For state A, on input 0, the machine arbitrarily "chooses" one of the possible transitions i.e. state A or state B

Input:  
\[0 \ 1 \ 1 \ 1 \ 0 \ 0 \ 1 \ 1 \ 0 \ 1 \ 1 \ 0\]

A string \( w \) is accepted iff one of the possible terminating states is a Final State
The above automaton accepts $w \in \Sigma^*$, if $w$ ends with 011

This automaton that can have multiple transitions is known as a Non-deterministic Finite Automaton (NFA).

Design an NFA that accepts the language $w \in \Sigma^*$, such that some pair of 1's is separated by $3i$ symbols $i \geq 0$

```
0 0 1 0 0 1 1
↑
0 1 0 1 0 0 1 0
```

X
NFA N:

Q: set of states
F \subseteq Q: set of final states
q_0 \in Q: initial state

\delta: Q \times \Sigma \rightarrow 2^Q \setminus \emptyset \quad (multi \text{ple states})

L(N) = \{ w | \hat{\delta}(q_0, w) \cap F \neq \emptyset \}

\hat{\delta}(\{q\}, a) = \delta(q, a) \quad q \in Q \quad a \in \Sigma

\hat{\delta}(P, a) = \bigcup \hat{\delta}(q, a)

P \subseteq Q \quad q \in P

\hat{\delta}(P, aw) = \hat{\delta}(\hat{\delta}(P, a), w)

a \in \Sigma, \quad w \in \Sigma^*