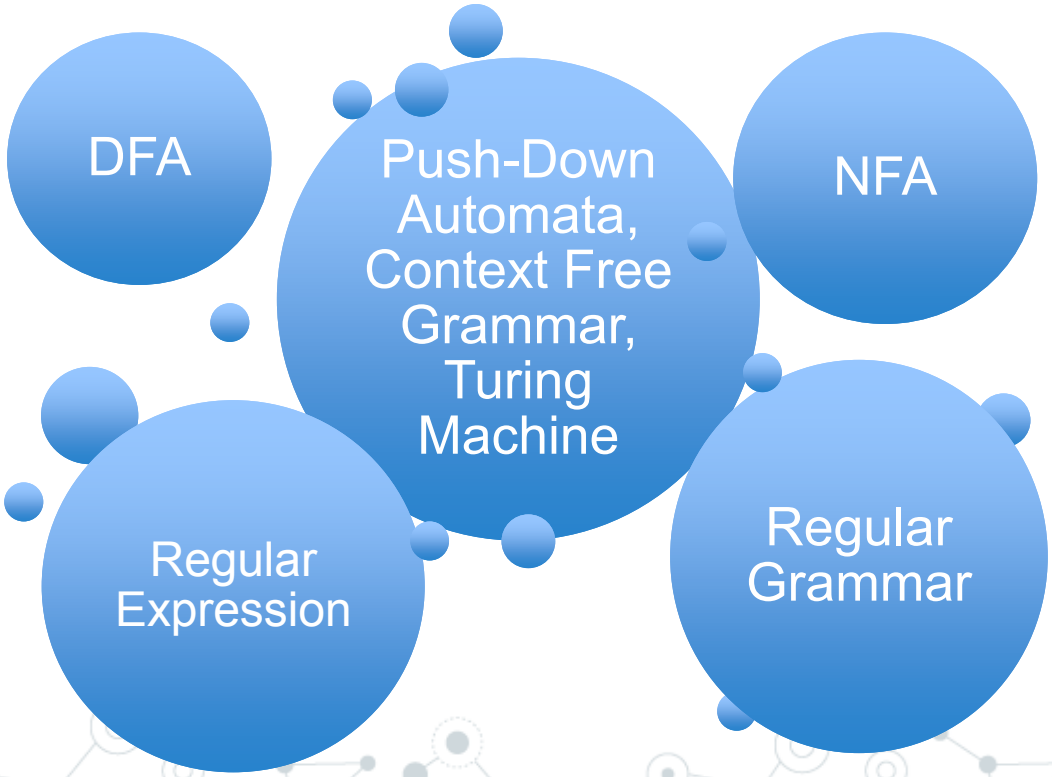
JFLAP

www.jflap.org

What is JFLAP?

- JFLAP is a software package of graphical tools used as an aid in learning basic concepts of Formal Languages and Automata Theory.
- Create and test languages such as:

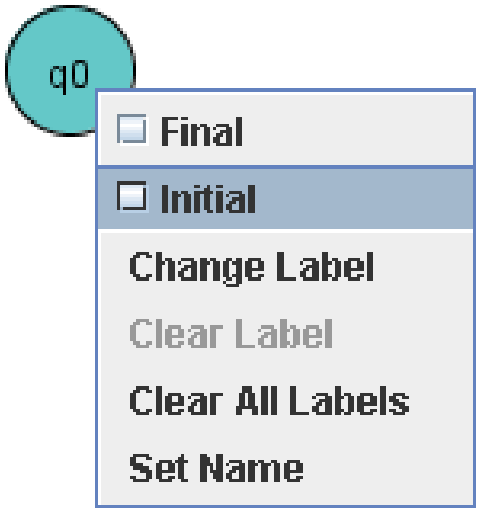


The FA Toolbar

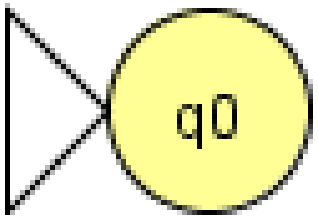
- Attribute Editor tool: sets initial and final states
- State Creator tool: creates states
- Transition Creator tool: creates transitions
- Deletor tool: deletes states and transitions

States

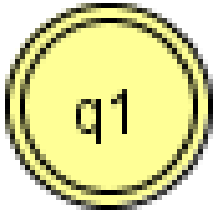
- Create a state by selecting the state creator tool then clicking in the canvas space.



