CS 154
Formal Languages and Computability

Spring 2016

Department of Computer Science
San Jose State University
Instructor: Ron Mak

Assignment #6

Assigned: Thursday, April 6
Due: Friday, April 15 at 11:59 pm
Individual assignment, 100 points max

Turing machines

Use JFLAP to create and program Turing machines to perform the following operations. For each TM:

- Describe your TM algorithm in words.
- Use pseudocode to show how your TM works.
- Give your TM at least two different input strings.
- For each input string, take a screenshot that shows that your TM successfully processed the input (i.e., show the TM in an accepting state). Indicate what the original input string was.

1. Accept the language $L_1 = \{a^n b^m a^{n+m} : n \geq 0, m \geq 1\}$

2. Accept the language $L_2 = \{w : n_a(w) = n_b(w)\}$
   (Strings where the number of a's is equal to the number of b's.)

3. Compute the function $f(x) = x \bmod 3$
   (Remainder of x divided by 3: Use unary notation to represent the quantities x and the final result each with that many 1's.)

4. Shift an entire input string consisting of 0's and 1's one cell to the right.

   10 points extra credit if you can program a TM to do this right shift without ever moving the read/write head to the left.

What to submit to Canvas

Submit your text files, screenshots, and .jff files into Canvas: **Assignment #6**