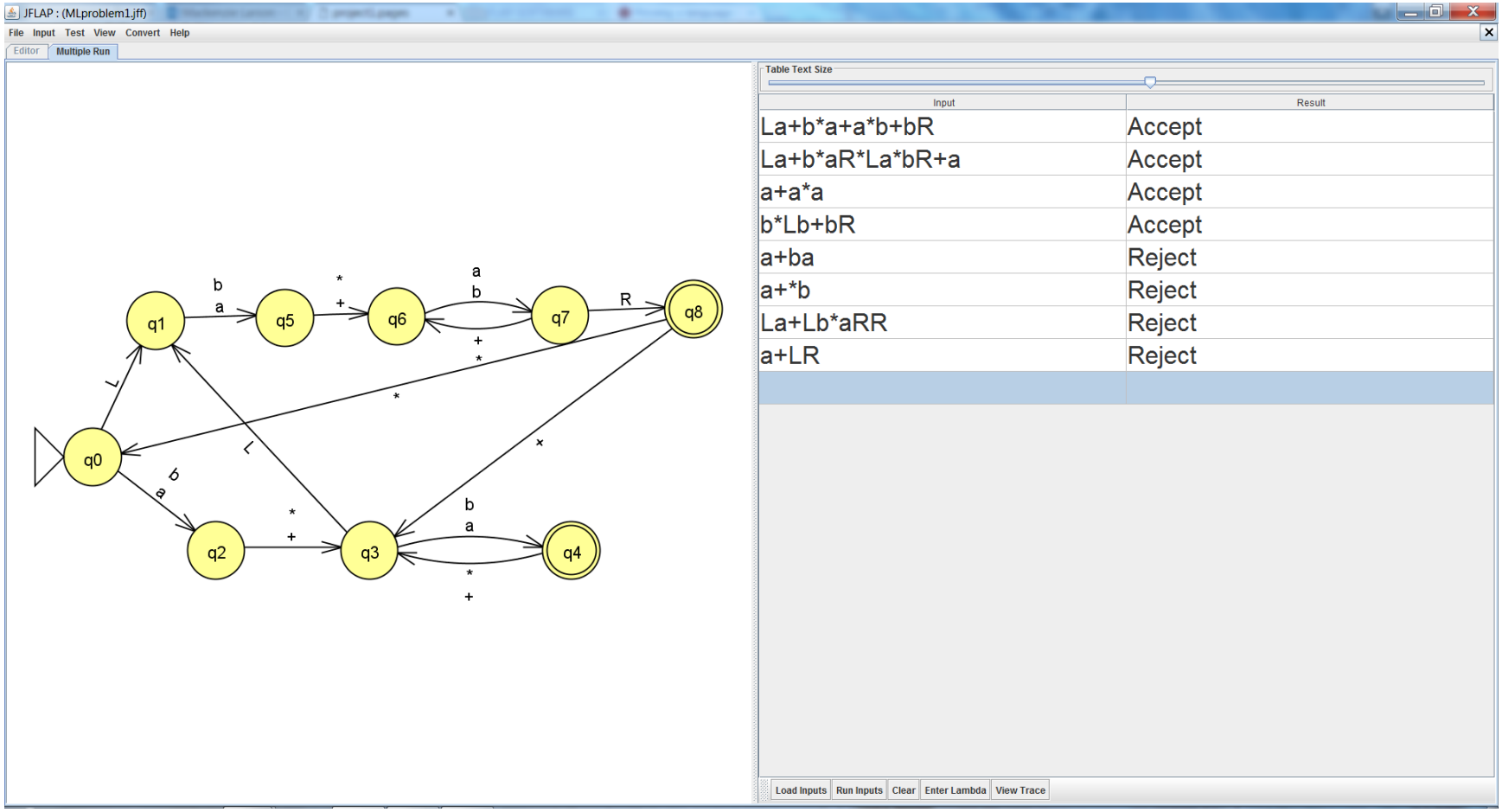
Mackenzie Larson
2/23/16
CS 454

Project 01

Problem 1



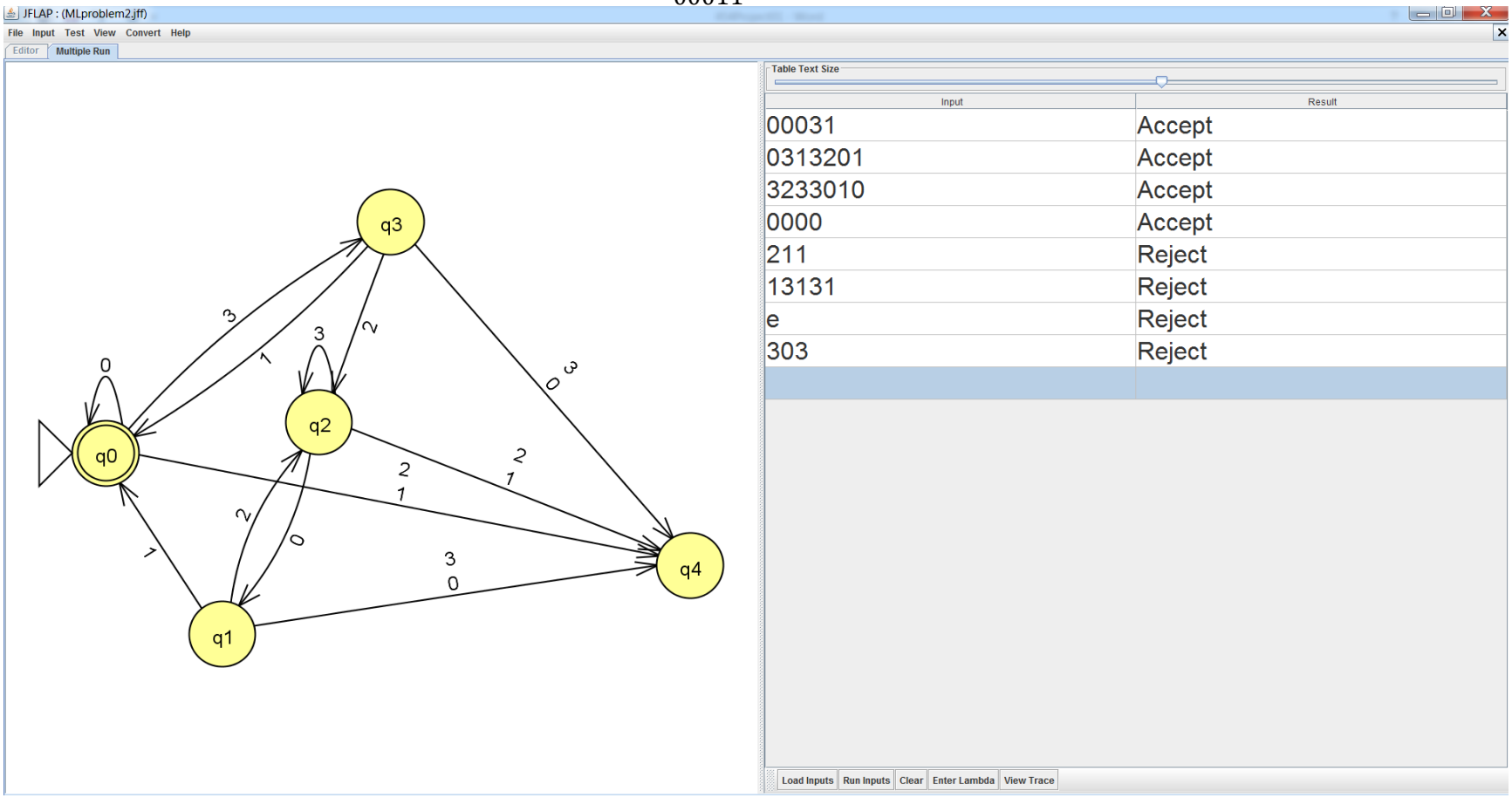
Problem 2

Case '0': w can end in any number of 0's (0 = [00]).

Case Carry: As you go across the top line (right to left because we are looking at a binary string) you are multiplying every space by 3. This is why leading numbers in the string can be 0 because 3*0 = 0. However, when you encounter the first 1 on the top line, you must have a 1 below it (3 = [11] because 3 * 1 = 3 = $11_{\text{base 2}}$. This will result into a carry into the next column over.

$\begin{bmatrix}0\\0\end{bmatrix} = 0$ $\begin{bmatrix}0\\1\end{bmatrix} = 1$ $\begin{bmatrix}1\\0\end{bmatrix} = 2$ $\begin{bmatrix}1\\1\end{bmatrix} = 3$

NOTE: As binary is read from right to left, the sequence 13000 is $\begin{matrix}00010\\00011\end{matrix}$ (why it is read in reverse in input).