Right click on a state for more options to set.

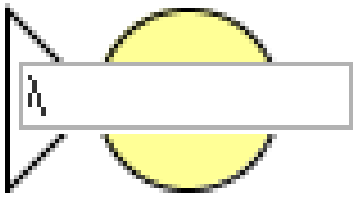


Initial State

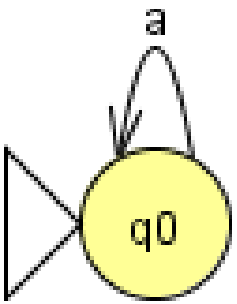


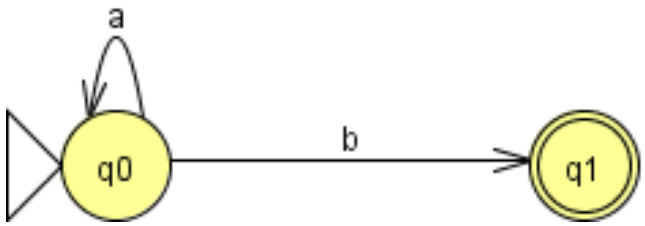
Final State

Transitions



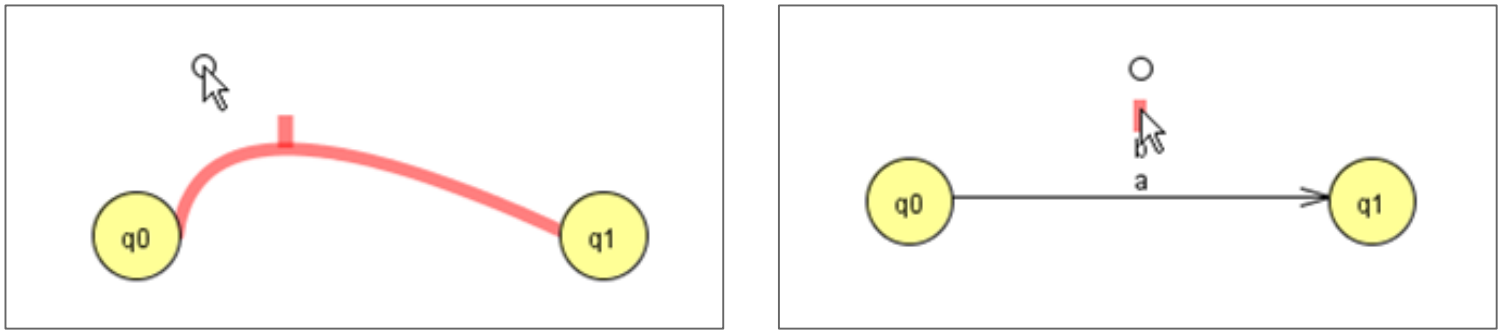
Create a transition by selecting the transition creator tool, then clicking on a state or clicking and dragging from one state to another. A box will appear to enter the transition value.





λ represents the empty string. Can be changed to ε in preferences.

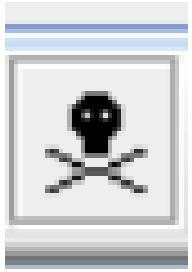
Manipulating Transitions



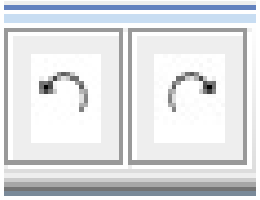
- Using the attribute editor tool, click on a transition once to highlight it. Click and drag the circle to adjust the curve. Click the transition again to deselect.

- When there are multiple labels, select each label separately to reposition it.

