REPORT FOR THEORY WITH PRACTICAL COMPONENT

FORMAL LANGUAGE AND AUTOMATA – CSE18R252

Submitted by

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Under the guidance of

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In partial fulfillment for the award of the degree

of

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of

KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION

(Deemed to be University)

Anand Nagar, Krishnankoil – 626 126

Academic Year Odd Semester (2019-20)

KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION

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BONAFIDE CERTIFICATE

This is to certify that the Theory with Practical Component Report titled **"FORMAL LANGUAGE AND AUTOMATA"** is a bonafide record of the work done by **RAMYASHRUTHI (9917004012)** in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Specialization of the Computer Science and Engineering, during the Academic year Even Semester (2019-2020).

Mr.Muthamil sudar,	**Dr.A.Francis Saviour Devaraj M.E.,Ph.D.,**
Assistant Professor & Supervisor	Professor & Head
Department of CSE	Department of CSE

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EX.NO 1 DERMINISTIC FINITE AUTOMATON

AIM:

To design a DFA to accept the given languages over the alphabet {a,b}.

ALGORITHM:

- Start the JFLAP8_beta.jar file.
- Add required states.
- Make required transitions.
- Denote starting and final state.
- Save the project.
- Stop the program.

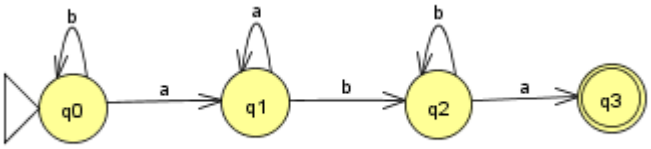
PROCEDURE:

- Start the JFLAP8_beta.jar file.
- Click Finite Automaton button.
- Add required states to the Automaton editor.
- Make required transitions as per the problem.
- Denote starting and final state.
- Save the project.
- Test the automaton for few input values.
- Stop the program.

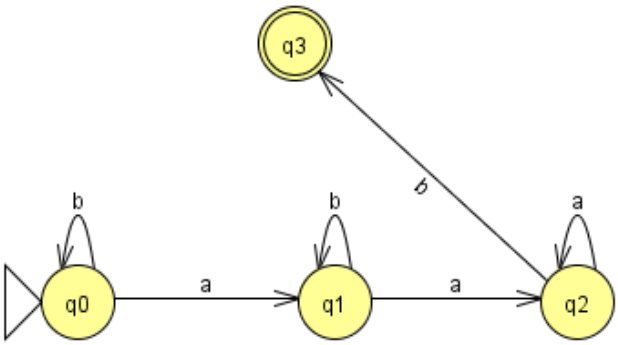
SCREENSHOTS:

.

1. Set of all substrings with aba.



2. Set of all strings starting with two a's and ending with b.



RESULT:

Thus, the given DFA has been successfully designed.

EX NO: 2 **NON - DETERMINISTIC FINITE AUTOMATION**

AIM:

To check the input string is accepted or not.

ALGORITHM:

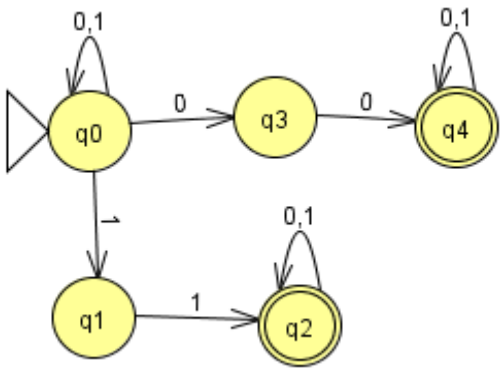
- Start the JFLAP8_beta.jar file.
- Add required states.
- Make required transitions.
- Denote starting and final state.
- Save the project.
- Stop the program.

PROCEDURE:

- Start the JFLAP8_beta.jar file.
- Click Finite Automaton button.
- Add required states to the Automaton editor.
- Make required transitions as per the problem.
- Denote starting and final state.
- Save the project.
- Test the automaton for few input values.
- Stop the program.

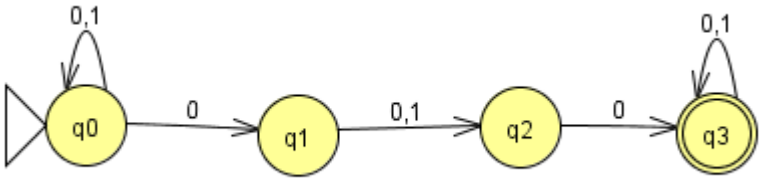
SCREENSHOTS:

1.



