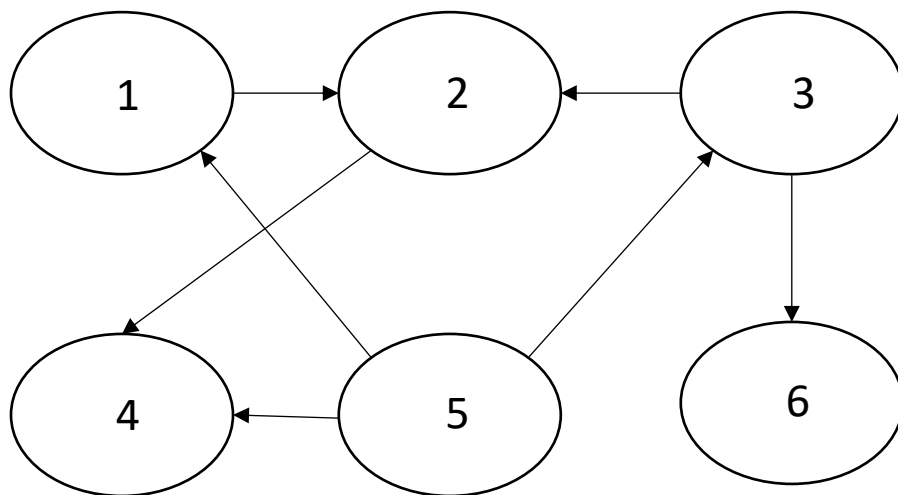1.
    i.   s is a sequence of characters of a's, b's, and c's that read the same forward and backwards, also known as a palindrome.

    ii. $\sqrt{n} = n + 1$

$n = n^2 + 2n + 1$

$n^2 + n + 1 = 0$

n is a natural number when added with its square and 1 result to 0.

2.
    i.   {a, g, j, h}

    ii. $\{w \mid w < 1.5 \text{ for } w \in N\}$

    iii. $\{w \mid w > \text{-}1.5 \text{ for } w \in Z\}$

    iv. ε

    v. $\emptyset$

    vi. $\{\emptyset\}$

3.
    i.

    ii.

