

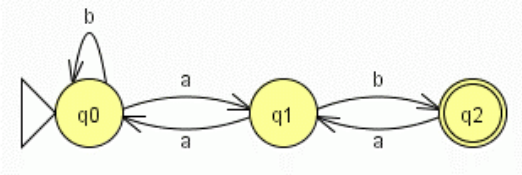
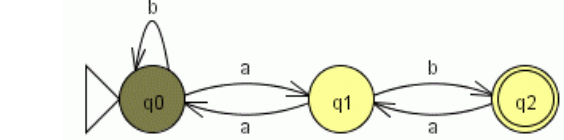


# How did JFLAP get Started?



- Aug. 1989 – Rodger started teaching automata theory course at Rensselaer
- Pencil and paper exercises
- Students requested feedback!

# Why Develop Tools for Automata?

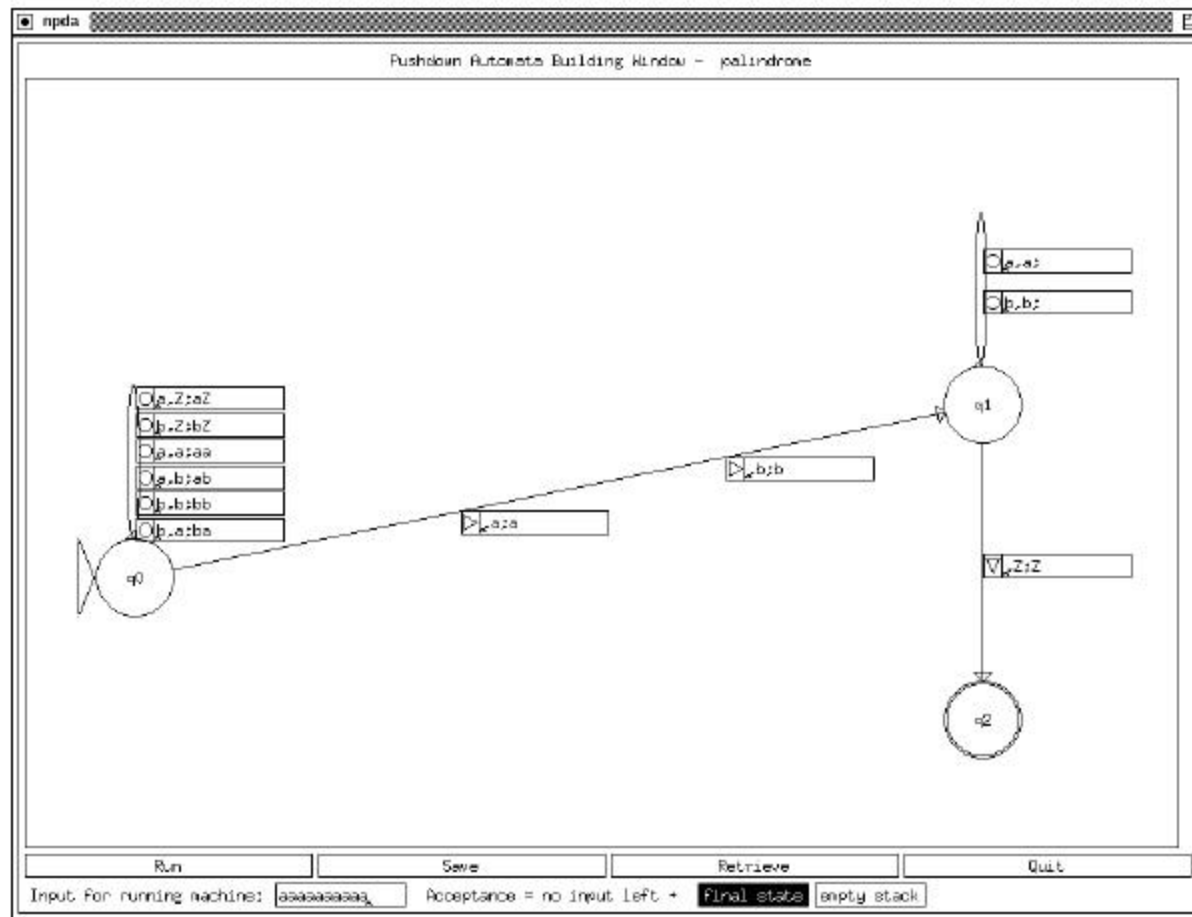
Textual	$(\{q_0, q_1, q_2\}, \{a, b\}, \delta, q_0, \{q_2\})$ $\delta = \{(q_0, b, q_0), (q_0, a, q_1), (q_1, a, q_0), (q_1, b, q_2), (q_2, a, q_1)\}$												
Tabular	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>a</th> <th>b</th> </tr> </thead> <tbody> <tr> <th>q<sub>0</sub></th> <td>q<sub>1</sub></td> <td>q<sub>0</sub></td> </tr> <tr> <th>q<sub>1</sub></th> <td></td> <td>q<sub>2</sub></td> </tr> <tr> <th>q<sub>2</sub></th> <td></td> <td></td> </tr> </tbody> </table>		a	b	q <sub>0</sub>	q <sub>1</sub>	q <sub>0</sub>	q <sub>1</sub>		q <sub>2</sub>	q <sub>2</sub>		
	a	b											
q <sub>0</sub>	q <sub>1</sub>	q <sub>0</sub>											
q <sub>1</sub>		q <sub>2</sub>											
q <sub>2</sub>													
Visual													
Interactive													