Input	Result
01001	Reject
1100101	Reject
001101	Reject
11	Accept
100	Reject
000	Reject

2.



Input	Result
000	Reject
010	Reject
10101	Reject
00000	Reject

RESULT:

Thus, the given NFA has been successfully designed.

EX NO: 3 **ε - NON - DETERMINISTIC FINITE AUTOMATON**

AIM:

To check the input string for ε -nfa and to accept the given strings

ALGORITHM:

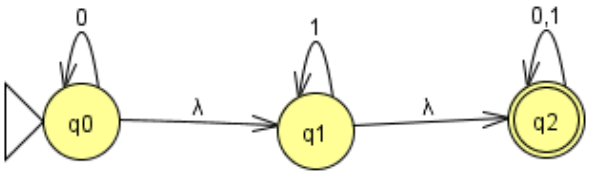
- Start the JFLAP8_beta.jar file.
- Add required states.
- Make required transitions.
- Denote starting and final state.
- Save the project.
- Stop the program.

PROCEDURE:

- Start the JFLAP8_beta.jar file.
- Click Finite Automaton button.
- Add required states to the Automaton editor.
- Make required transitions as per the problem.
- Denote starting and final state.
- Save the project.
- Test the automaton for few input values.
- Stop the program.

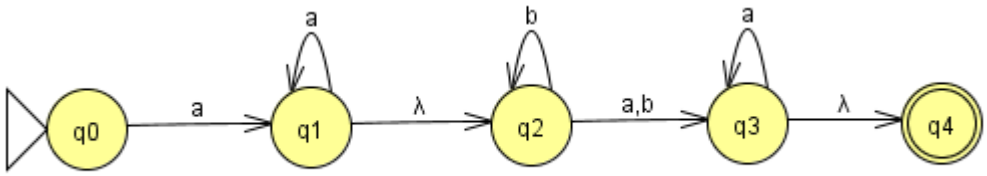
SCREENSHOTS:

1.



Input	Result
0011	Accept
1100	Reject
1010	Reject

2.



Input	Result
abab	Reject
aabba	Reject
ababab	Reject

RESULT:

Thus, the given NFA has been successfully designed.

EX NO: 4 **CONVERT AUTOMATON TO DFA**

AIM:

To convert the given automaton to DFA.

ALGORITHM:

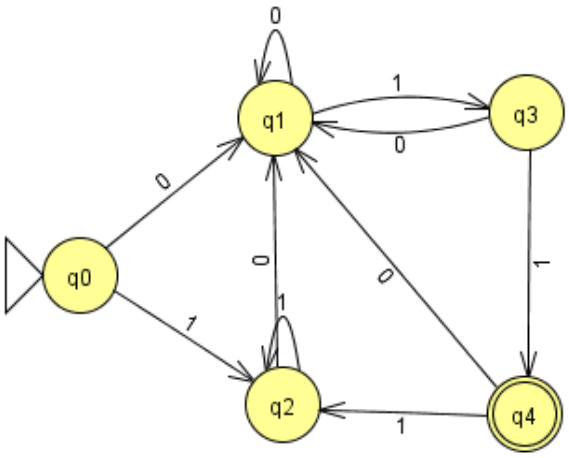
- Start the JFLAP8_beta.jar file.
- Add required states.
- Make required transitions.
- Denote starting and final state.
- Save the project.
- Click convert to DFA button.
- Stop the program.

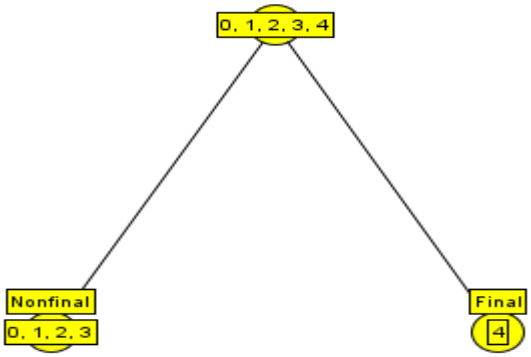
PROCEDURE:

- Start the JFLAP8_beta.jar file.
- Click Finite Automaton button.
- Add required states to the Automaton editor.
- Make required transitions as per the problem.
- Denote starting and final state.
- Save the project.
- Test the automaton for few input values.
- Stop the program.

