

MUST

Wisdom & Virtue

MIRPUR UNIVERSITY OF SCIENCE AND TECHNOLOGY (MUST), MIRPUR
DEPARTMENT OF SOFTWARE ENGINEERING

Formal Methods in Software Engineering

Lecture [11]: Conversion of NFA to DFA

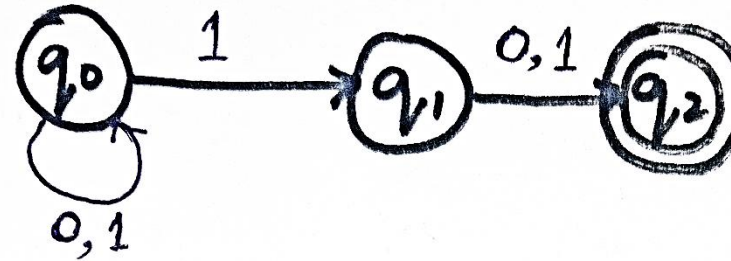
Engr. Samiullah Khan
(Lecturer)

Topics discussed in Today's Lectures

- Conversion of NFA to DFA
- Examples of Conversion of NFA to DFA

Conversion of NFA to DFA – Example 1

- Given NFA



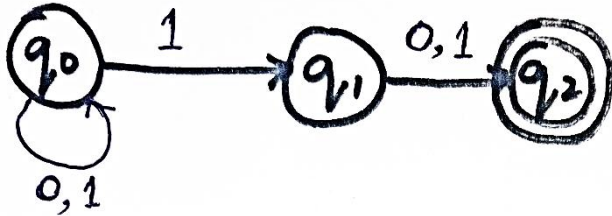
- Truth Table of NFA
 - ❖ Taught in Class on whiteboard

→

States	0	1
q_0	q_0	$q_0 q_1$
q_1	q_2	q_2
q_2	—	—

Conversion of NFA to DFA - Example 1 (Contd...)

- New States of DFA and its Truth Table of NFA



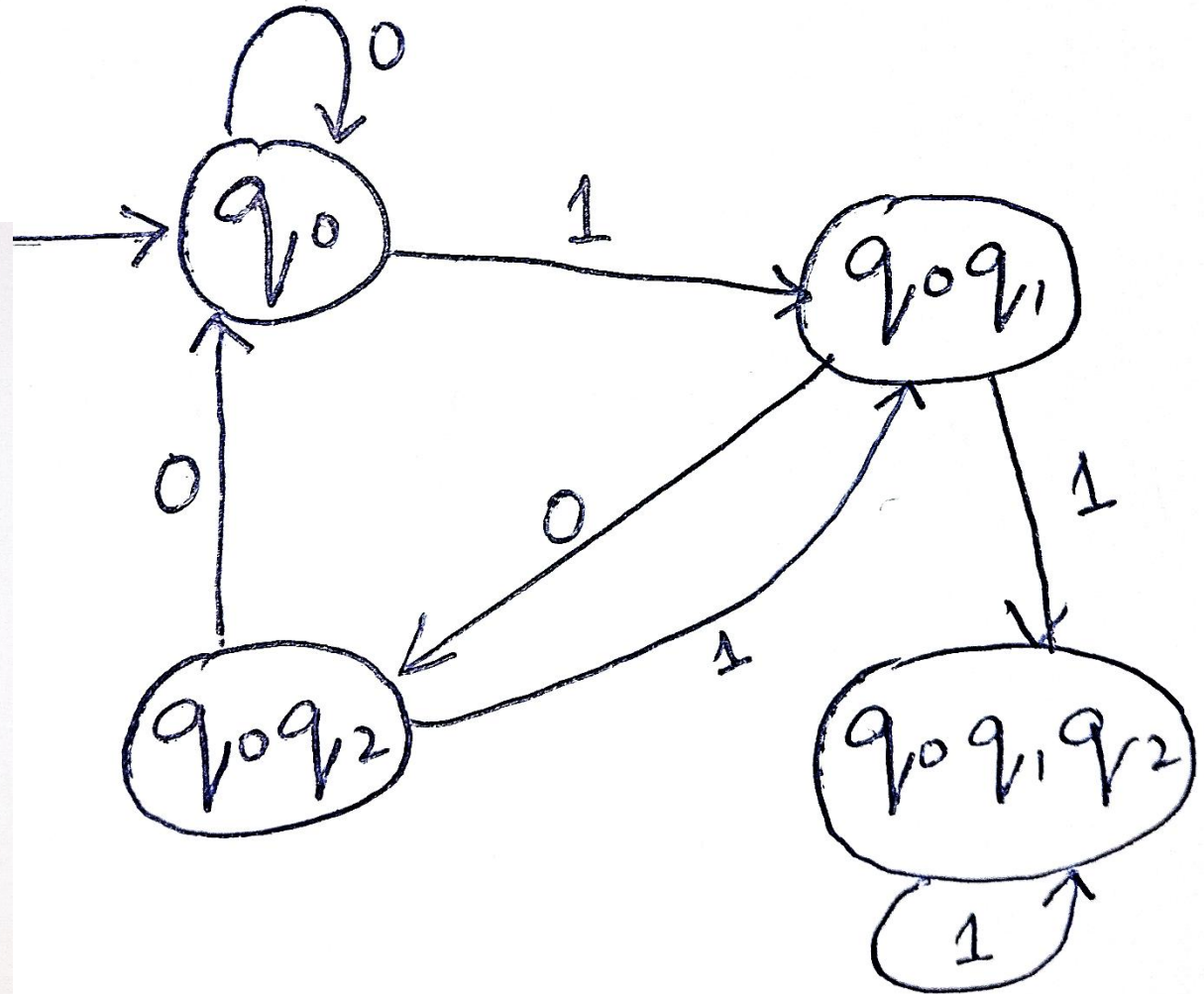
States	0	1
→ q ₀	q ₀	q ₀ q ₁
q ₁	q ₂	q ₂
q ₂	—	—