# JFLAP Evolved 1990-present

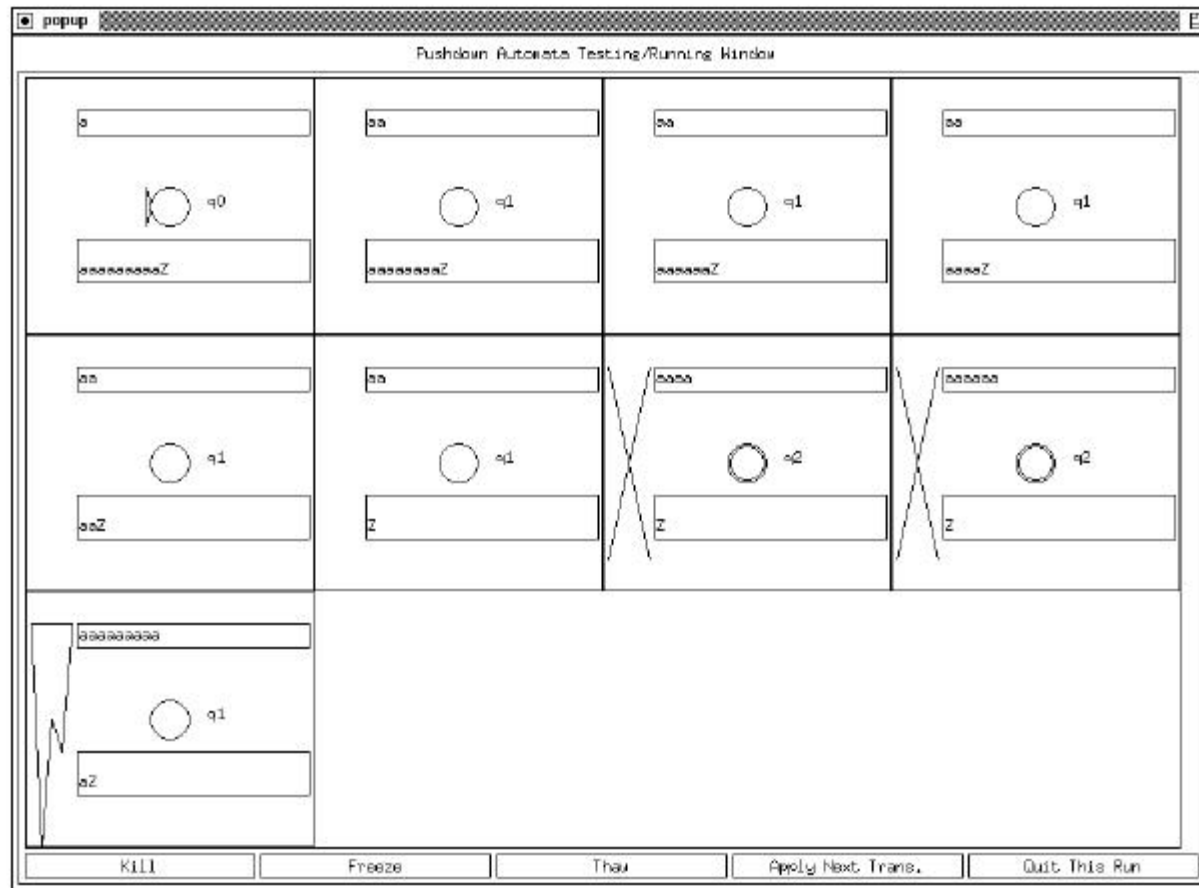
- Many tools were developed ...
- Many students ...
- Many years...
- Java came along... made our life easier...