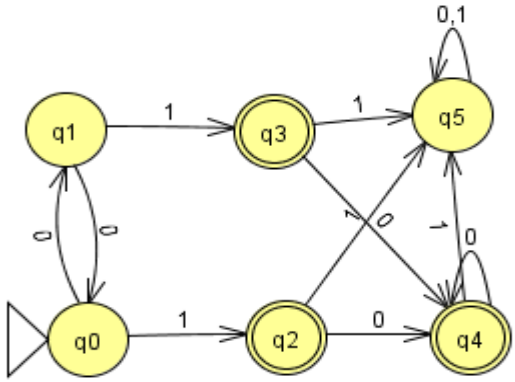
SCREENSHOTS:

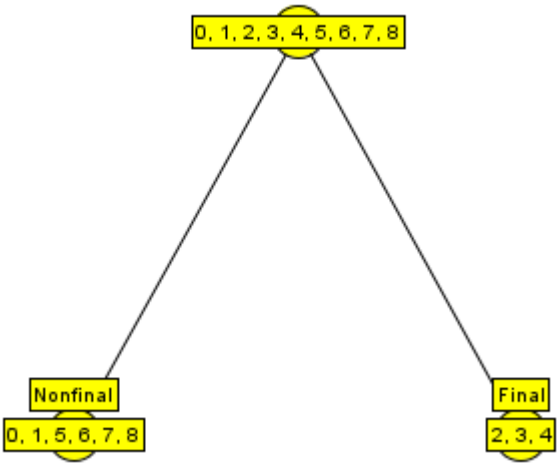
1.


0
1
q1
q3
0
0
q0
0
0
1
1
1
q2
q4
1


0, 1, 2, 3, 4
Nonfinal
0, 1, 2, 3
Final
4

2.


0,1
q1
1
q3
1
q5
0
0
1
0
1
0
q0
1
q2
0
q4



RESULT:

Thus, the given automaton has been successfully converted to DFA.

EX NO: 5 **CONVERT NFA TO DFA**

AIM:

To design DFA from the given NFA transitions.

ALGORITHM:

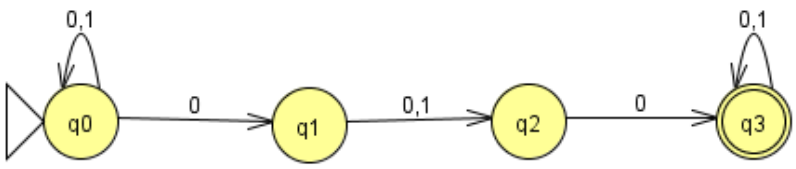
- Start the JFLAP8_beta.jar file.
- Add required states.
- Make required transitions.
- Denote starting and final state.
- Save the project.
- Click convert to DFA button.
- Stop the program.

