

## Context-Free Grammar Using Multi-Character Mode - Exercise

*Problem:*

Suppose we want to accept simple sentences as:

bob wants oranges

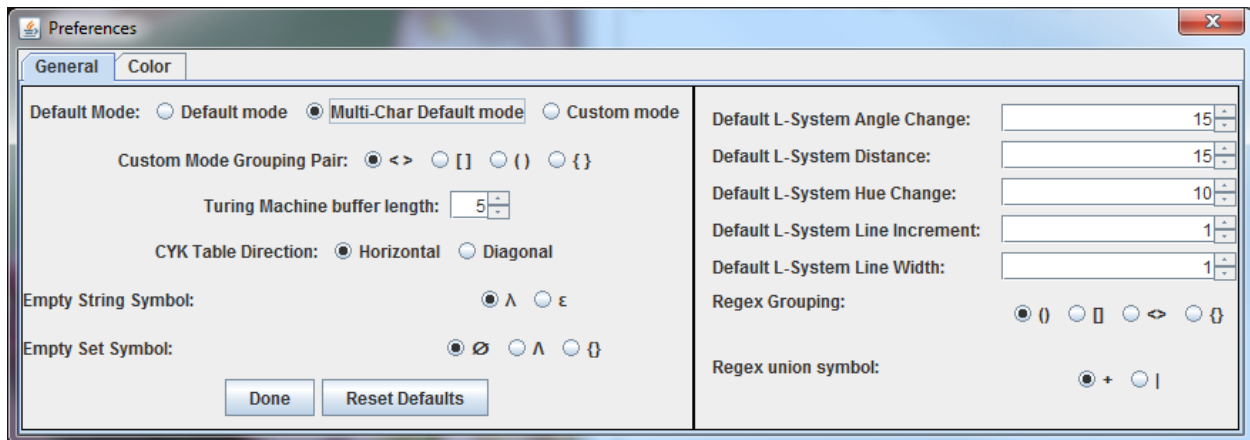
bob likes apples

jen wants apples

Create a context-free grammar on JFLAP to accept such sentences.

*Solution:*

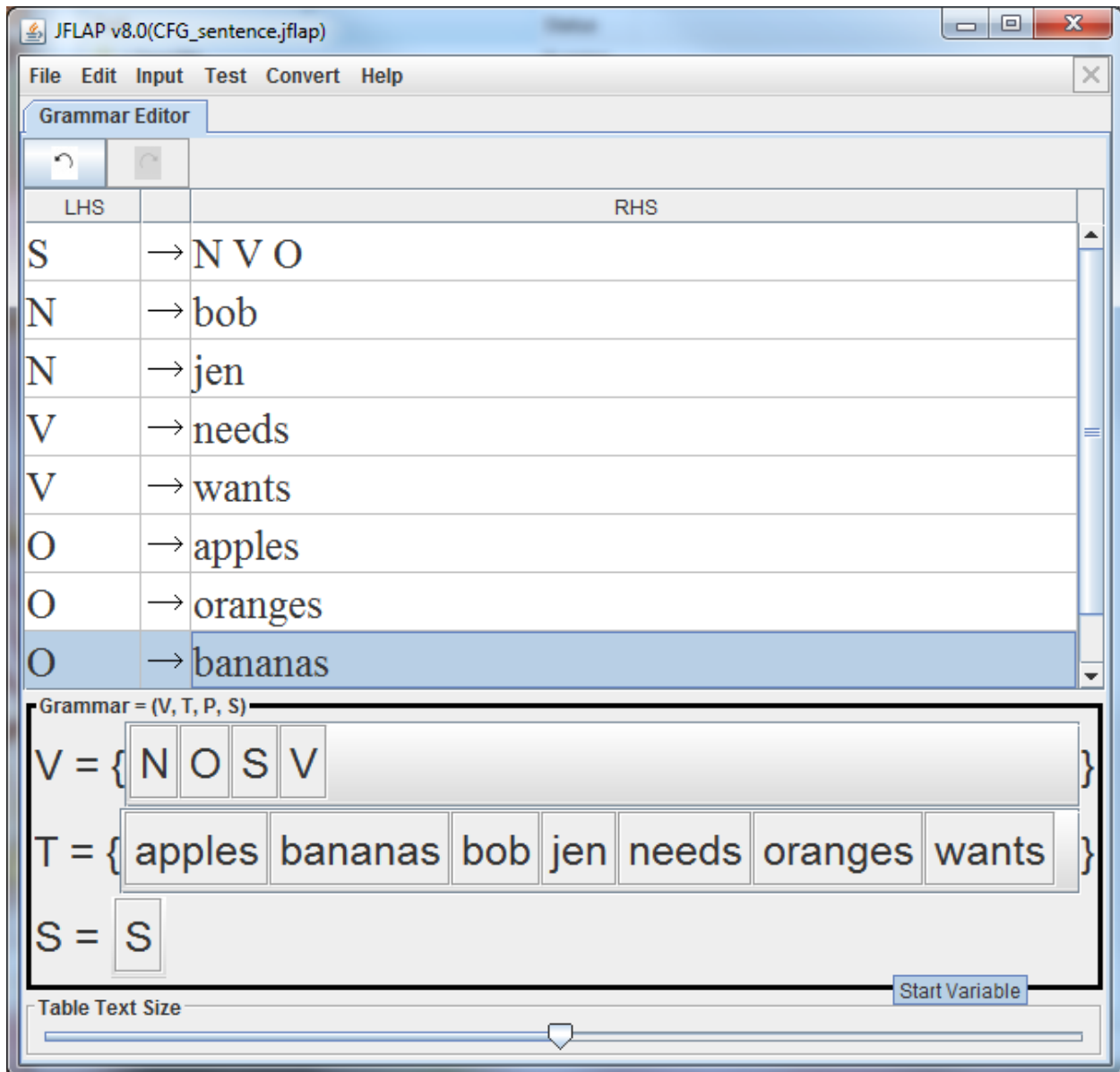
By default, JFLAP assumes that each terminal on a context-free grammar is a single character. We may change this by opening JFLAP and changing this setting to a multi-character mode. Click *Help > Preferences* to do this. Select the Multi-Char Default mode radio button and click *Done*.



Next, create a grammar rule to accept a noun verb object,  $S \rightarrow N V O$ . Note that you should add spaces in between the right-hand side variables. We will limit *nouns* to *bob* and *jen*.

Next, we add the rules for *verbs* allowing *needs* and *wants*.

Lastly, we add the *objects* *apples*, *oranges*, and *bananas*.



Test an input sentence like bob wants bananas and check that input should be accepted.

JFLAP v8.0(CFG\_sentence.jflap)

File Help

Grammar Editor Brute Force Parser

Input: bob wants bananas Set Change

Step Complete Reset

Input accepted! Change view to see derivation!

		Brute Parse Table		
		Level	Total Nodes	Current Derivations
S	→ N V O			
N	→ bob			
N	→ jen	1	1	[N V O]
O	→ apples	2	8	[bob V O, N wants O, N V ...
O	→ bana...	3	22	[bob wants O, bob V bana...
O	→ oran...	4	24	[bob wants bananas]
V	→ needs			

Grammar = (V, T, P, S)

V = { N O S V }

T = { apples bananas bob jen needs oranges wants }

S = S

Table Text Size

Lastly, try an invalid sentence and verify that it is rejected.

