

Conversion NFA to DFA

The NFA has states $q_0, q_1, q_2, q_3, \dots$

The DFA has states from the power set

$\emptyset, \{q_0\}, \{q_1\}, \{q_2\}, \{q_0, q_1\}, \{q_0, q_2\}, \dots, \{q_0, q_1, q_2\}$

Step 1)

initial state of NFA : q_0



initial state of DFA : $\{q_0\}$

$$\delta^*(q_0, \epsilon) = \{q_0, \dots, \dots\}$$

initial state of NFA is q_0 and state

is transition function δ

initial state in DFA

step 2,3)

for every DFA's state $\{q_i, q_j, \dots, q_m\}$

find its transition state

initial state

The symbol in alphabet

DFA states	a	b
$\{q_0\}$	$\{q_0, q_1\}$	$\{q_0, q_2\}$
$\{q_0, q_1\}$	$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$
$\{q_0, q_2\}$	$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$
$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$

we take the initial states and symbols of the states, we write them in the set $\{ \}$

then we take the transitions and apply them to the initial state

no more states can be added in DFA

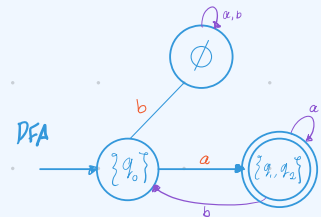
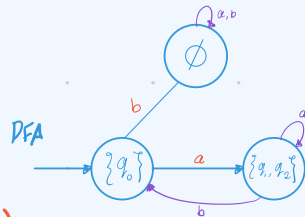
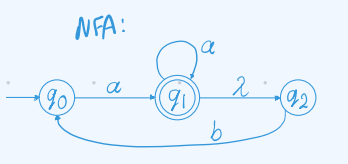
step 4)

Accept states in DFA

so we find the accept states in NFA

DFA states	a	b
$\{q_0\}$	$\{q_0, q_1\}$	$\{q_0, q_2\}$
$\{q_0, q_1\}$	$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$
$\{q_0, q_2\}$	$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$
$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$

example:



step 1)

initial in NFA : q_0

initial in DFA : $\{q_0\}$



step 2,3)

DFA state	a	b
$\{q_0\}$	$\{q_0, q_1\}$	\emptyset
$\{q_0, q_1\}$	$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$
\emptyset	\emptyset	\emptyset

trap state

step 4)

The accept state in NFA is q_1 , so, every state in DFA contain q_1 will be accept state

$$= \{q_0, q_1\}$$