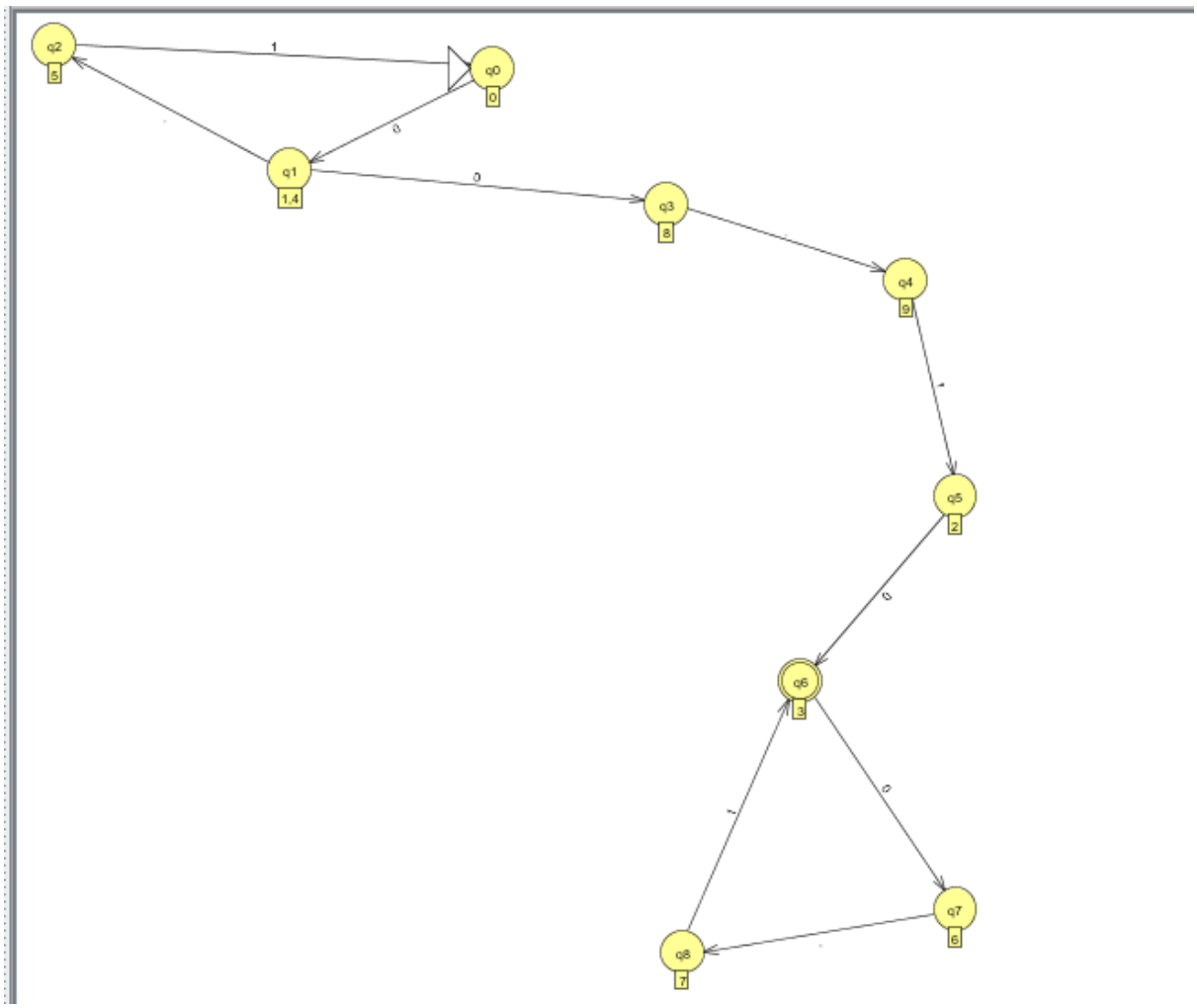
PROCEDURE:

- Start the JFLAP8_beta.jar file.
- Click Finite Automaton button.
- Add required states to the Automaton editor.
- Make required transitions as per the problem.
- Denote starting and final state.
- Save the project.
- Test the automaton for few input values.
- Stop the program.

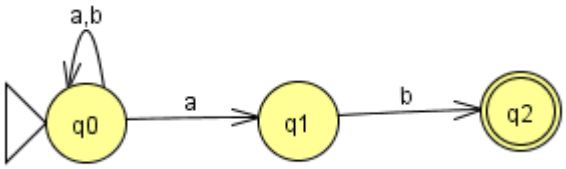
SCREENSHOTS:

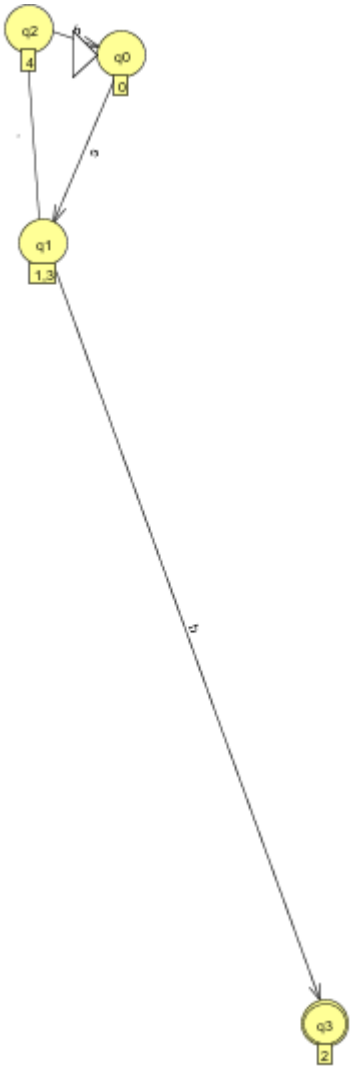
1.





2.





RESULT:

Thus, the DFA has been designed successfully from the given NFA transition.

EX NO: 6 **CONVERT ε - NFA TO DF**

AIM:

To design DFA from the given ε - NFA transition table.

ALGORITHM:

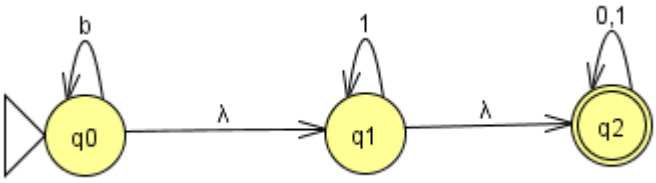
- Start the JFLAP8_beta.jar file.
- Add required states.
- Make required transitions.
- Denote starting and final state.
- Save the project.
- Click convert to DFA button.
- Stop the program.