# NPDA

- Dan Caugherty – Rensselaer, 1990
- In C++ and X Windows
- DIMACS (1992)

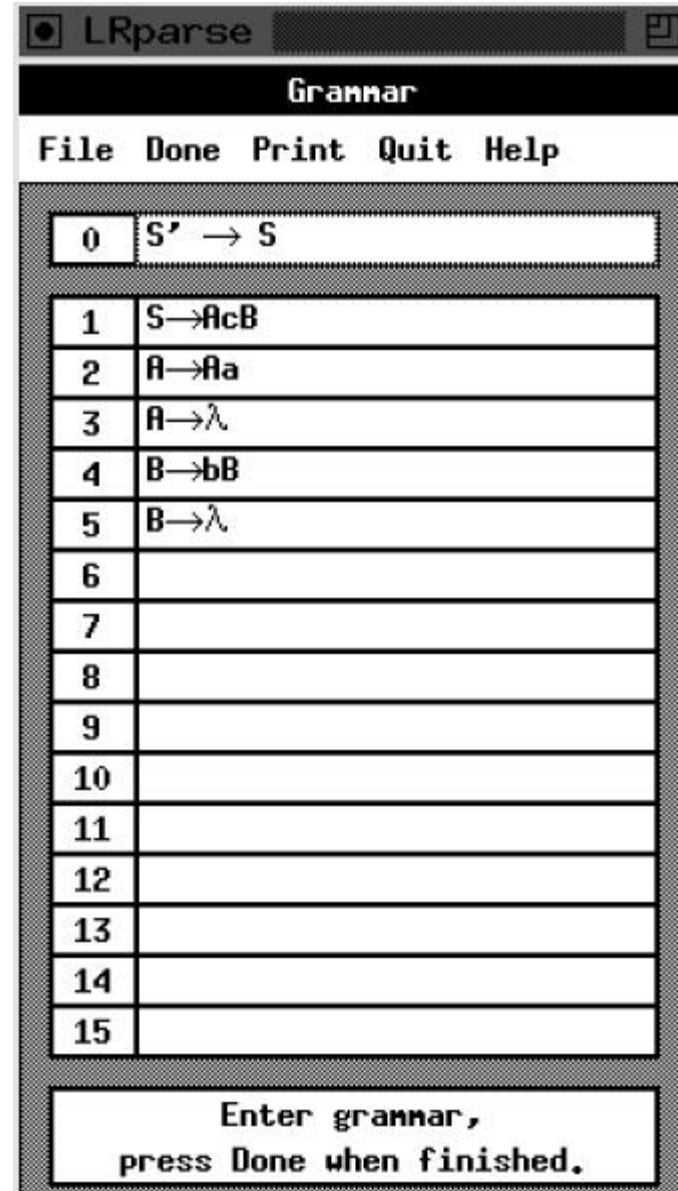


# Running NPDA



# LR Parser

- Rensselaer
- Mike James 1992
- Steve Blythe 1993
- In C++ and X Windows
- SIGCSE 1994