States	0	1
→ q ₀	q ₀	q ₀ q ₁
q ₀ q ₁	q ₀ ,q ₂	q ₀ ,q ₁ ,q ₂
q ₀ ,q ₂	q ₀	q ₀ ,q ₁
q ₀ q ₁ q ₂	q ₀ q ₂	q ₀ q ₁ q ₂

Conversion of NFA to DFA – Example 1 (Contd...)

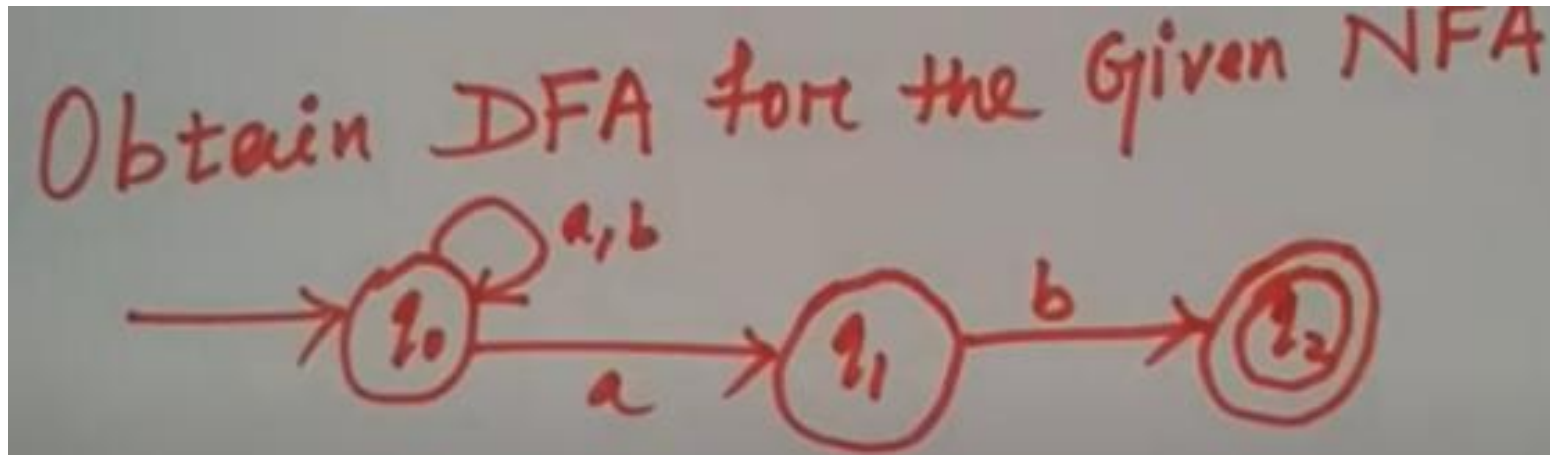
- Final DFA obtained

States	0	1
$\rightarrow q_0$	q_0	$q_0 q_1$
$q_0 q_1$	q_0, q_2	q_0, q_1, q_2
q_0, q_2	q_0	q_0, q_1
$q_0 q_1 q_2$	$q_0 q_2$	$q_0 q_1 q_2$