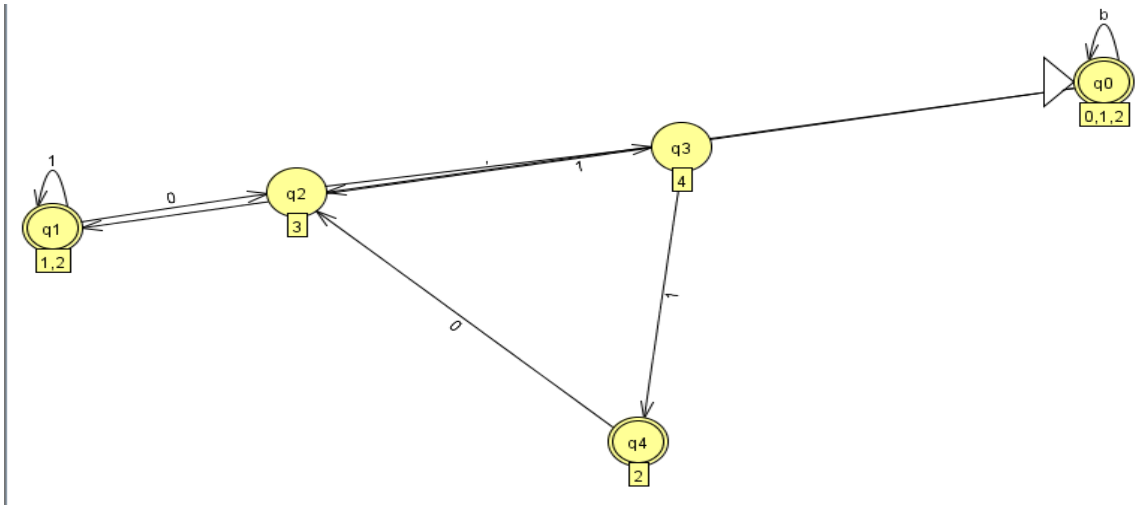
PROCEDURE:

- Start the JFLAP8_beta.jar file.
- Click Finite Automaton button.
- Add required states to the Automaton editor.
- Make required transitions as per the problem.
- Denote starting and final state.
- Save the project.
- Test the automaton for few input values.
- Stop the program.

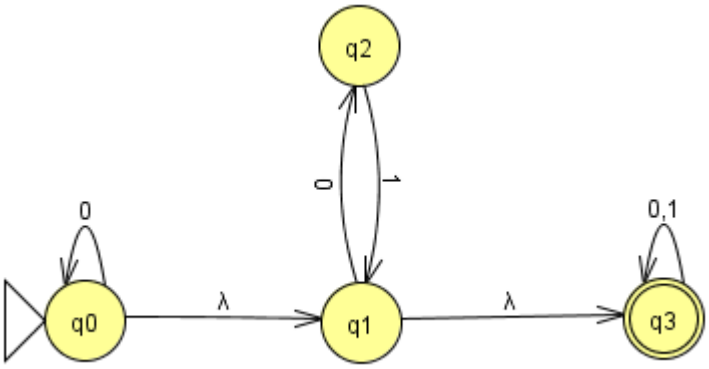
SCREENSHOTS:

