Example 1: This is a TEXfile.

$$(f * g) = \int_{-\infty}^{\infty} f\tau g(t-\tau)\, d\tau$$

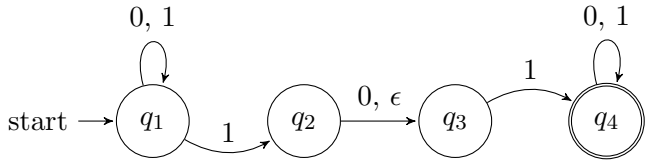
Example 2: *As NFA defined on Page 54 of ITC* textbook.

$Q = \{q_1, q_2, q_3, q_4\}$
$\sum = \{0, 1\}$
$F = \{q_4\}$
$q_0 = q_1$
$\delta = \{((q_1, 0), \{q_1\}), ((q_1, 1), \{q_1, q_2\}), ((q_1, \epsilon), \phi),$
$((q_2, 0), \{q_3\}), ((q_2, 1), \phi), ((q_2, \epsilon), \{q_3\}),$
$((q_3, 0), \phi), ((q_3, 1), \{q_4\}), ((q_3, \epsilon), \phi),$
$((q_4, 0), \{q_4\}), ((q_4, 1), \{q_4\}), ((q_4, \epsilon), \phi)\}$

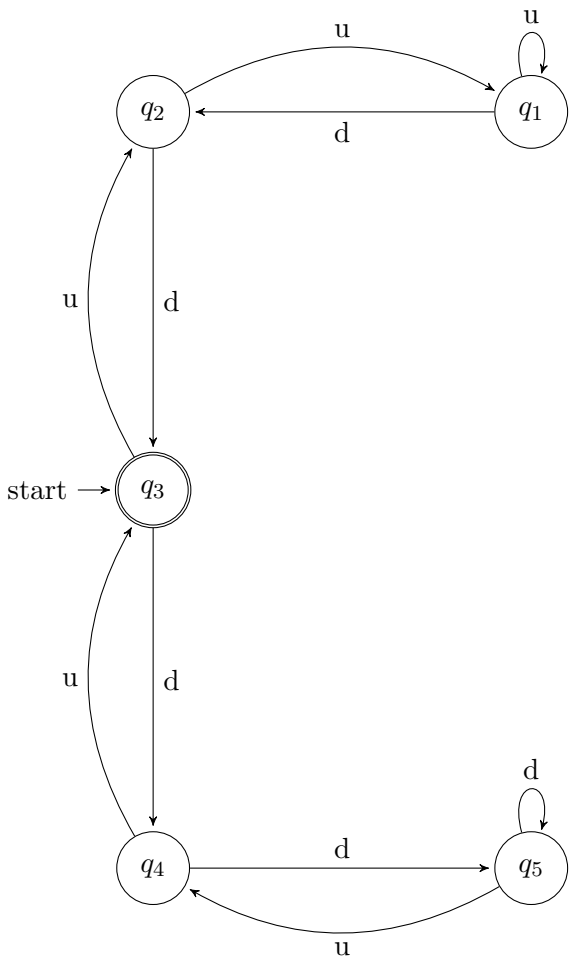
Transition Function in Table form:

	0	1	ϵ
q_1	$\{q_1\}$	$\{q_1, q_2\}$	ϕ
q_2	$\{q_3\}$	ϕ	$\{q_3\}$
q_3	ϕ	$\{q_4\}$	ϕ
q_4	$\{q_4\}$	$\{q_4\}$	ϕ

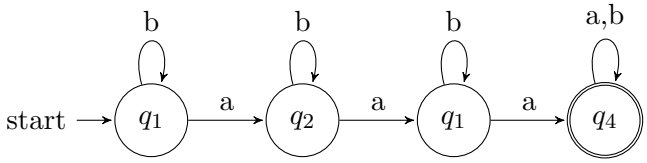
NFA in pictorial form:



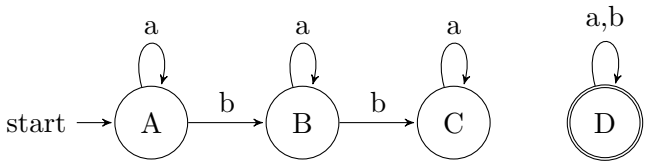
Example 3: ***DFA, state diagram of machine M***



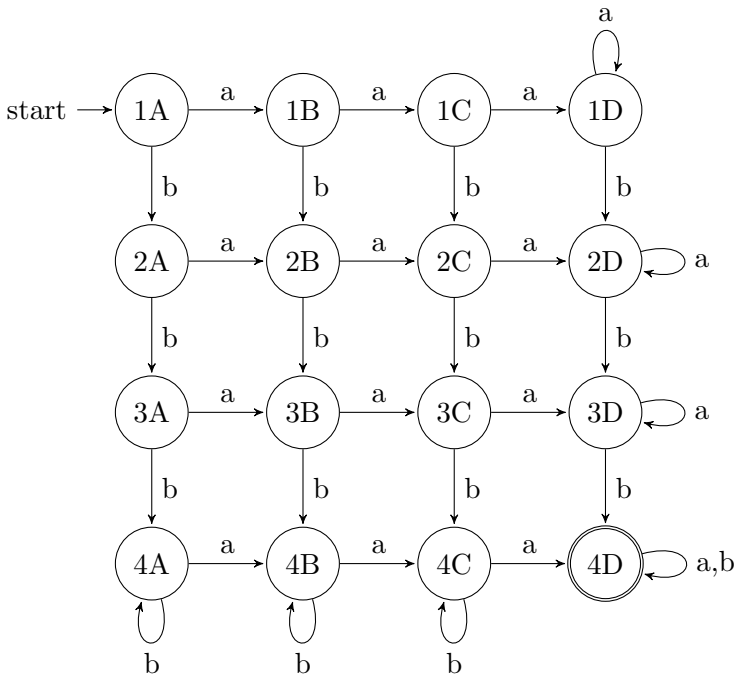
Example 4: **textitMachine DFA has 02 languages and it combine:**
{w| w has at least three a's}



{w| has at least three b's}



Combining them using the intersection construction for DFA machine:



Regular expression and it diagram DFA: $\mathbf{1}\sum^{*}\mathbf{0}$
{w|w begin with a 1 and end with a 0}