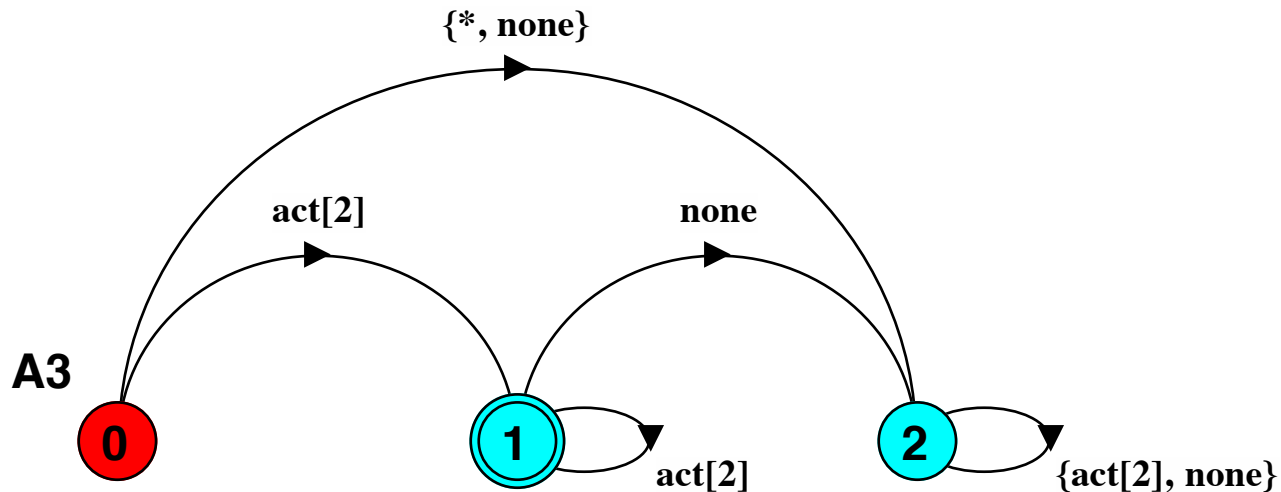


if act[1] the very first action then  
 must be followed by act[2]. If it  
 is not the very first action then  
 anything is ok.

TEST = ( act[ 1 ]  $\rightarrow$  act[ 2 ]  $\rightarrow$  TEST |  
act[ 3 ]  $\rightarrow$  TEST2 ),  
TEST2 = ( act[ 4 ]  $\rightarrow$  act[ 5 ]  $\rightarrow$  TEST2 ).

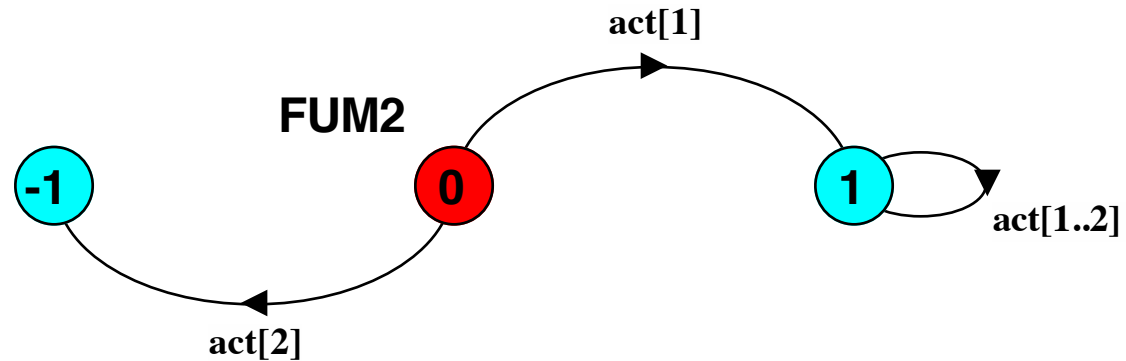
assert A3 = ( act[ 2 ]  $\rightarrow$  <> none )

This is True because act[2] not in set of first actions. Does not matter than none is not an action in TEST.



TEST = ( act[ 1 ]  $\rightarrow$  act[ 2 ]  $\rightarrow$  TEST |  
act[ 3 ]  $\rightarrow$  TEST2 ),  
TEST2 = ( act[ 4 ]  $\rightarrow$  act[ 5 ]  $\rightarrow$  TEST2 ).