Delete, Undo, Redo

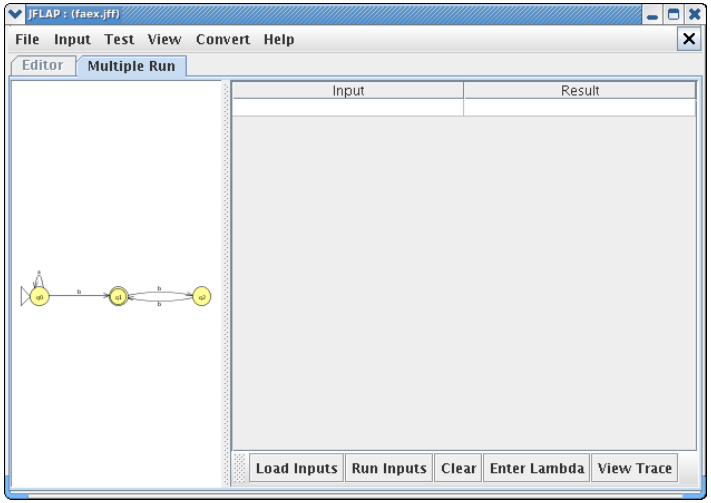


- Click on the deletor tool, then click on the state(s) or transition(s) to be removed. Note: When deleting a state, any connected transitions will also be removed.



- Click on the undo or redo tool, then click anywhere in the canvas space.

