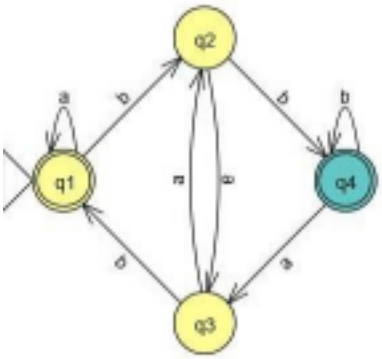
CSE 355: Intro to Theoretical Computer Science
Recitation #2 (20 pts)

- Due: **Tuesday, Jan. 26, 2021 at 11:59pm** Arizona time on Canvas.

1. [5 pts] For the following DFA, answer questions.



1) Which state is the initial/start state?

Answer: q1

2) Which state(s) is(are) accepting state(s)?

Answer: q1 and q4

3) Write state sequence for input string *aabb*, does the DFA accept string *aabb*?

Answer: q1(start) → q1(a, stays) → q1(a, stays) → q2(b) → q4(b)

Yes, the DFA accept string *aabb.*

4) Write state sequence for input string *aabaaba*, does the DFA accept string

aabaaba?

Answer: q1(start) → q1(a, stays) → q1(a, stays) → q2(b) → q3(a) → q2(a) → q4(b) → q3(a)

No, the DFA does not accept string *aabaaba,* since it is not in the accepting stage(q1 or q4)

5) Does above DFA accept the empty string ε?

Answer: q1(start). Yes, the DFA accept empty string since it starts at stage q1

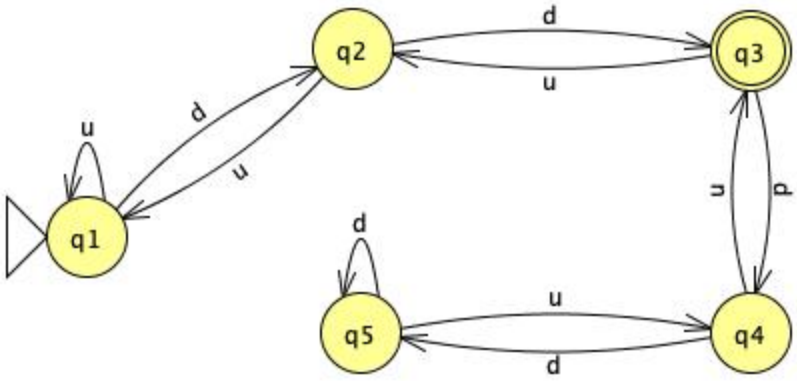
and it is a accepting stage

2. [2 pts] Given the formal description of a DFA M defined as below, using JFLAP (http://www.jflap.org) to draw its state diagram (save it as .jpg file and paste it here)