$\text{Outdegree}^1 = 1$

$\text{Indegree}^1 = 1$

$\text{Outdegree}^2 = 1$

$\text{Indegree}^2 = 2$

$\text{Outdegree}^3 = 2$

$\text{Indegree}^3 = 1$

$\text{Outdegree}^4 = 0$

$\text{Indegree}^4 = 2$

$\text{Outdegree}^5 = 3$

$\text{Indegree}^5 = 0$

$\text{Outdegree}^6 = 0$

$\text{Indegree}^6 = 1$

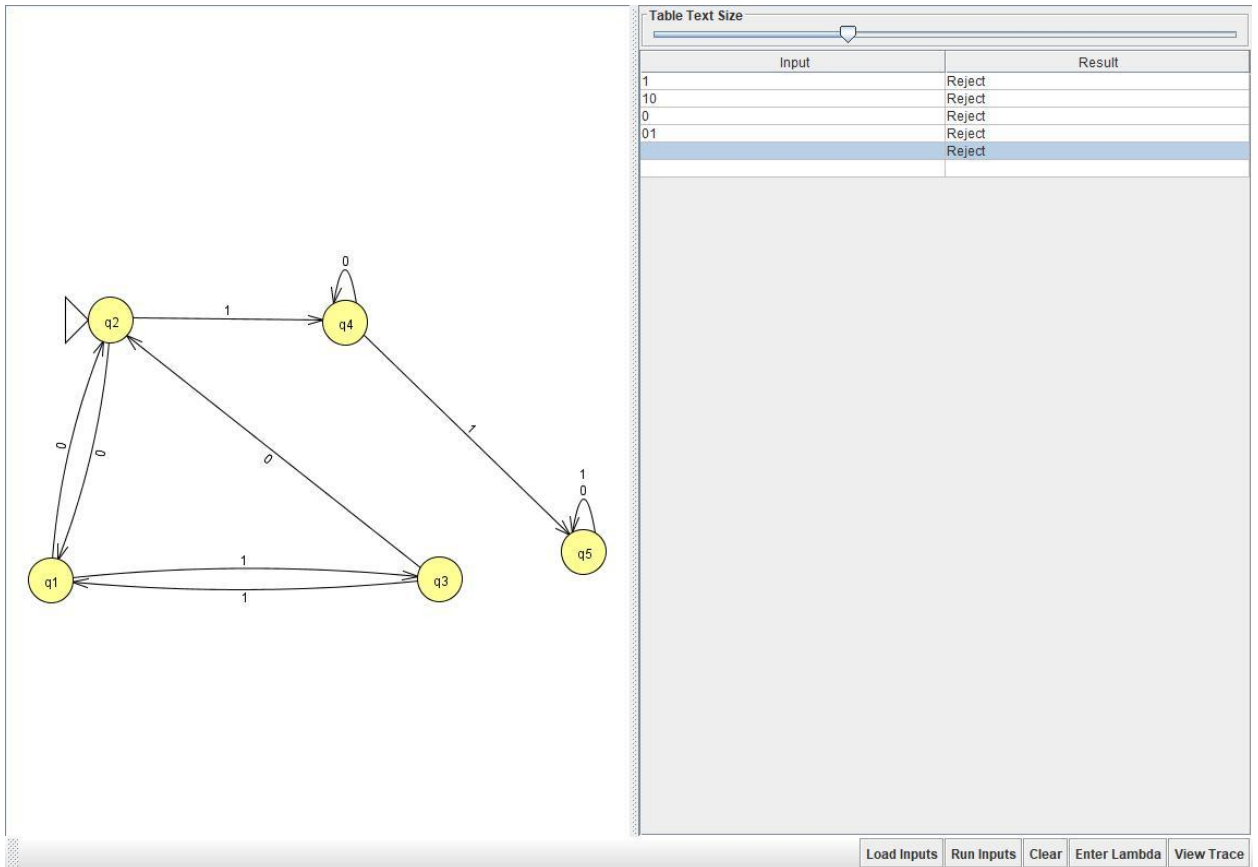iii.   No, there is not a path leading from node 6 to node 2.

4.

  i. $\{a, b\}$ x $\{\emptyset\}$ x $2^{\{a,b\}}$

       $\{a, b\}$ x $\{\emptyset\}$ x $\{\emptyset, \{a\}, \{b\}, \{a, b\}\}$

       $\{\{a, \emptyset\}, \{b, \emptyset\}\}$ x $\{\emptyset, \{a\}, \{b\}, \{a, b\}\}$

   $\{\{a, \emptyset, \{\emptyset\}\}, \{a, \emptyset, \{a\}\}, \{a, \emptyset, \{b\}\}, \{a, \emptyset, \{a, b\}\}, \{b, \emptyset, \{\emptyset\}\}, \{b, \emptyset, \{a\}\}, \{b, \emptyset, \{b\}\}, \{b, \emptyset, \{a, b\}\}\}$

  ii. $\{a, b\}$ x $\emptyset$ x $2^{\{a,b\}}$

       $\emptyset$ x $2^{\{a,b\}}$

       $\emptyset$

  iii. $\{a, \{\emptyset\}\}$ x $2^{\{a,b\}}$

       $\{a, \{\emptyset\}\}$ x $\{\emptyset, \{a\}, \{b\}, \{a, b\}\}$

       $\{\{a, \emptyset\}, \{a, \{a\}\}, \{a, \{b\}\}, \{a, \{a, b\}\}, \{\{\emptyset\}, \emptyset\}, \{\{\emptyset\}, \{a\}\}, \{\{\emptyset\}, \{b\}\}, \{\{\emptyset\}, \{a, b\}\}\}$

  iv. $2^{\{\emptyset\}}$ x $2^{\emptyset}$

       $\{\emptyset, \{\emptyset\}\}$ x $\emptyset$

                                       $\emptyset$

5.

6.

i.

ii.

iii.