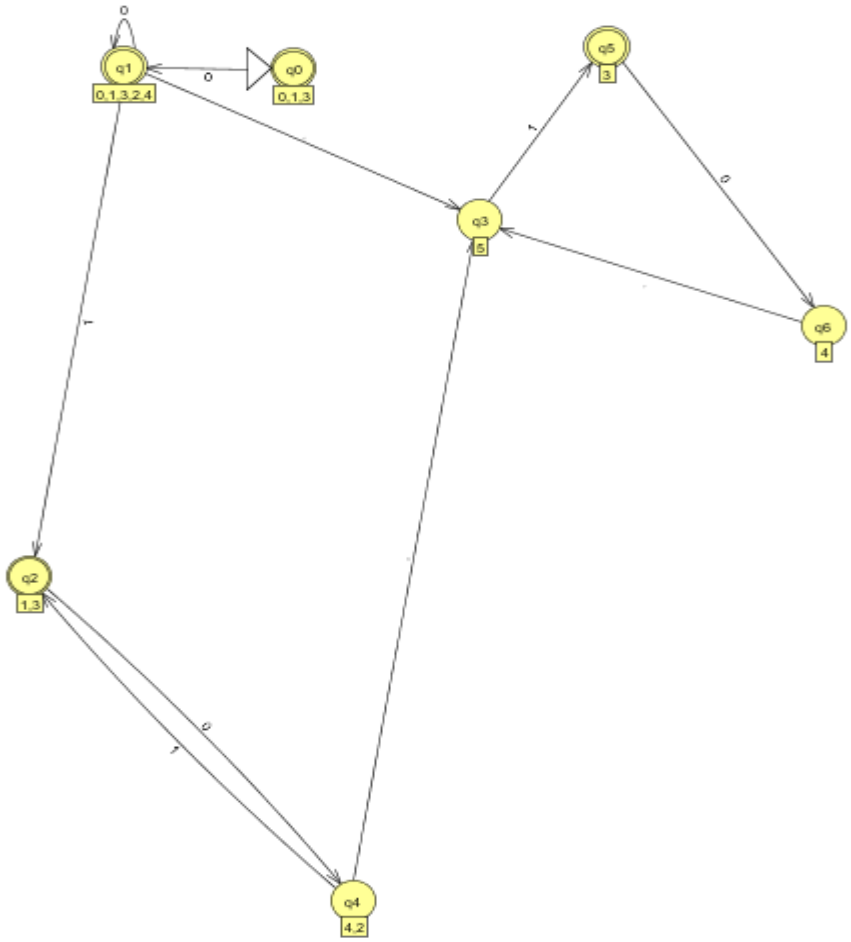
1.


b
1
0,1
q0
λ
q1
λ
q2


b
q0
0,1,2
q3
4
1
0
q2
3
1
1,2
q1
1
0
q4
2

2


q2
0
1
0
0,1
q0
λ
q1
λ
q3



RESULT:

Thus, the DFA has been successfully designed from the given ε - NFA.

EX NO: 7 **REGULAR EXPRESSION TO ε - NFA**

AIM:

To construct ε - NFA from the given regular expression.

ALGORITHM:

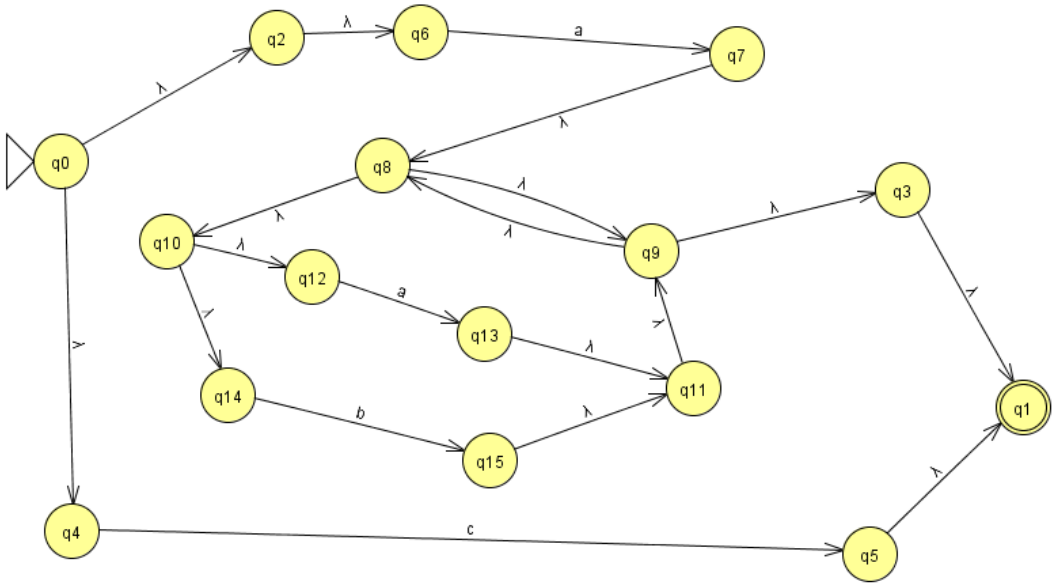
- Start the JFLAP8_beta.jar file.
- Add required states.
- Make required transitions.
- Denote starting and final state.
- Save the project.
- Stop the program.