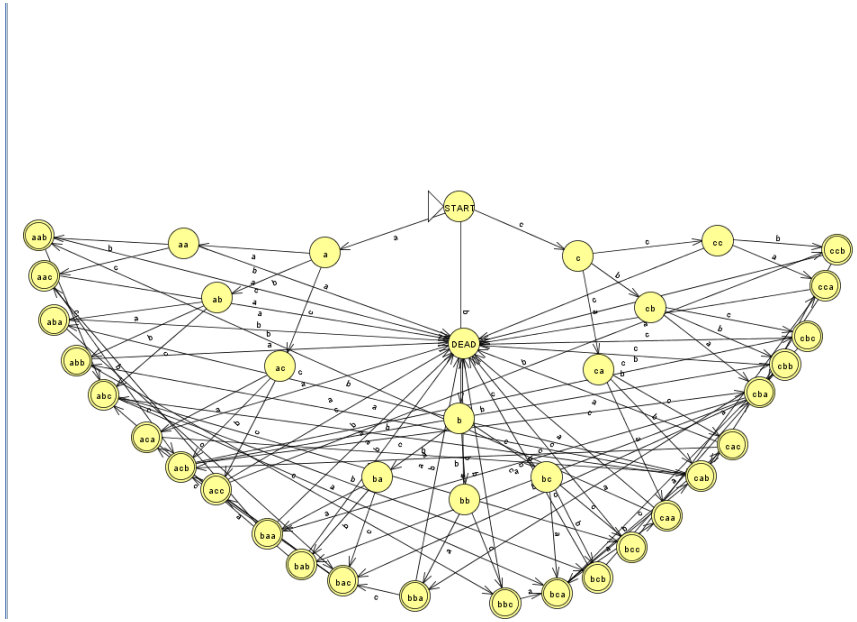


Problem 3

```
11:27:15 mlarson@blue ~/CS454$ cat testFile.txt
strategy
tragedy
stravegy
trategy
strattegy
stratego
tratagy
strat
trategy
strategy
strategy
11:27:19 mlarson@blue ~/CS454$ g++ LarsonP1EX3.cpp -std=c++11
11:27:24 mlarson@blue ~/CS454$ ./a.out
What string would you like to enter?
strategy
Original string was: strategy
Your grep statement is:
egrep ' ^[^s]trategy$|^s[^t]rategy$|^st[^r]ategy$|^str[^a]tegy$|^stra[^t]egy$|^strat[^e]gy$|^strate[^g]y$|^strateg[^y]$|^trategy$|^srategy$|
^stategy$|^strtegy$|^straegy$|^stratgy$|^strategy$|^strateg$|^.strategy$|^s.trategy$|^st.rategy$|^str.ategy$|^stra.tegy$|^strat.egy$|^strate.
gy$|^strateg.y$|^strategy.$'
11:27:30 mlarson@blue ~/CS454$
11:27:32 mlarson@blue ~/CS454$
11:27:32 mlarson@blue ~/CS454$ egrep ' ^[^s]trategy$|^s[^t]rategy$|^st[^r]ategy$|^str[^a]tegy$|^stra[^t]egy$|^strat[^e]gy$|^strate[^g]y$|^st
rateg[^y]$|^trategy$|^srategy$|^stategy$|^strtegy$|^straegy$|^stratgy$|^strategy$|^strateg$|^.strategy$|^s.trategy$|^st.rategy$|^str.ategy$|^
stra.tegy$|^strat.egy$|^strate.gy$|^strateg.y$|^strategy.$' testFile.txt
grep: warning: GREP_OPTIONS is deprecated; please use an alias or script
stravegy
trategy
strattegy
stratego
trategy
11:27:45 mlarson@blue ~/CS454$
```

Problem 4

Problem 4 DFA:



Input	Result
abbc	Accept
abcac	Accept
abcabaccba	Accept
abbb	Reject
abcaaa	Reject
cbbb	Reject
bbcabbcacbbac	Accept
bbcabbcaccbac	Reject
cccc	Reject
caba	Accept
abcabaacba	Reject
caabccab	Accept
cabbcc	Reject
aacb	Accept
aacc	Reject

Result:

```
10:01:55 mlarson@blue ~/CS454$ python MLP1Problem4.py
Enter a value for n: 4
The number of strings of length n that can be accepted by the language is:
[36.0]
10:02:08 mlarson@blue ~/CS454$ python MLP1Problem4.py
Enter a value for n: 9
The number of strings of length n that can be accepted by the language is:
[816.0]
10:02:19 mlarson@blue ~/CS454$ python MLP1Problem4.py
Enter a value for n: 28
The number of strings of length n that can be accepted by the language is:
[87078324.0]
10:02:27 mlarson@blue ~/CS454$ python MLP1Problem4.py
Enter a value for n: 100
The number of strings of length n that can be accepted by the language is:
[-1.2958165294453069226e+20]
10:02:34 mlarson@blue ~/CS454$
```