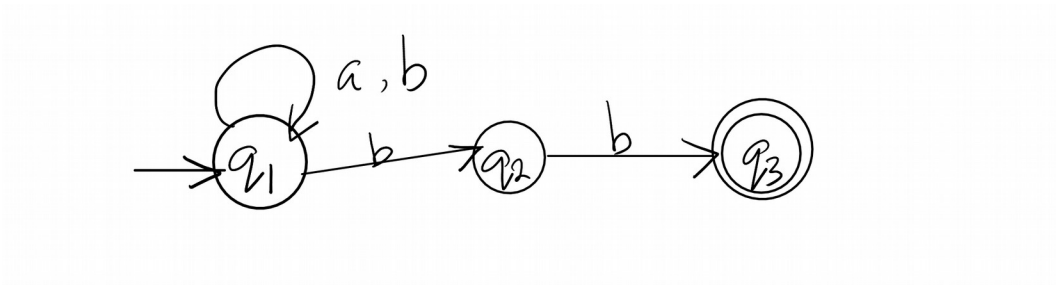
Convert the following Non-Deterministic Finite Automata (NFA) to Deterministic Finite Automata (DFA)-



Solution-

Transition table for the given Non-Deterministic Finite Automata (NFA) is-

State / Alphabet	a	b
→ **q1**	q1	q1, q2
q2	–	*q3
***q3**	–	–

Step-01:

Let Q' be a new set of states of the Deterministic Finite Automata (DFA).

Let T' be a new transition table of the DFA.

Step-02:

Add transitions of start state q1 to the transition table T'.

State / Alphabet	a	b
→**q1**	q1	{q1, q2}

Step-03:

New state present in state Q' is {q1, q2}.

Add transitions for set of states {q1, q2} to the transition table T'.

State / Alphabet	a	b
→**q1**	q1	{q1, q2}
{q1, q2}	q1	{q1, q2,q3}

Step-04:

New state present in state Q' is {q1, q2,q3}.

Add transitions for set of states {q1, q2,q3} to the transition table T'.

State / Alphabet	a	b
→**q1**	q1	{q1, q2}
{q1, q2}	q1	{q1, q2,q3}
{q1, q2, q3}	q1	{q1, q2,q3}

Step-05:

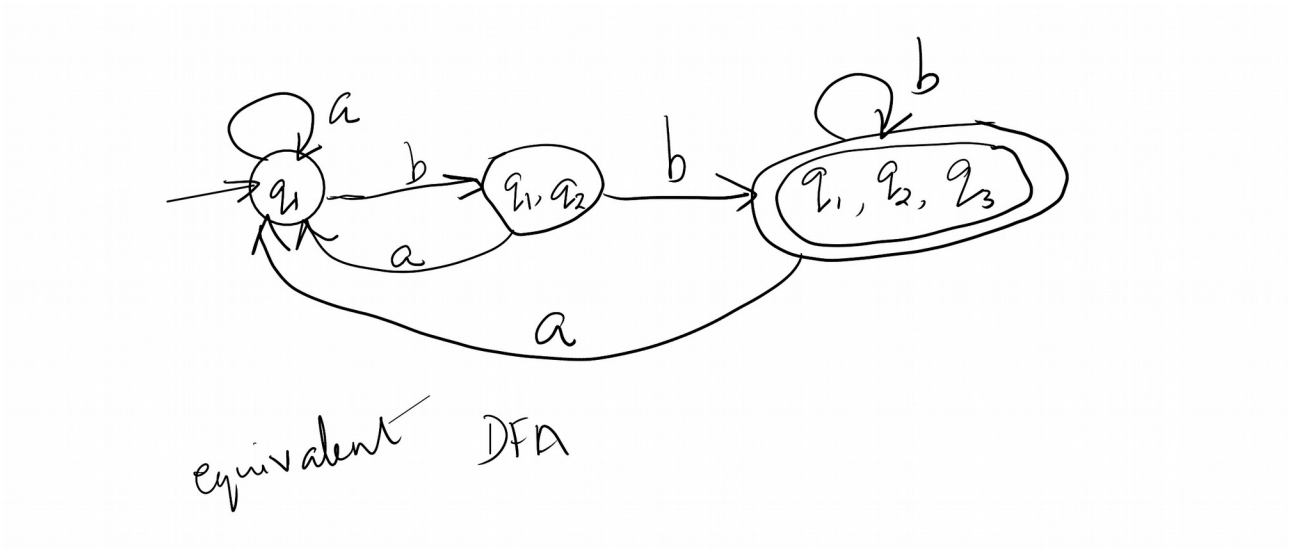
Since no new states are left to be added in the transition table T', so we stop.

States containing q3 as its component are treated as final states of the DFA.

Finally, Transition table for Deterministic Finite Automata (DFA) is-

State / Alphabet	a	b
→**q1**	q1	{q1, q2}
{q1, q2}	q1	*{q1, q2, q3}
***{q1, q2, q3}**	q1	*{q1, q2, q3}

Now, Deterministic Finite Automata (DFA) may be drawn as-



Input the NFA as follows.

Enter the number of alphabets?
NOTE:- [use letter e as epsilon]
NOTE:- [e must be last character ,if it is present]

Enter No of alphabets and alphabets?
2
a
b
Enter the number of states?
3
Enter the start state?

1
Enter the number of final states?
1
Enter the final states?
3
Enter no of transition?
4
NOTE:- [Transition is in the form–> qno alphabet qno]
NOTE:- [States number must be greater than zero]

Enter transition?
1 a 1
1 b 1
1 b 2
2 b 3

Sample output:

Equivalent DFA.....
.....
Transitions of DFA

{q1,} a {q1,}

{q1,} b {q1,q2,}

{q1,q2,} a {q1,}

{q1,q2,} b {q1,q2,q3,}

{q1,q2,q3,} a {q1,}

{q1,q2,q3,} b {q1,q2,q3,}

States of DFA:
{q1,} {q1,q2,} {q1,q2,q3,}
Alphabets:
a b
Start State:
q1
Final states:
{q1,q2,q3,}