$$M = (\{q1, q2, q3, q4, q5\},\{u, d\}, \delta, q3,\{q3\})$$

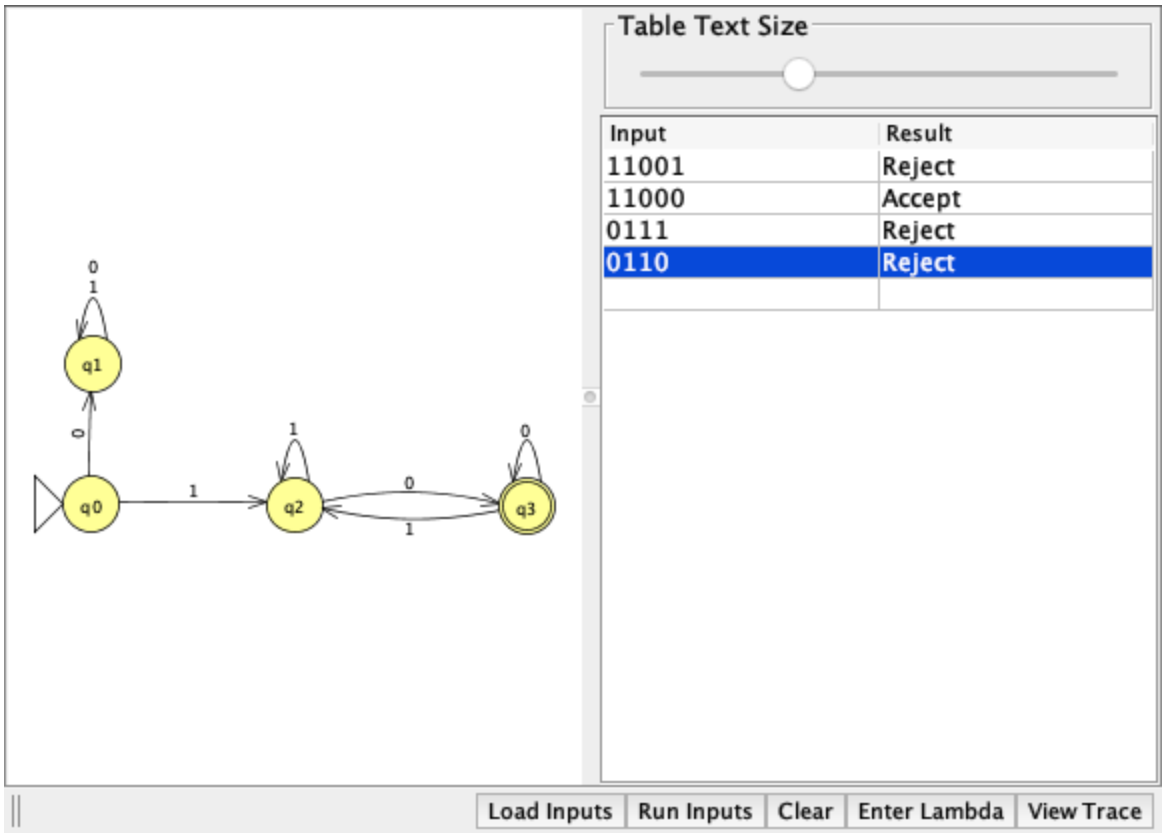
where the transition function δ is defined as:

δ	u	d
q1	q1	q2
q2	q1	q3
q3	q2	q4
q4	q3	q5
q5	q4	q5



3. [5 pts] For the following language L, assume alphabet $\Sigma = \{0, 1\}$. Use JFLAP (http://www.jflap.org) to draw its state diagram (save it as .jpg file and paste it here).

$L = \{\omega | \ \omega$ begins with a 1 and ends with a 0$\}$



4. [4 pts] The following language is the intersection of two simpler languages. First construct DFAs for the simpler languages, then combine them using the product construction described in Theorem 1.25 (textbook pp.66) to draw the state diagram (Use JFLAP) for the language given. Assume alphabet $\Sigma = \{a, b\}$.