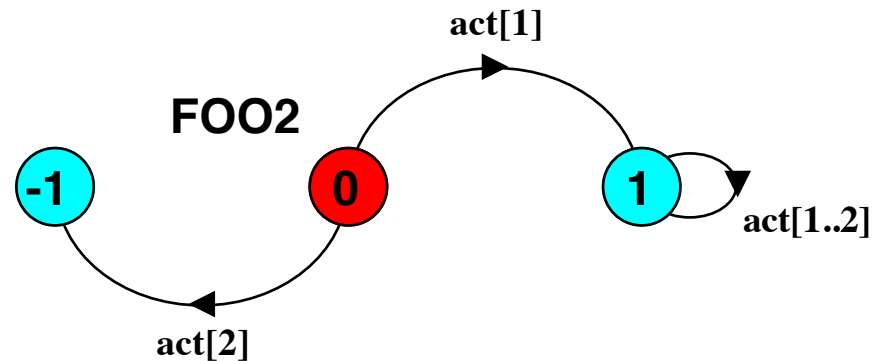
assert FUM2 = ( !act[ 2 ] W act[ 1 ] )



$$\begin{aligned} \text{TEST} &= ( \text{act}[1] \rightarrow \text{act}[2] \rightarrow \text{TEST} \mid \\ &\quad \text{act}[3] \rightarrow \text{TEST2} ), \\ \text{TEST2} &= ( \text{act}[4] \rightarrow \text{act}[5] \rightarrow \text{TEST2} ). \end{aligned}$$

property FOO2 = (  $\text{act}[1] \rightarrow \text{GOOD}$  ),  
 $\text{GOOD} = ( \{ \text{act}[1], \text{act}[2] \} \rightarrow \text{GOOD} ).$

Equiv to assert  $\text{FUM2} = ( !\text{act}[2] \text{ W } \text{act}[1] )$





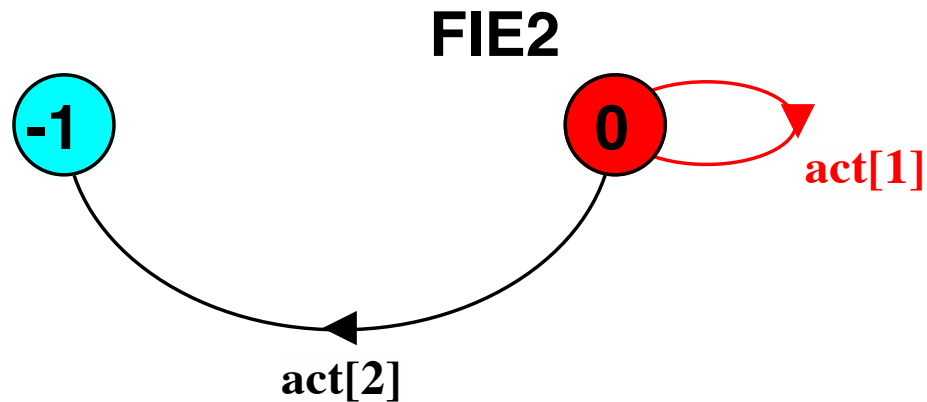
$$\text{TEST} = ( \text{act}[1] \rightarrow \text{act}[2] \rightarrow \text{TEST} \mid$$

$$\text{act}[3] \rightarrow \text{TEST2} ),$$

$$\text{TEST2} = ( \text{act}[4] \rightarrow \text{act}[5] \rightarrow \text{TEST2} ).$$

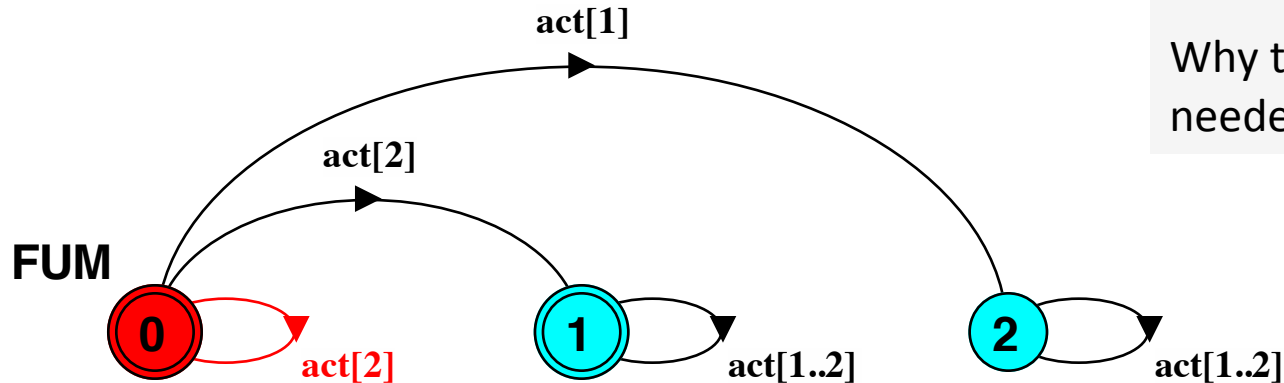
assert FIE2 = [ ] ( !act[2] W act[1] )