# LR Parser had lots of windows!

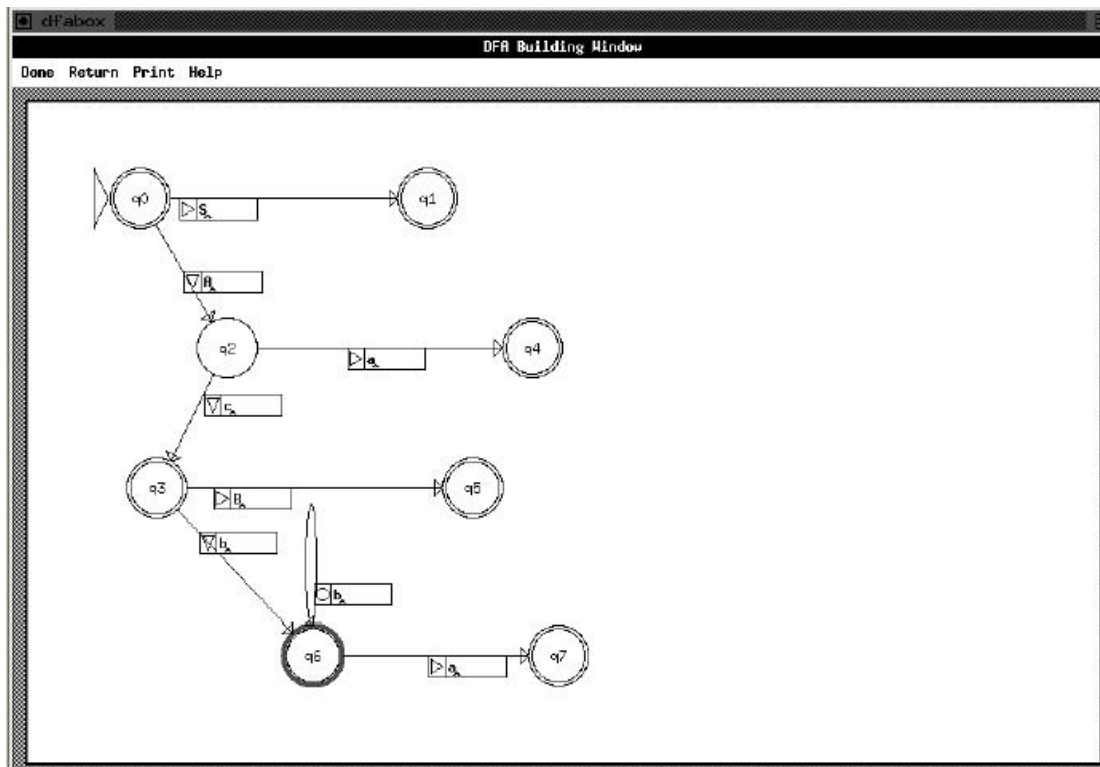
firstpopup

**FIRST Sets**

Done Show Print Return Help

S	a
A	$\lambda a$
B	$\lambda b$

the darkened entries are incorrect  
please correct them before continuing



lrPopup

**LR Item Set for q0**

Hide

$S' \rightarrow \_ S$
$S \rightarrow \_ A c B$
$A \rightarrow \_ A a$
$A \rightarrow \_ \lambda \_$



- LR parse table

tablePopup

**Parse Table**

Done Show Print Return Help

	c	a	b	\$		S	A	B
0	r3	r3			0	1	2	
1				acc	1			
2	s3	s4			2			
3	r5				3			5
4	r2	r2			4			
5				r1	5			
6			s6	r5	6			7
7				r4	7			