PROCEDURE:

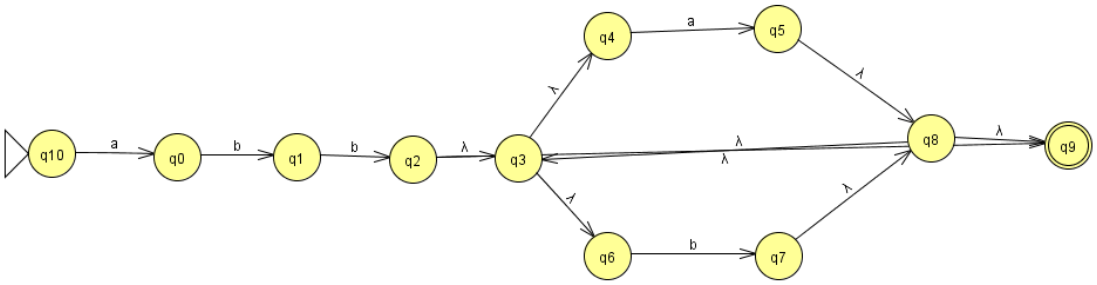
- Start the JFLAP8_beta.jar file.
- Click Regular Expression button.
- Add required states to the Automaton editor.
- Make required transitions as per the problem.
- Denote starting and final state.
- Save the project.
- Test the automaton for few input values.
- Stop the program.

SCREENSHOTS:

1. a(a+b)*+c



2. abb.(a/b)*



RESULT:

Thus, the ε - NFA has been designed successfully from the given regular express

EX NO: 8

PUSHDOWN AUTOMATON

AIM:

To construct a pushdown automata.

ALGORITHM:

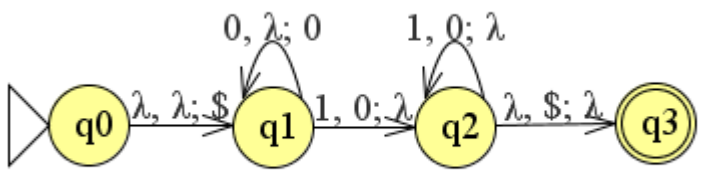
- Start the JFLAP8_beta.jar file.
- Add required states.
- Make required transitions.
- Denote starting and final state.
- Save the project.
- Stop the program.

PROCEDURE:

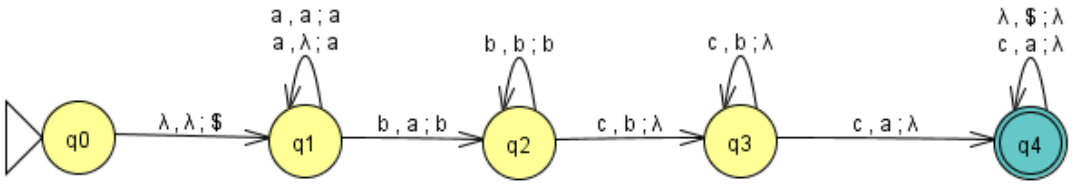
- Start the JFLAP8_beta.jar file.
- Click Pushdown Automaton button.
- Add required states to the Automaton editor.
- Make required transitions as per the problem.
- Denote starting and final state.
- Save the project.
- Test the automaton for few input values.
- Stop the program.

SCREENSHOTS:

PDA that accepts L = $\{0^n 1^n \mid n \geq 0\}$



PDA that accepts L={anbncm/m,n>=1}



RESULT:

Thus, the given PDA is constructed successfully.

EX NO: 9 **PUMPING LEMMA**

AIM:

To draw the transition diagram of a NFA from given transition table.

ALGORITHM:

