Práctica 2
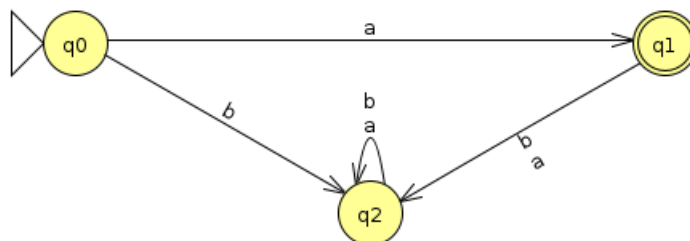
Adrián Racero Serrano

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Ejercicio 1

Consider the language over the alphabet {a, b} that only contains the string a.

   a. Build a DFA that recognizes this language and rejects all those strings that do not belong to the language.

   b. Test the automaton that you have created by introducing 6 chains.

a)
$$M = (\{q_0, q_1, q_2\}, \{a, b\}, \delta, q_0, \{q_1\})$$

$\delta(q, \sigma)$	a	b
q_0	q_1	q_2
q_1	q_2	q_2
q_2	q_2	q_2

b)

Input	Result
a	Accept
ab	Reject
aaa	Reject
ba	Reject
bab	Reject
aab	Reject

Ejercicio 2

Finite automaton in Octave:

a) Open the Octave finiteautomata.m script and test it with the given example (see script help) in the GitHub repository.

b) Specify in finiteautomata.json the automaton created in Activity 1 and test it with the script!

a)

```
>> finiteautomata("aa*bb*", "ab")
warning: strmatch is obsolete; use strncmp or strcmp instead

M = ({q0, q1, q2}, {a, b}, q0, {q2}, {(q0, a, q1), (q1, a, q1), (q1, b, q2), (q2, b, q2)})

w = ab

(q0, ab) ⊢ (q1, b) ⊢ (q2, ε)

x ∈ L(M)
ans = 1
>> finiteautomata("aa*bb*", "ab", "LaTeX")

$M = (\{q_0, q_1, q_2\}, \{a, b\}, q_0, \{q_2\}, \{(q_0, a, q_1), (q_1, a, q_1), (q_1, b, q_2), (q_2, b, q_2)\})$

$w = ab$

$(q_0, ab) \vdash (q_1, b) \vdash (q_2, \varepsilon)$

x ∈ L(M)
ans = 1
```

b)

$$M = (\{q_0, q_1, q_2\}, \{a, b\}, q_0, \{q_1\}, \{(q_0, a, q_1), (q_0, b, q_2), (q_1, a, q_2), (q_1, b, q_2), (q_2, a, q_2), (q_2, b, q_2)\})$$
$$w = a$$
$$(q_0, a) \vdash (q_1, \varepsilon)$$

```
{
    "name" : "only-a",
    "representation" : {
        "K" : ["q0", "q1", "q2"],
        "A" : ["a", "b"],
        "s" : "q0",
        "F" : ["q1"],
        "t" : [["q0", "a", "q1"],
               ["q0", "b", "q2"],
               ["q1", "a", "q2"],
               ["q1", "b", "q2"],
               ["q2", "a", "q2"],
               ["q2", "b", "q2"]]
    }
}
```

```
>> finiteautomata("only-a", "a")

M = ({q0, q1, q2}, {a, b}, q0, {q1}, {(q0, a, q1), (q0, b, q2), (q1, a, q2), (q1, b, q2), (q2, a, q2), (q2, b, q2)})

w = a

(q0, a) ⊢ (q1, ε)

x ∈ ℒ(M)
ans = 1
>> finiteautomata("only-a", "ab")

M = ({q0, q1, q2}, {a, b}, q0, {q1}, {(q0, a, q1), (q0, b, q2), (q1, a, q2), (q1, b, q2), (q2, a, q2), (q2, b, q2)})

w = ab

(q0, ab) ⊢ (q1, b) ⊢ (q2, ε)

x ∉ ℒ(M)
ans = 0
>> finiteautomata("only-a", "abb")

M = ({q0, q1, q2}, {a, b}, q0, {q1}, {(q0, a, q1), (q0, b, q2), (q1, a, q2), (q1, b, q2), (q2, a, q2), (q2, b, q2)})

w = abb

(q0, abb) ⊢ (q1, bb) ⊢ (q2, b) ⊢ (q2, ε)

x ∉ ℒ(M)
ans = 0
```