there are errors in your parse table  
please correct them before continuing

- LR Parser

parserpopup

**Parser**

Return Print Quit Help

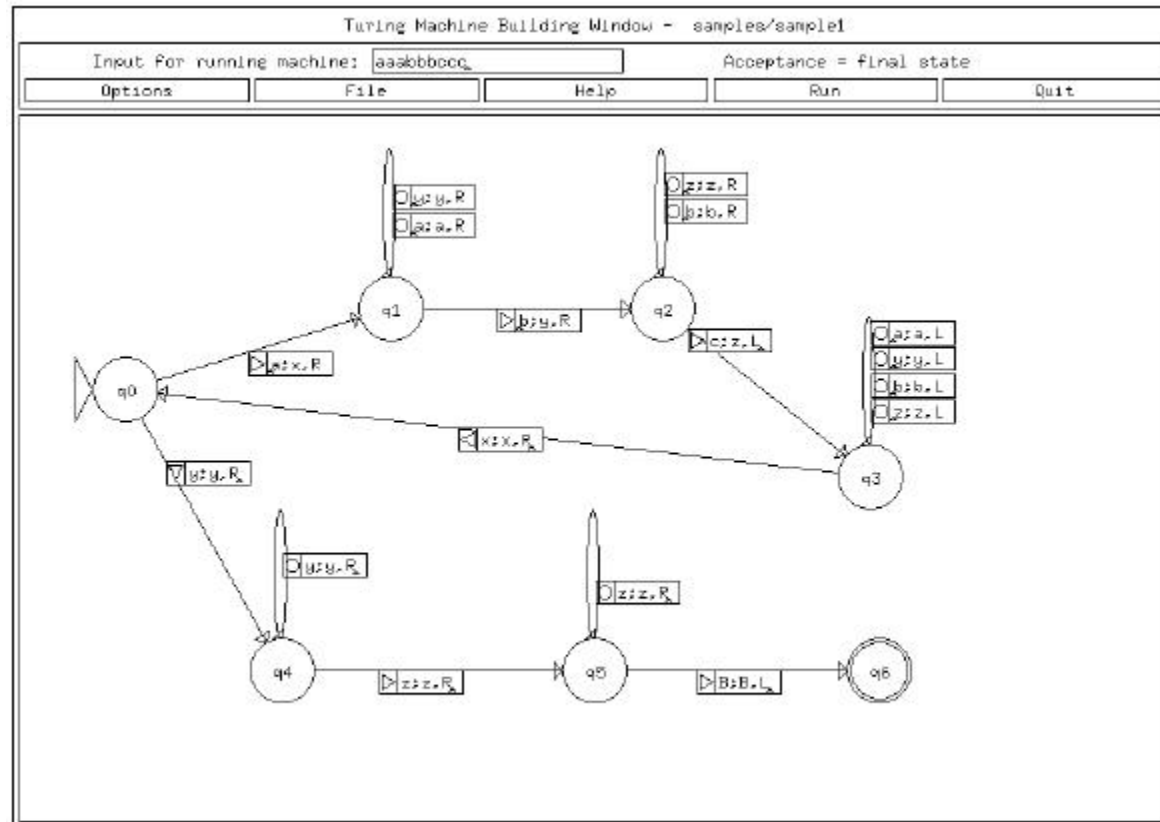
String to parse:	aacbbb
Rest of input:	acbbb\$
Symbol Stack:	A \$
State Stack:	2 0

Start	Step
-------	------

reducing using the production  
A → Aa

# JFLAP was born!

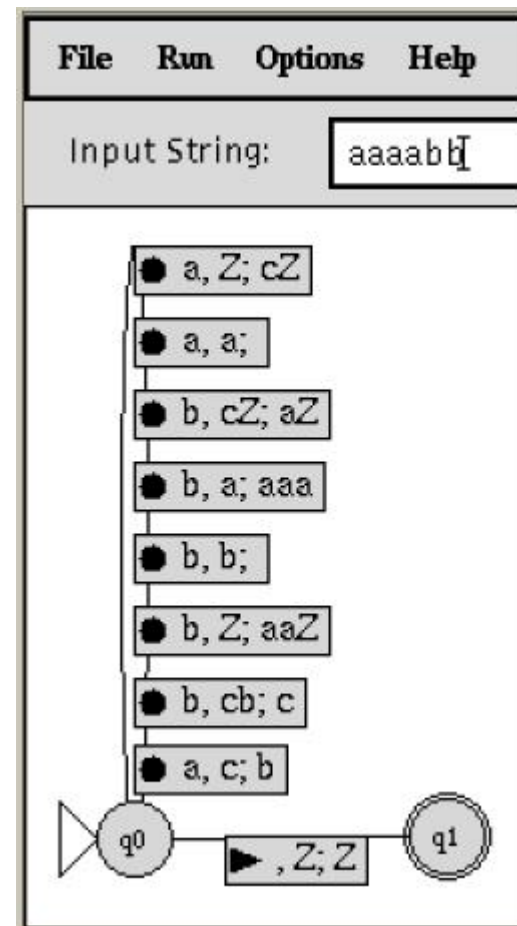
- Modified NPDA to add menu, DFA and TM
- Mark LoSacco – 1991
- EdMedia 1993