$L = \{\omega | \ \omega$ has even length and an odd number of a's$\}$

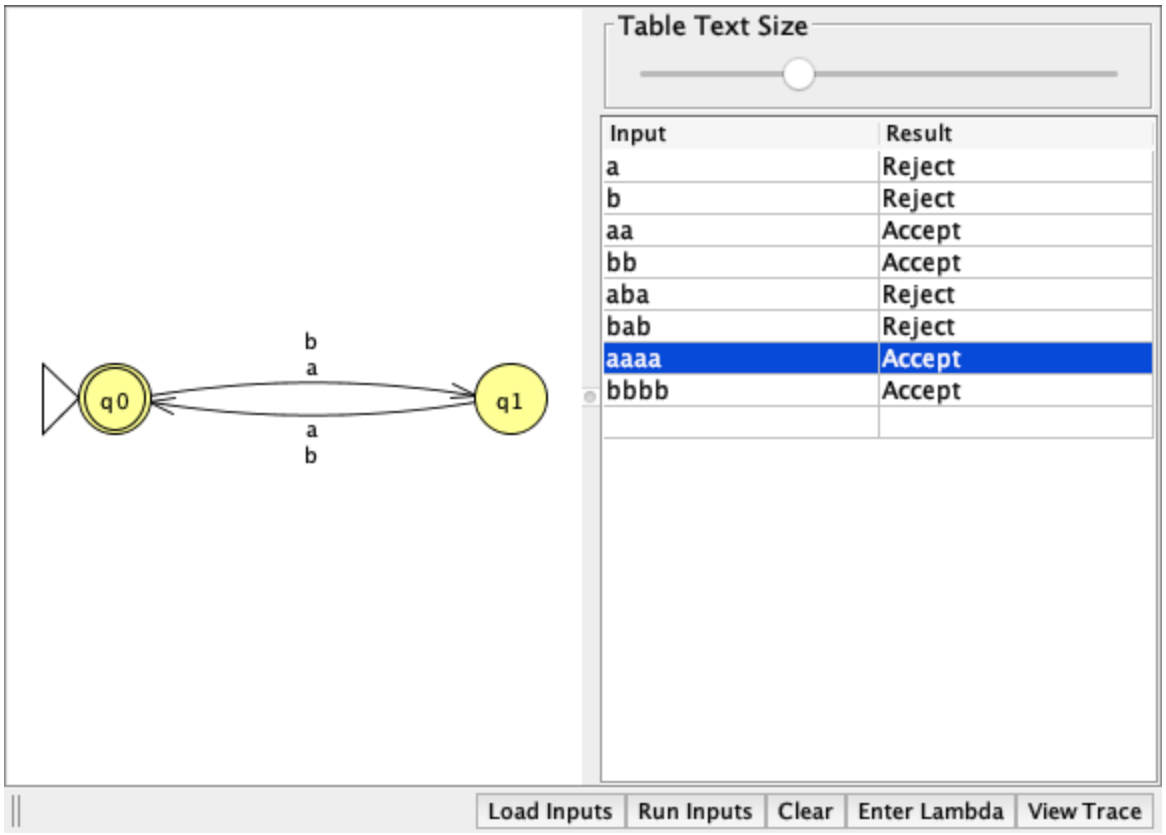


Table Text Size
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Load Inputs