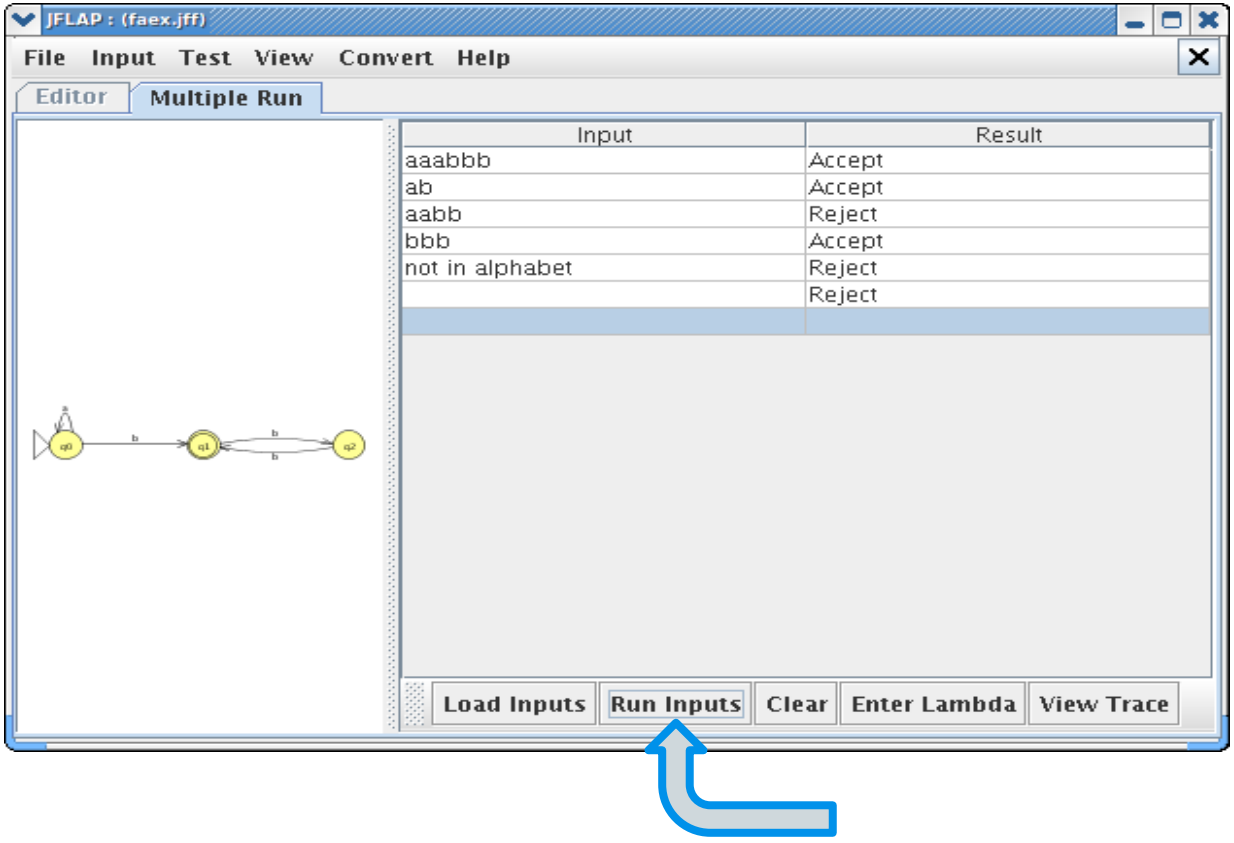
Running the FA on Multiple Strings



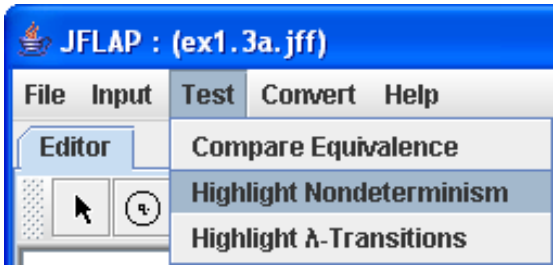
- Use the multiple run tab to see if the FA accepts strings from the language.
- Click on the first row of the input column and type in the string and press enter to add more strings.
- You can also load inputs from a file delimited by white space.
- To remove the tab, select File : Dismiss Tab.

Running the FA on Multiple Strings

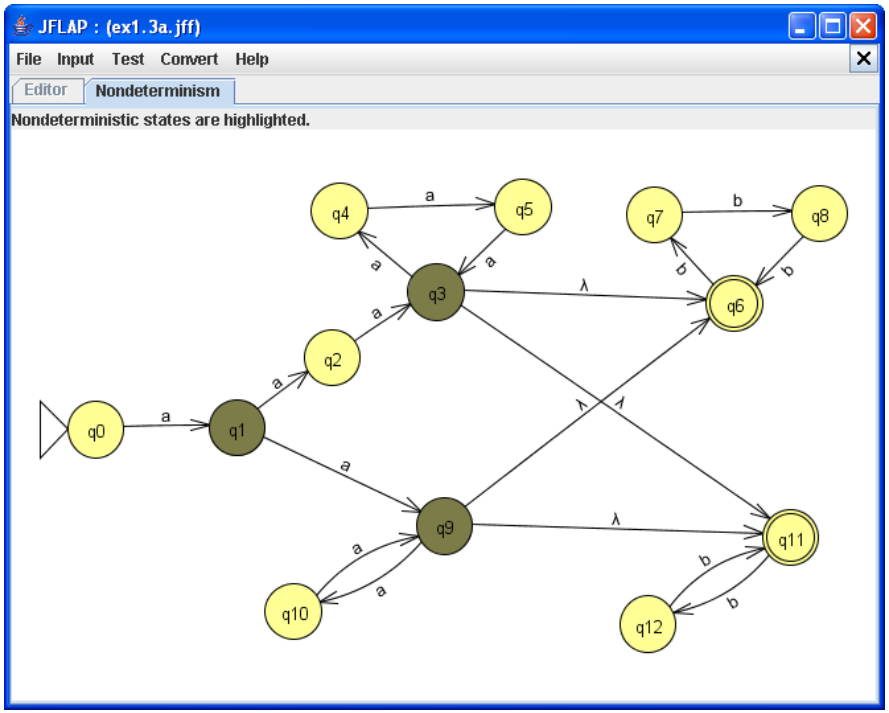
- Select Run Inputs to see which which strings are accepted and which are rejected.



