

Due: Thursday, March. 25, 8pm
20 points

Problem:

Using JFLAP, construct pushdown automata for the following languages. (NOTE: If you have problems typing Z in the labels, then instead use little z and push it onto the stack as the first transition and use little z as the bottom of stack marker. To accept by empty stack, when little z is removed, go to a final state.)

1. $\Sigma = \{a, b\}$, $L = \{a^{3n}b^{2n} \mid n > 0\}$. For example, $aaabb$ and $aaaaaabb$ are in L . Accept by *Final State*.

Save this PDA in the file lab2a. (“PDA” will automatically be added to the file name).

2. $\Sigma = \{a, b\}$, $L = \{w \in \Sigma^* \mid w = w^R \text{ and } w \text{ is of odd length}\}$. For example, $bbabb$ and $ababa$ are in L , $aabbaa$ and $bbbab$ are not in L . Accept by *Empty Stack*. You’ll need to select this in the top right corner. A string is accepted if the string is processed and the stack is empty.

Save this PDA in the file lab2b.

3. $\Sigma = \{a, b\}$, $L = \{a^n b^m \mid m > 0, n \leq m \leq 3n\}$. For example, $aaabbbb$ and $aabbbbb$ are in L , and $aabbb$ and $aaaaaabb$ are not in L . Accept by *Final State*. You’ll need to reset this back to Final State.

Save this PDA in the file lab2c.

4. $\Sigma = \{a, b\}$, $L = \{w \in \Sigma^* \mid \text{the number of } b\text{'s is twice the number of } a\text{'s}\}$. For example, $bababb$, and abb are in L , $aabbbaba$ and $bbab$ are not in L . Accept by *Final State*.

Save this PDA in the file lab2d.

Comments

Create a README file with your name, date, and comments on the tool jflap. For example,

1. Was it easy to use? What parts did you have difficulty with?
2. Suggestions for improvement of the tool?
3. Do you prefer creating pda using JFLAP or drawing them on paper?

Submission

To submit your files, type the following (this assumes the README and .PDA files are in the same directory):

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submit140 lab2 README *.PDA
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See the Lab 1 handout for more info on using JFLAP.

Mouse buttons:

- left: creates arc between two states (click on one state, HOLD button down and release on other state)
- middle: create/move state, move labels (cursor must be in small box of label)
- right: menu pops up, can delete state, make state final, make state a start state, remove arcs

Using the mouse, you can move states and labels around to make a prettier picture.

NOTES:

- The Bottom of stack marker is Z (Capital letter Z).
- Leave a field blank to represent λ .