# JFLAP moves to Java!

- 1996 – Madga and Octavian Procopiuc
- FIE 1996



# JFLAP Evolves

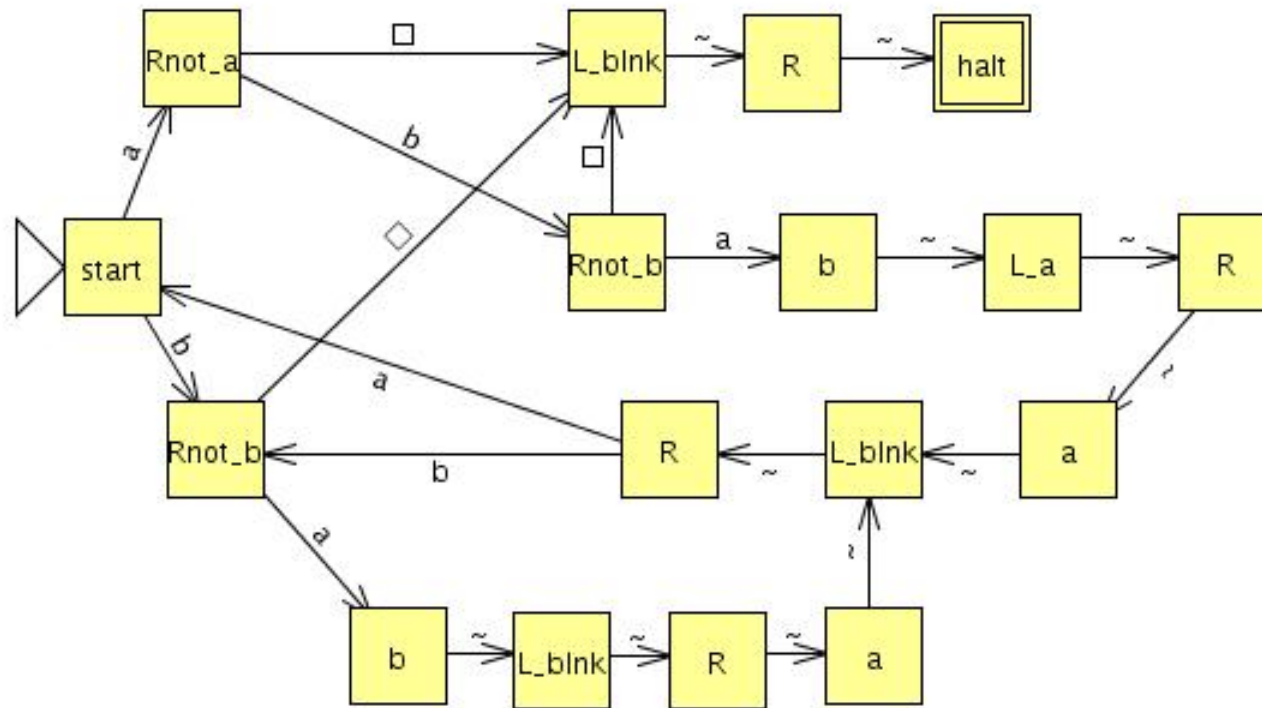
- L-systems - Wolfman(1993), Ramm (1998)
- Pumping Lemma – Leider (1996)
- Pate – Salemmme and Bilaska (1996)
- JeLLRap – Geer and Karweit (1997)
- Proving Theorems to JFLAP – Grammond (1998)
- Regular Expressions to JFLAP – Hung (1999)

# JFLAP Moves to Swing!

- 2001 and on – Finley, Cavalcante
  - Complete rewrite
  - Changed some of the algorithms
  - Incorporating many of the previous tools
  - Including L-Systems
  - SIGCSE 2004

# JFLAP adds Building Blocks

- 2005 – Stephen Reading and Bart Bressler
- SIGCSE 2006



# JFLAP – Where we are now!