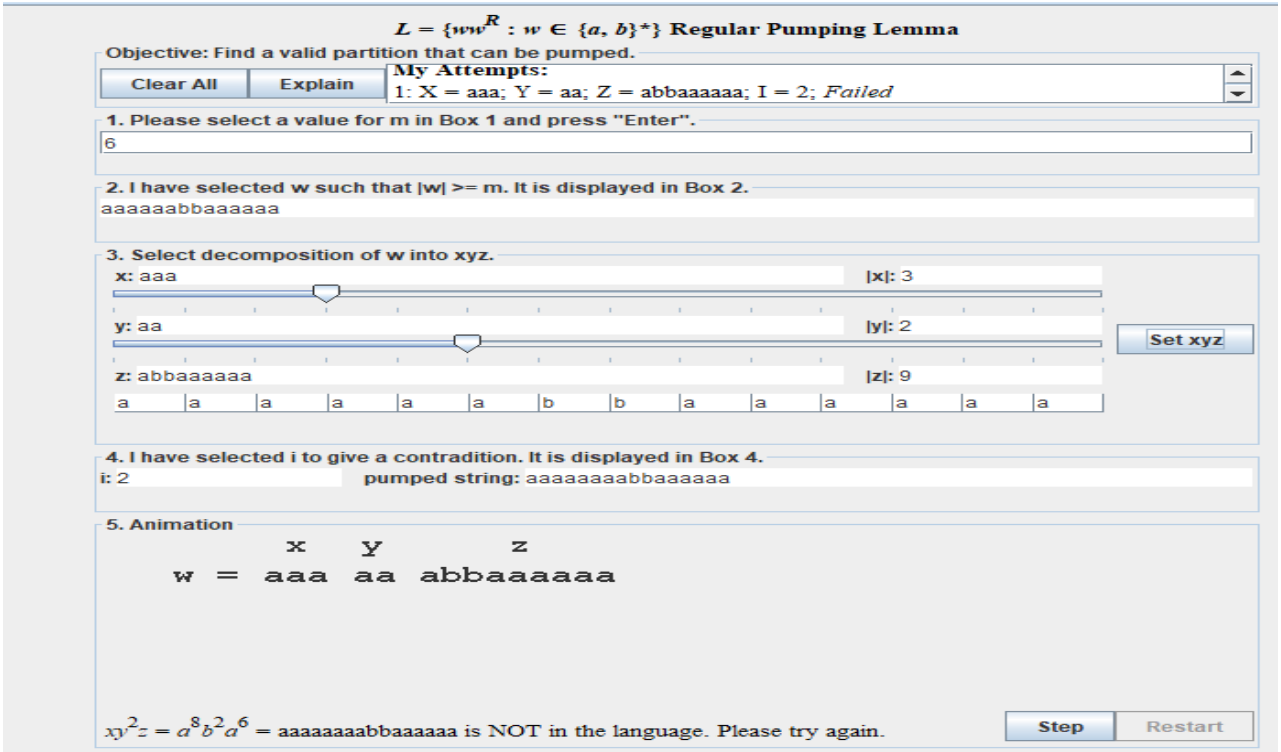
- Start the JFLAP8_beta.jar file.
- Add required states.
- Make required transitions.
- Denote starting and final state.
- Save the project.
- Stop the program.

PROCEDURE:

- Start the JFLAP8_beta.jar file.
- Click Pumping lemma button.
- Add required states to the Automaton editor.
- Make required transitions as per the problem.
- Denote starting and final state.
- Save the project.
- Test the automaton for few input values.
- Stop the program.

SCREENSHOTS:

1.



RESULT:

Thus, pumping lemma for given language is proved successfully.

EX NO: 10 **TURING MACHINE**

AIM:

To construct a Turing Machine that accepts $0^n1^n \mid n > 1$**.**

.

ALGORITHM:

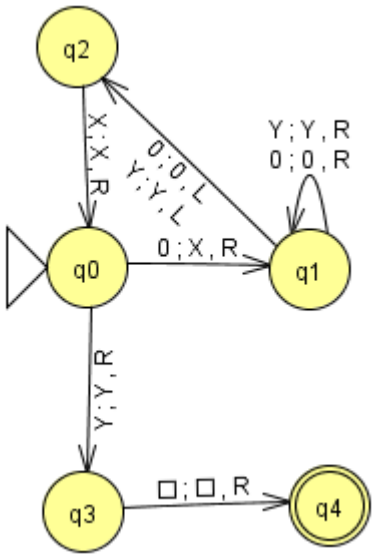
- Start the JFLAP8_beta.jar file.
- Add required states.
- Make required transitions.
- Denote starting and final state.
- Save the project.
- Stop the program.

PROCEDURE:

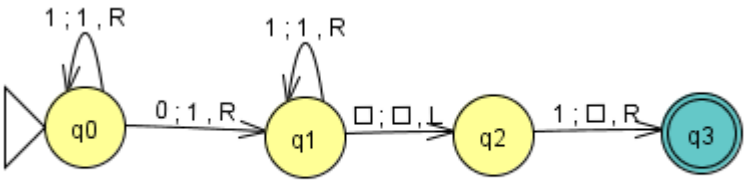
- Start the JFLAP8_beta.jar file.
- Click Turing machine button.
- Add required states to the Automaton editor.
- Make required transitions as per the problem.
- Denote starting and final state.
- Save the project.
- Test the automaton for few input values.
- Stop the program.

SCREENSHOTS:

Turing machine for L={0n1m/n>=1}



Turing machine for a+b



RESULT:

Thus, the given Turing Machine is designed successfully.