Nondeterministic Finite Automaton

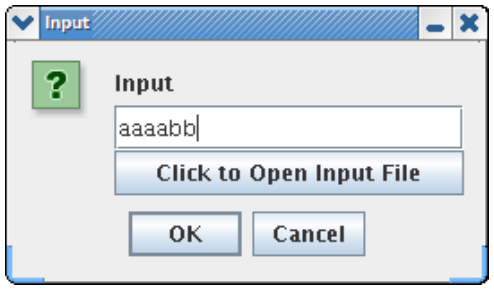


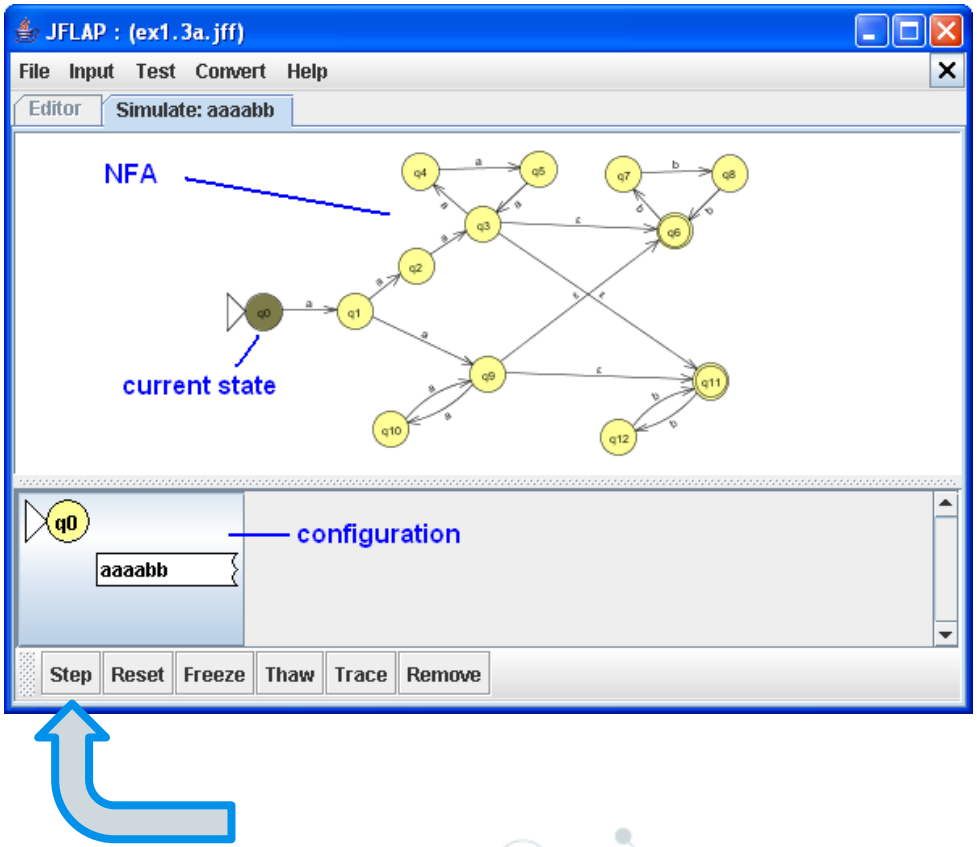
You can highlight nondeterministic states in an NFA.



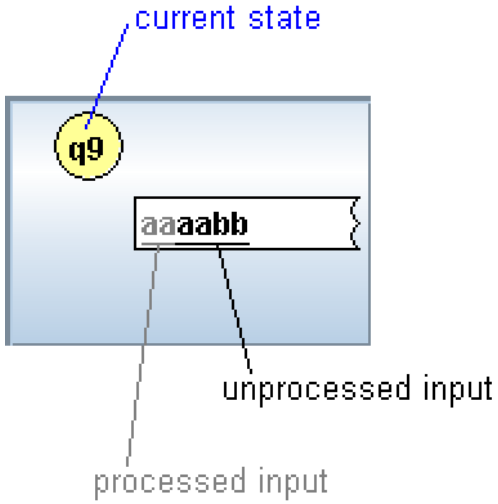
Running input on NFA - Step through

Select Input : Step with Closure…
and enter a string in the text box.