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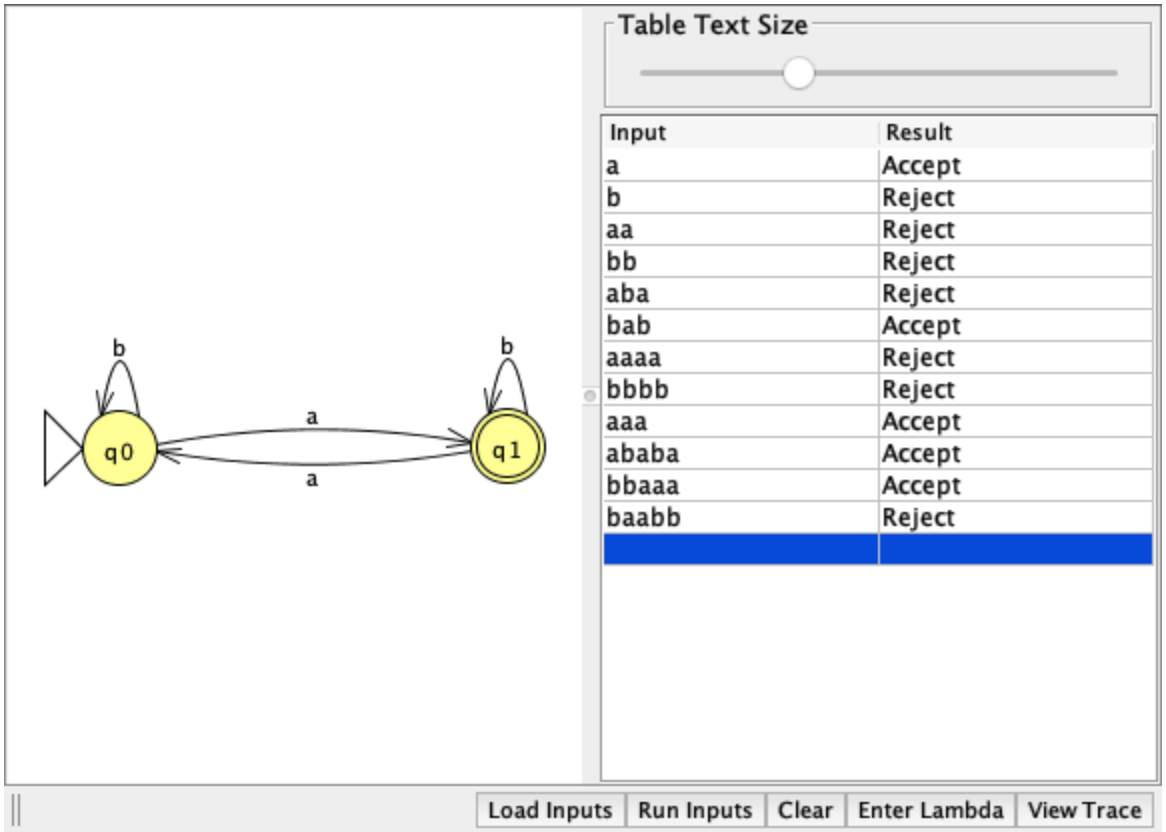
Table Text Size
Input
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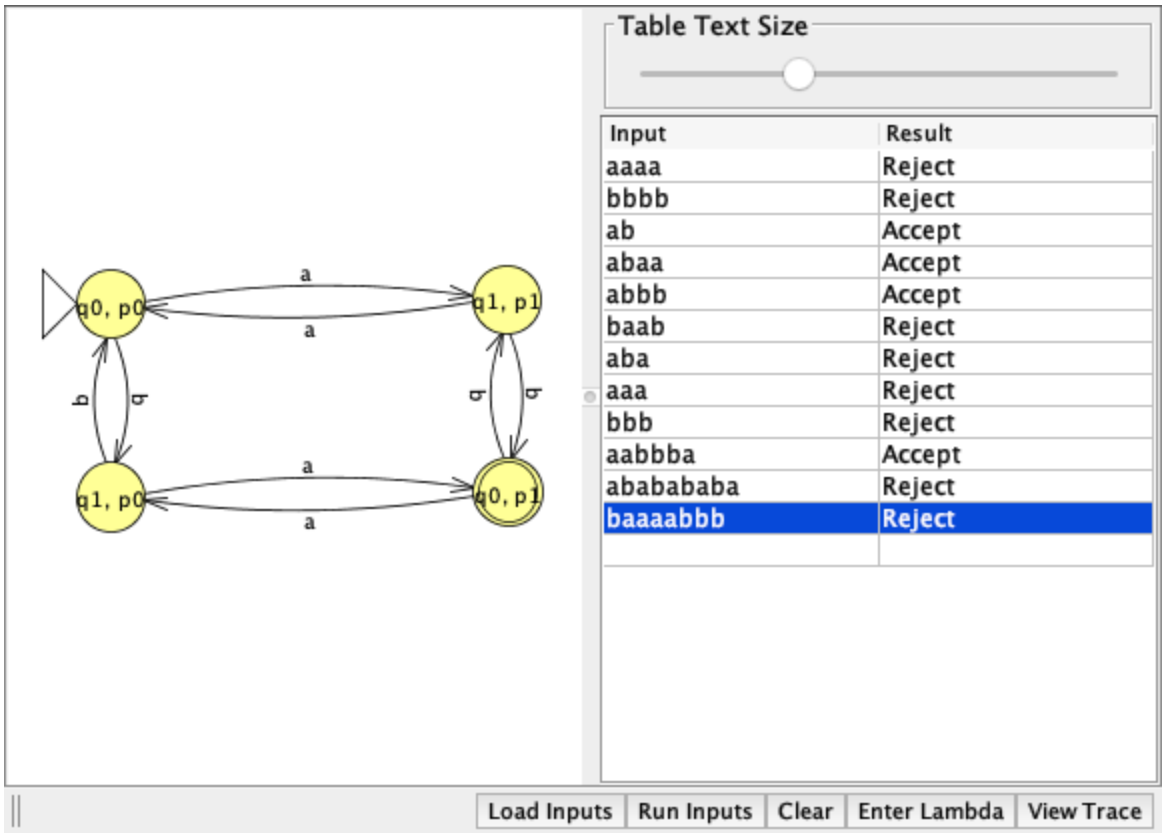

