Due 11/19

Construct a deterministic one way infinite single tape Turing machine that accepts the language { w | w in {a, b, c}* such that the number of a's in w ≥ the number of b's in w and ((the number of b's in w divides the number of c's in w) or (the number of c's in w divides the number of b's in w)) }.

You may not make use of the fact that JFLAP has blank spaces to the left of the input. And you may not use blocks for this Turing machine. And finally, you can only use the left and right tape head moves. That is, do not use the stay directive, and your Turing machine must read and write a symbol from/to the tape and move the read/write head to the left or right for each transition.

Since JFLAP does not specifically have a reject state, you can either have a state that you transition to that has no transitions leaving it or you can simply leave off invalid transitions, which will cause your Turing machine to reject the input.

My Turning machine has 31 states, but it appears that it could be reduced to 28 states or less, since I have two accept states and two reject states (states that go nowhere).

My implementation does the following:

1) Inserts a $ in front of the input string to mark the left end of the tape
2) As part of inserting the $, it rejects if the input consists of only a's (since 0 does not divide 0)
3) Verify that the number of a's ≥ the number of b's
    1. If not, reject
4) Check if b's = c's – if so, accept the input
    1. If the number of b's < c's – relabel b's as 0's and c's as 1's
    2. If the number of b's > c's – relabel b's as 1's and c's as 0's
5) Verify that the number of 0's divides the number of 1's
    1. If it does, accept
    2. If it doesn't, reject

E-mail the JFLAP file to me (david.garrison@binghamton.edu) by 11:59:59.999pm on the date due. The filename must be your last name followed by "_p6.jff" (as an example, my filename would be "garrison_p6.jff"). The subject of your e-mail is to be "CS 373 program 6".

For this programming assignment, and the remainder of them for the semester, you need to follow my submission directions – filename (lower case last name followed by "_p6.jff") and e-mail subject ("CS 373 program 6").