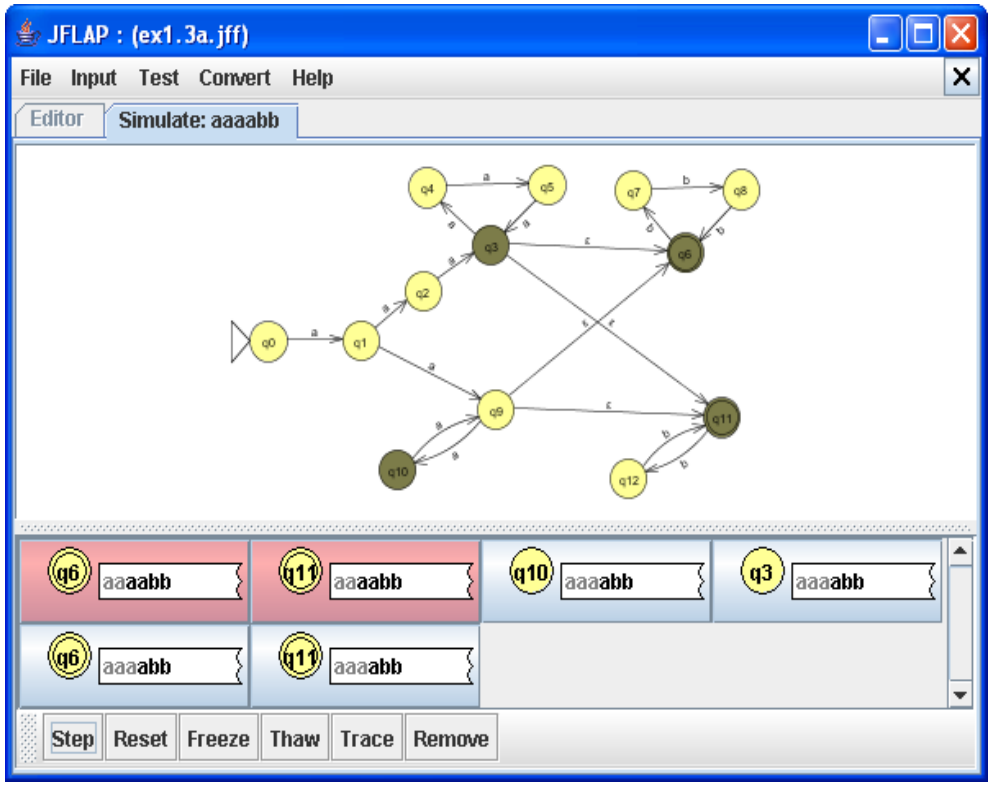




Click Step to walk
through the input.



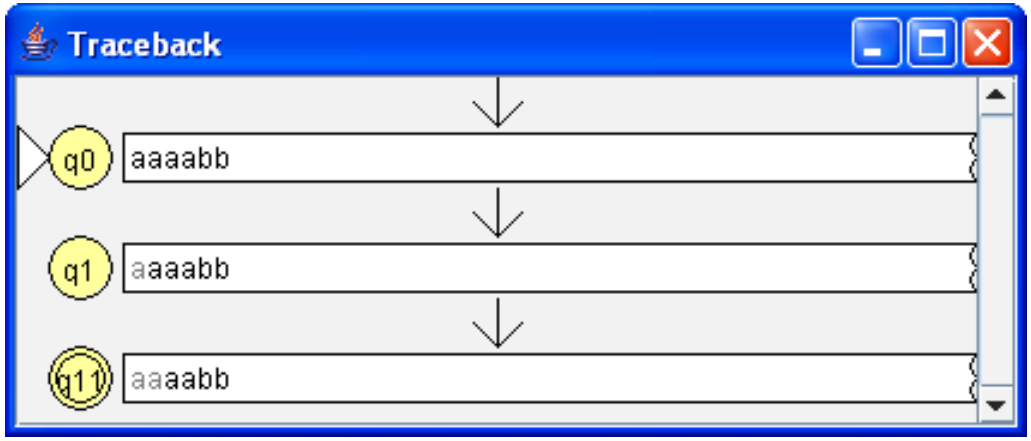
Running input on NFA - Step through



- Many states are highlighted in one step because it is an NFA.
- Configurations are highlighted in red because they were rejected.

