

SNS COLLEGE OF TECHNOLOGY

Coimbatore-36.

An Autonomous Institution

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai**

**COURSE CODE & NAME : 19CSB301 & AUTOMATA THEORY
AND COMPILER DESIGN**

III YEAR/ V SEMESTER

UNIT – I FINITE AUTOMATA AND REGULAR LANGUAGES

Topic: Equivalence of DFA and N DFA

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Equivalence of NFA & DFA

- NFA and DFA are equivalent.
- $NFA \rightarrow DFA \rightarrow L(N) == L(D)$
- $NFA = \{Q, \Sigma, q_0, F, \delta\}$
- $DFA = \{Q', \Sigma, q_0, F', \delta'\}$
- Steps for converting NFA to DFA
 - Initially $Q' = \emptyset$
 - $Q' = \{q_0\}$
 - For each state in Q' find the possible set of states for each input symbol. If this set of states is not in Q' add them to Q'
 - Final state of DFA will be the states which contain Final states of NFA

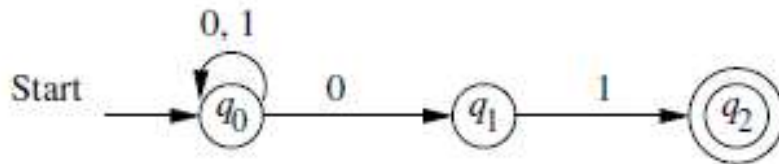
References

- John E. Hopcroft and Rajeev Motwani and Jeffrey D. Ullman, “Introduction to Automata Theory, Languages and Computation”, Second Edition, Pearson Education, New Delhi, (2007) (UNIT-I)
- Linz P. An introduction to formal languages and automata. Sixth edition, Jones and Bartlett Publishers; 2016.(UNIT-I)
- [Ramaiah k. Dasaradh](#) “Introduction to Automata and Compiler Design “ First Edition ,Prentice Hall India Learning Private Limited(2011)(UNIT-I to V)



Equivalence of NFA & DFA

- NFA which accepts all the strings ending with 01



	0	1
q ₀	q ₀ , q ₁	q ₀
q ₁	-	q ₂
q ₂	-	-

- DFA Construction

- $Q' = \{q_0, \{q_0, q_1\}, \{q_0, q_2\}\}$

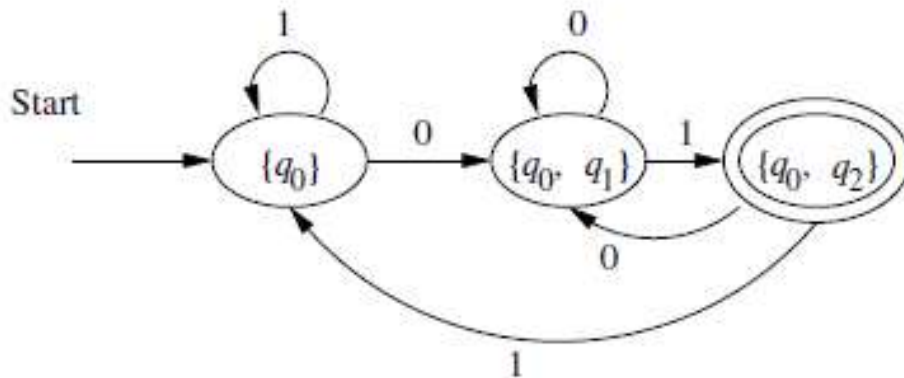
	0	1
q ₀	q ₀ , q ₁	q ₀
Q _{0,q1}	Q _{0,q1}	q ₀ , q ₂
q ₀ , q ₂	Q _{0,q1}	q ₀



Equivalence of NFA & DFA

- DFA Construction – strings that end with 01
 - $Q' = \{q_0, \{q_0, q_1\}, \{q_0, q_2\}\}$

	0	1
q_0	$\{q_0, q_1\}$	q_0
$\{q_0, q_1\}$	$\{q_0, q_1\}$	$\{q_0, q_2\}$
$\{q_0, q_2\}$	$\{q_0, q_1\}$	q_0





Equivalence of NFA & DFA- Example

- Construct the NFA for the given transition table and find the equivalent DFA

States/ Inputs	0	1
A	A	B
B	B	A,B

References

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