Input	Result
	Accept
aa	Accept
bba	Accept
ababa	Reject
aab	Reject
aaaaa	Reject
bbaaa	Reject
bbabba	Reject

iv.

Input	Result
a	Accept
aa	Accept
b	Accept
bb	Accept
	Reject
aaa	Reject
bbb	Reject
aba	Reject
bab	Reject

7.

Table Text Size

Input	Result
abb	Accept
baaaaab	Accept
abaaaab	Accept
bbaaaaa	Accept
babaaaaa	Accept
	Reject
bababa	Reject
aaaaabbbb	Reject
baaaaaaa	Reject
aaaaab	Reject

States: q0p0, q0p1, q1p1, q2p1, q3p1, q1p0, q2p0, q3p0

Load Inputs | Run Inputs | Clear | Enter Lambda | View Trace
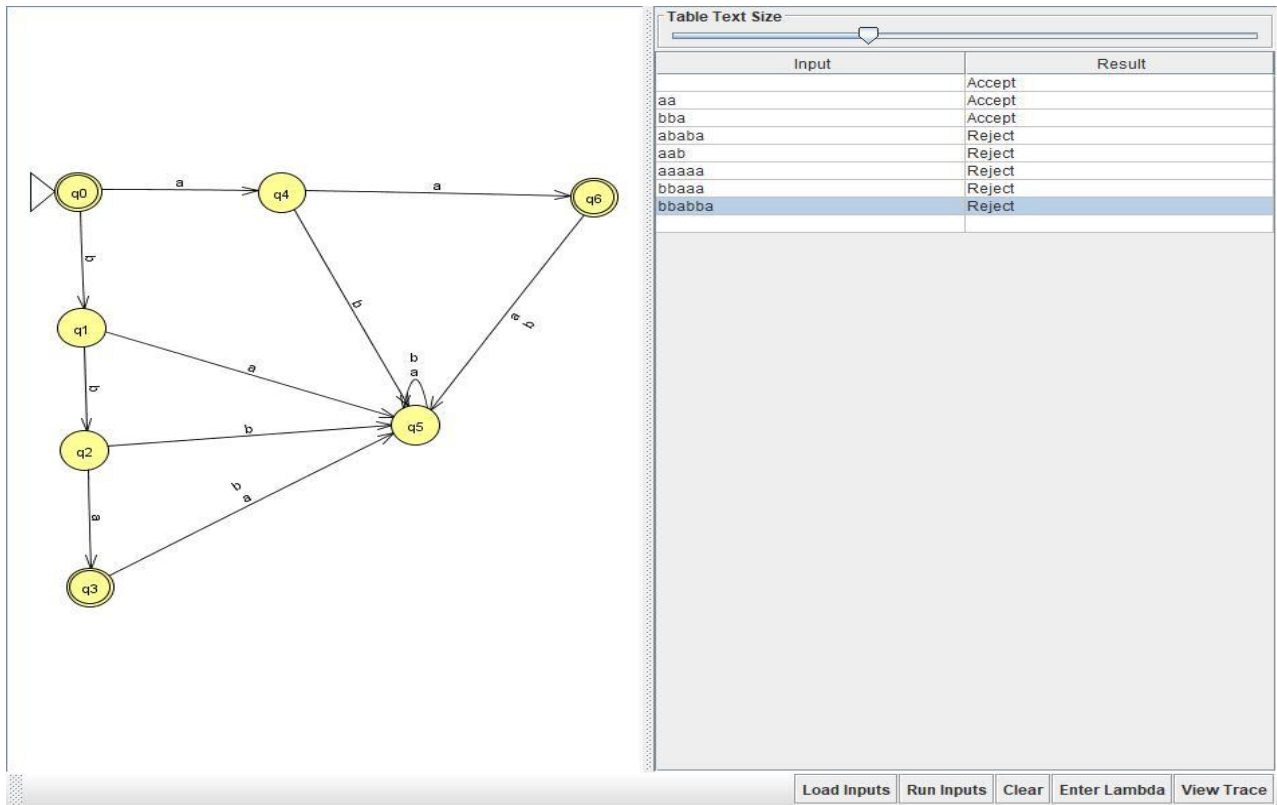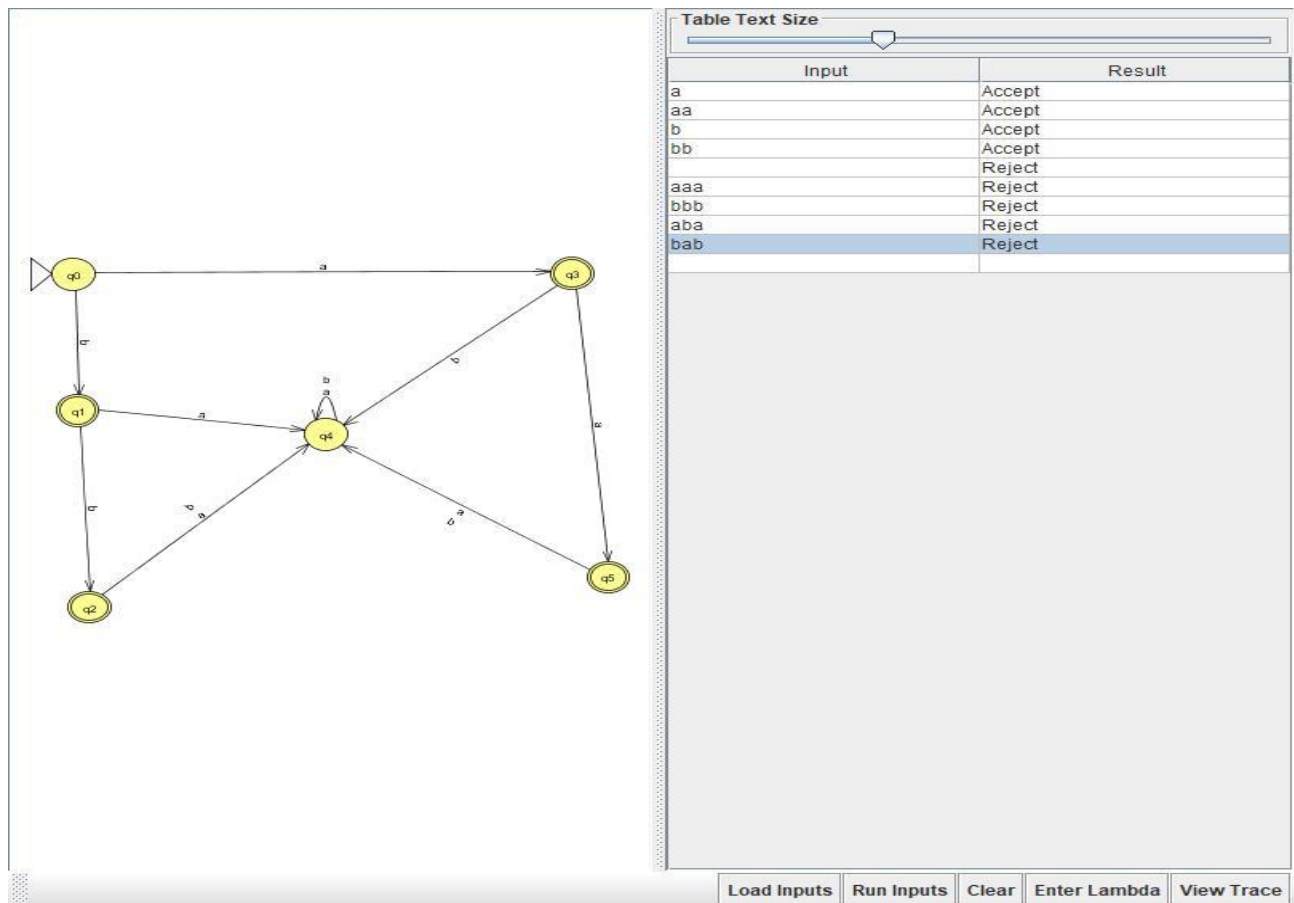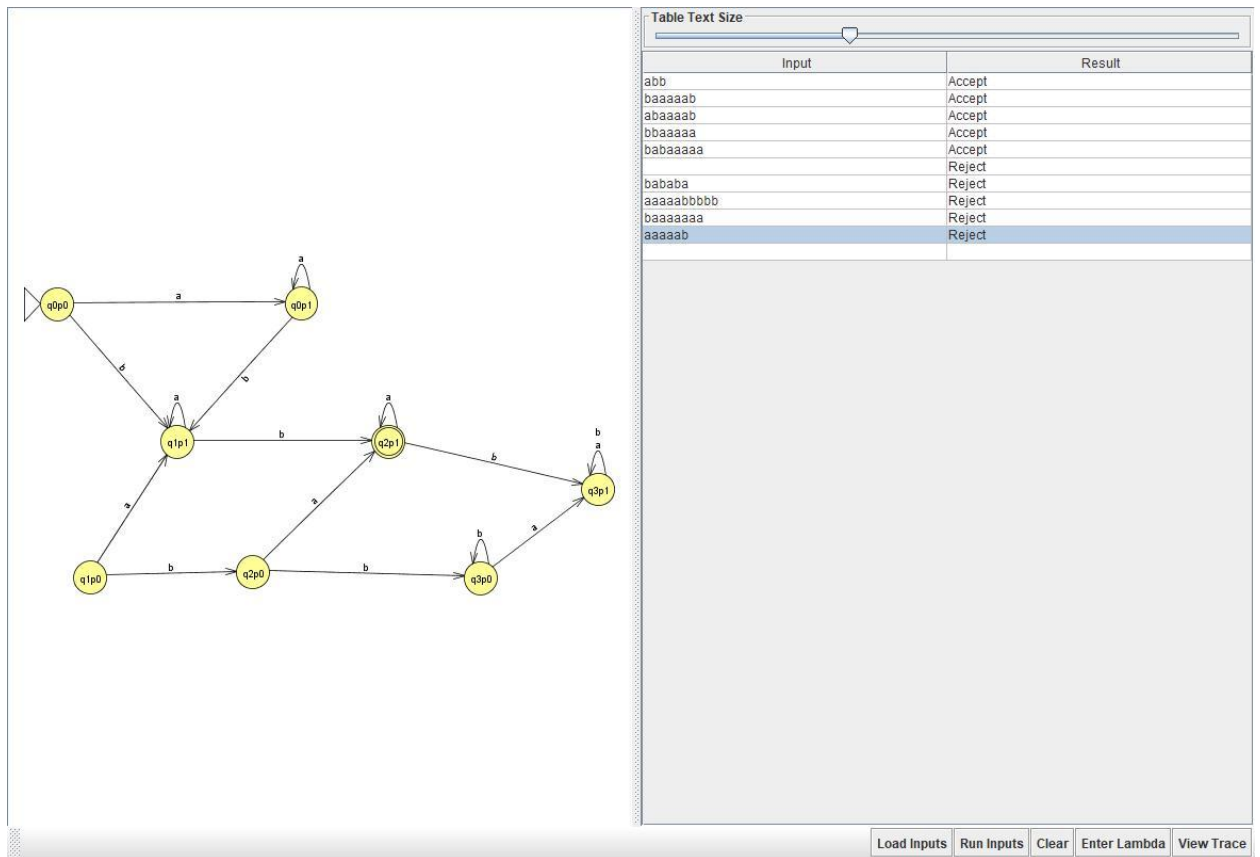
8.

   i.   a0@0a

   ii.   ab1#1ba

   iii.   aba10#10aba

   iv.   aaba10#10abaa

   v.   aabba101#101abbaa

   vi.   aabab11011#11011babaa

   vii.   ababa1011#1011ababa

   viii.   aabbbbb1111#1111bbbbbaa

   ix.   abaabbab10101#10101babbaaba

   x.   aaaaaabbbbbb101101#101101bbbbbbaaaaaa