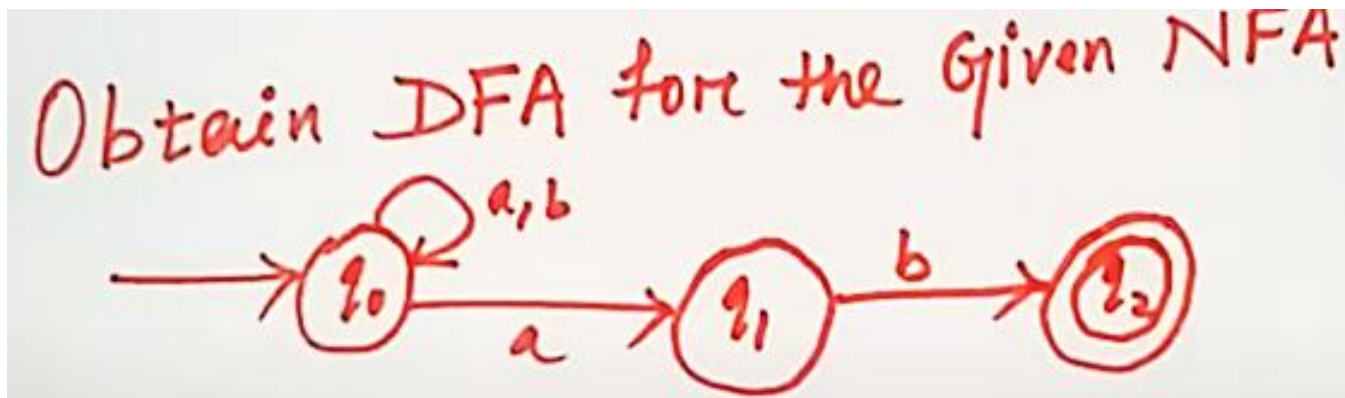
Conversion of NFA to DFA - Example 2

- Given NFA



Conversion of NFA to DFA - Example 2 (Contd...)

- Given NFA



→ Truth Table

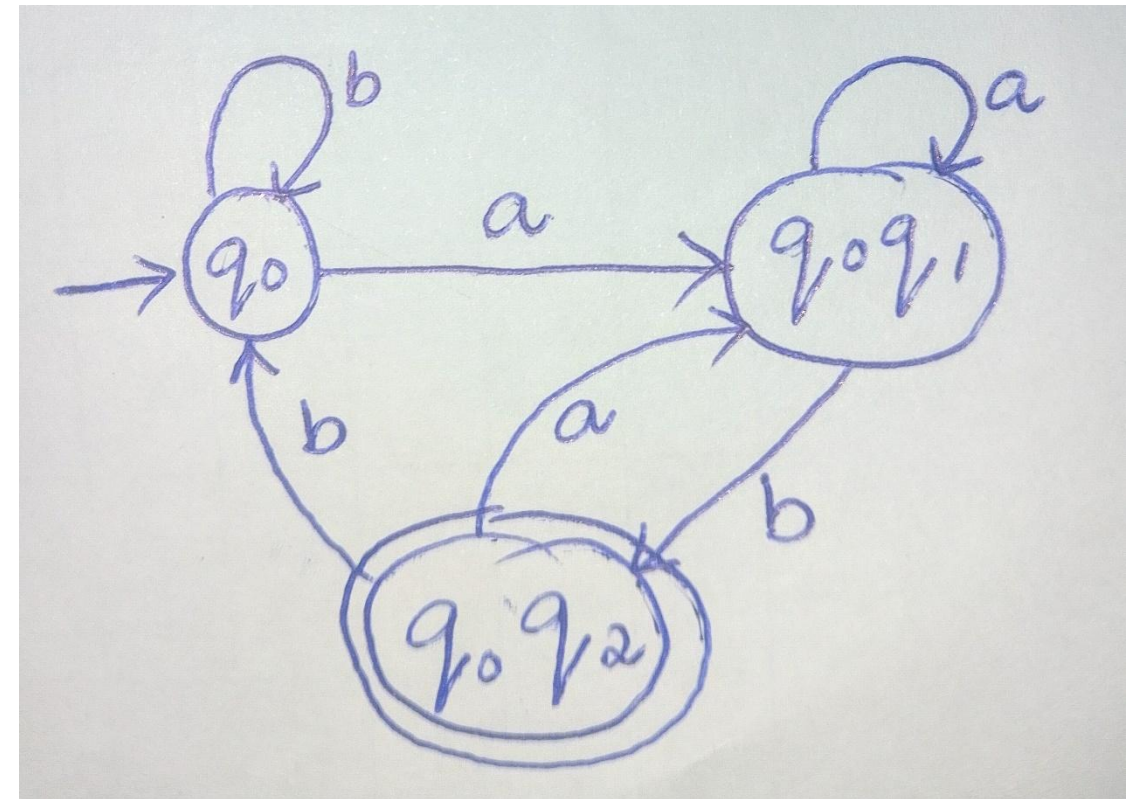
δ	a	b
→ q_0	$\{q_0, q_1, q_2\}$	$\{q_0, q_2\}$
q_1	ϕ	$\{q_2\}$
* q_2	ϕ	ϕ

DFA - Example 2 (Contd...)

δ	a	b
$\rightarrow q_0$	$\{q_0, q_1, q_3\}$	$\{q_0\}$
q_1	ϕ	$\{q_2\}$
$*q_2$	ϕ	ϕ

	a	b
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

→ Resultant DFA from NFA



THANKS