5. [4 pts] The following language is the complement of a simpler language. First construct DFA for the simpler languages, then use it to give the state diagram of the language (use JFLAP). Assume alphabet $\Sigma = \{a, b\}$.

$L = \{\omega |\ \omega$ does not contain the substring $ab\}$

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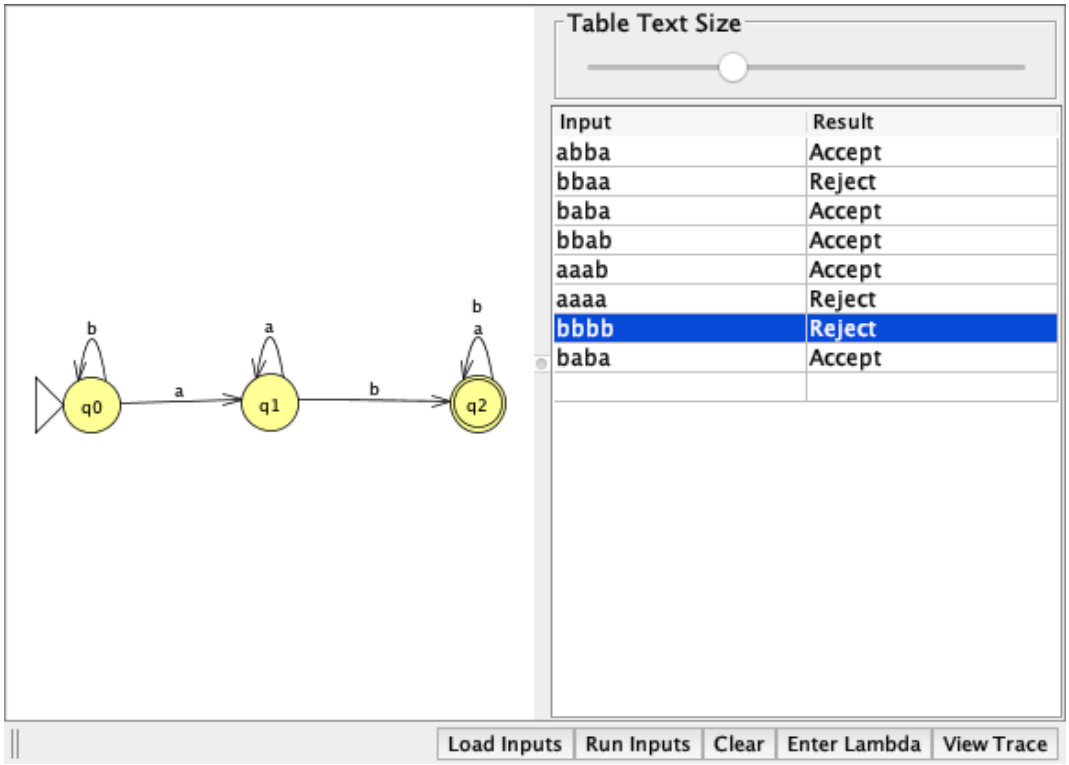
(contains *ab)*



Ans : (Does not contain *ab)*