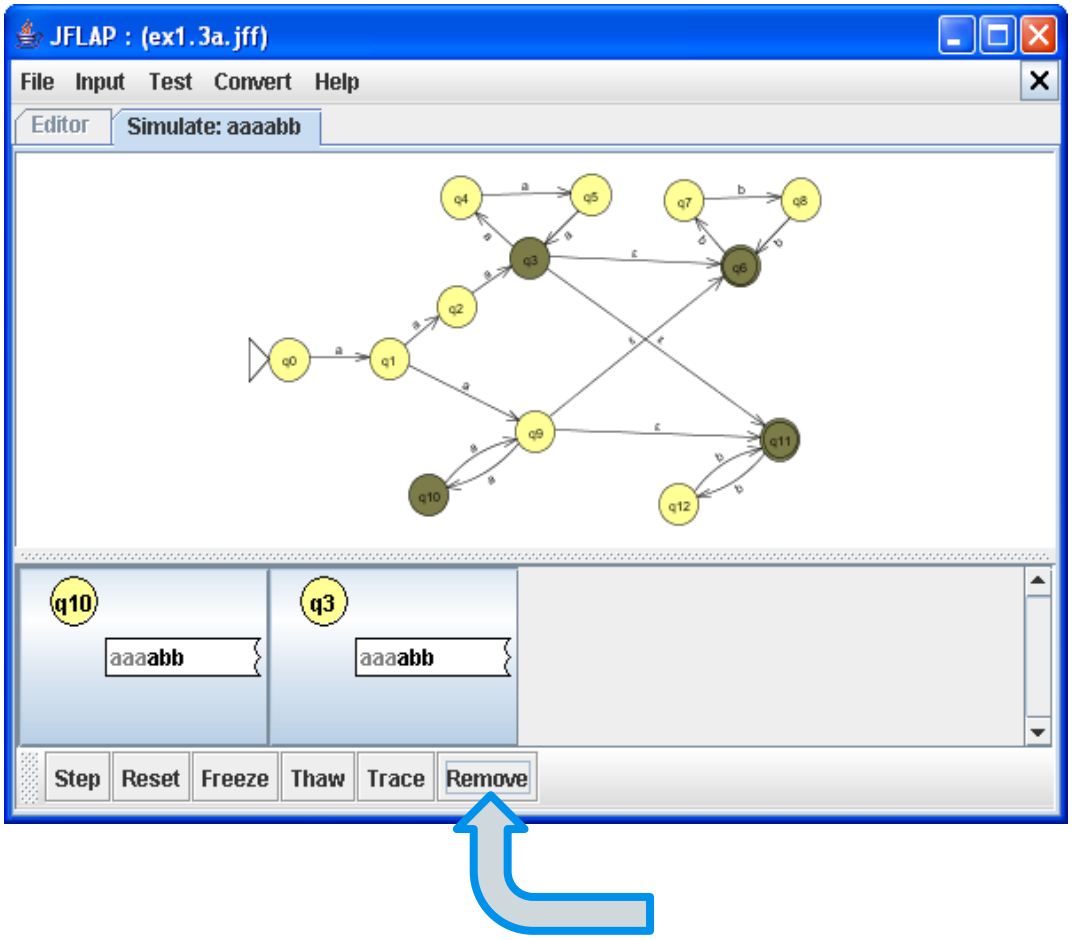
Producing a Trace

- Select a configuration, then select Trace.



- A new window will appear showing the traceback of that configuration.
- This particular example processed:
  - a from q0 to q1
  - a from q1 to q9
  - took a λ-transition to q11
  - the configuration was rejected

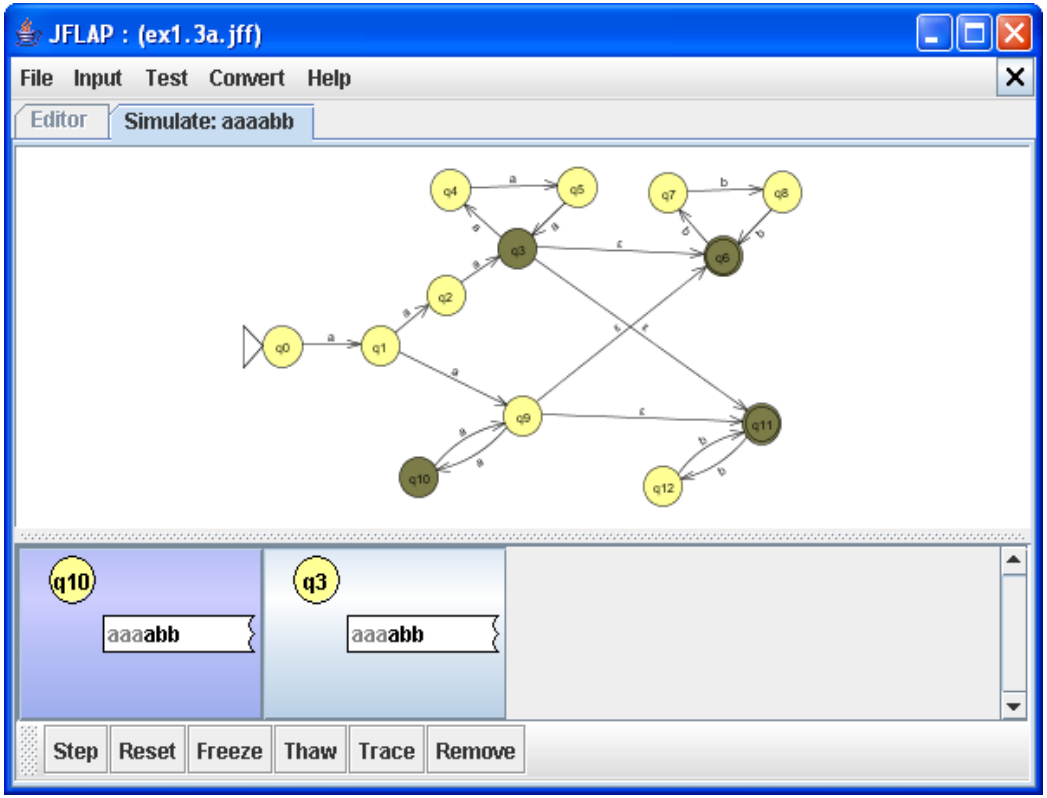
Removing Configurations



- Select a configuration, then select Remove.
- Rejected configurations are automatically removed on the next step through.