Non-obvious. Can you work it out?



$$\begin{aligned} \text{TEST} &= ( \text{act}[1] \rightarrow \text{act}[2] \rightarrow \text{TEST} \mid \\ &\quad \text{act}[3] \rightarrow \text{TEST2} ), \\ \text{TEST2} &= ( \text{act}[4] \rightarrow \text{act}[5] \rightarrow \text{TEST2} ). \end{aligned}$$

assert FUM = (!act[2] U act[1])



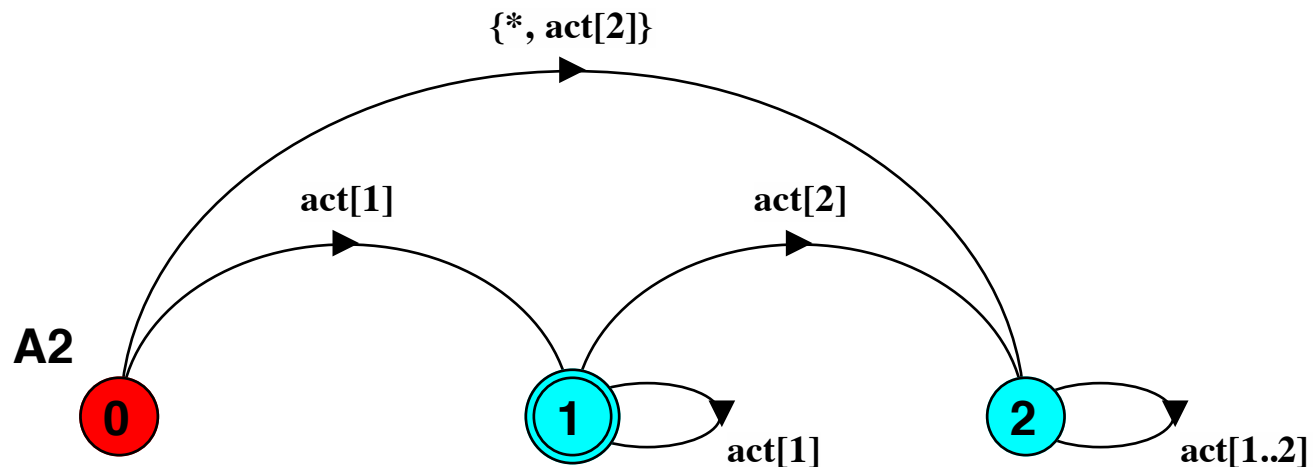
Confusing. Seems to allow  
 $\text{act}[2] \rightarrow \text{act}[1] \rightarrow \text{any}$ .

Why that red transition  
needed?

$$\begin{aligned} \text{TEST} &= ( \text{act}[1] \rightarrow \text{act}[2] \rightarrow \text{TEST} \mid \\ &\quad \text{act}[3] \rightarrow \text{TEST2} ), \\ \text{TEST2} &= ( \text{act}[4] \rightarrow \text{act}[5] \rightarrow \text{TEST2} ). \end{aligned}$$

**assert A2 = (act[1] -> <> act[2])**

Probably not what you want. Looks at very first set of actions possible. If it includes act[1] then it has to be followed by act[2]. If it does not include act[1], then it is True.



TEST = ( act[ 1 ] -> act[ 2 ] -> TEST |  
          act[ 3 ] -> TEST2 ),  
TEST2 = ( act[ 4 ] -> act[ 5 ] -> TEST2 ).

assert FEE3 = [](act[ 1 ] -> <>act[2])

