The set of binary strings with a 1 in the 3rd position from the start

Nondeterministic Finite Automata

An NFA:
Still has exactly one start state and any number of final states.
The NFA accepts $x$ if there is some path from a start state to a final state labeled with $x$.
From a state, you can have 0, 1, or many outgoing arrows labeled with a single character. You can choose any of them to build the required path.
Three ways to think about NFAs

“Outside Observer”: is there a path labeled by $x$ from the start state, to the final state (if we know the input in advance can we tell the NFA which decisions to make)

“Perfect Guesser”: The NFA has input $x$, and whenever there is a choice of what to do, it magically guesses a transition that will eventually lead to acceptance (if one exists)

“Parallel exploration”: The NFA computation runs all possible computations on $x$ in parallel (updating each possible one at every step)

What about those $\varepsilon$-transitions?