Freezing Configurations

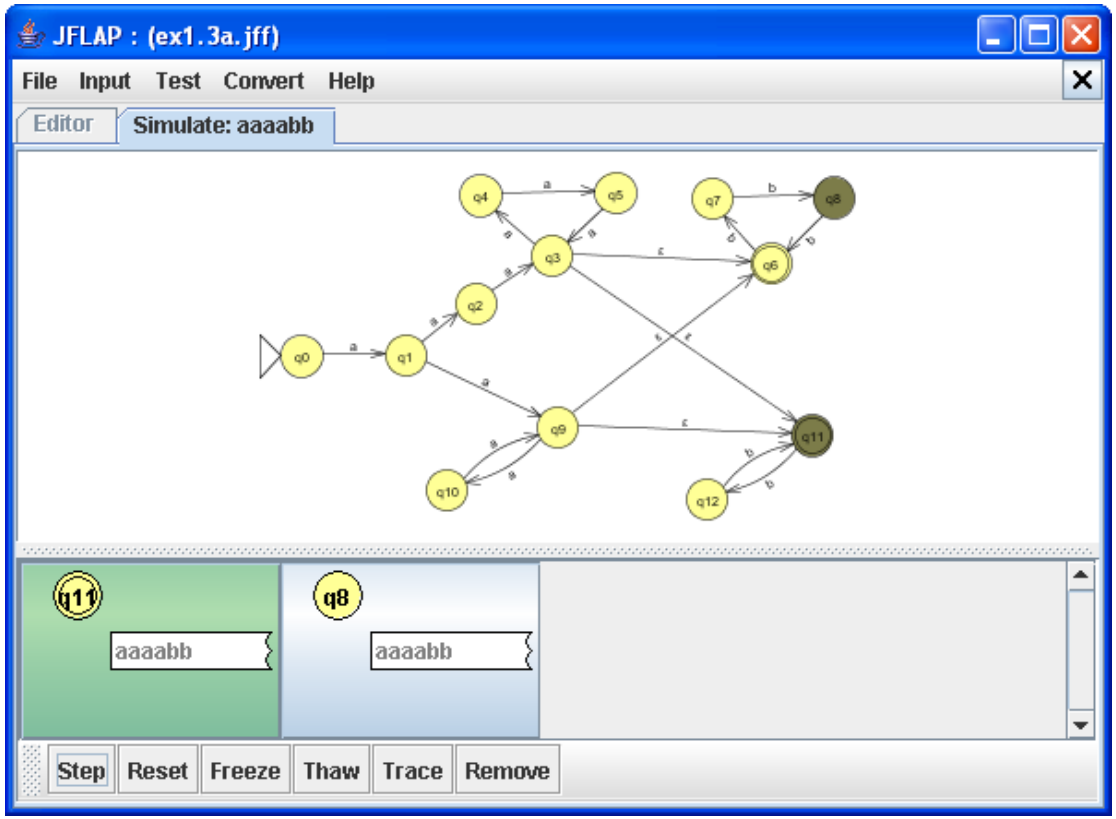
- A configuration that has been frozen will NOT step through the states.



- Frozen configurations will be tinted a darker shade.
- As you click step, the frozen configuration remains the same. This allows you to step through other configurations.

Thawing Configurations

- A configuration that has been thawed will continue to step through following the states.



- To proceed with a frozen configuration, select it and click Thaw.
- Accepting configuration s are colored green.

Other things you can do include:

- Conversions: Convert an NFA to a DFA
- Minimizations: Convert a DFA to a minimal state DFA
- Combine Automata
- Create and analyze other machines including:
  - Pushdown Automata
  - Turing Machine
  - Grammer
- More tutorials at: http://www.jflap.org/tutorial/