

Ejercicio 1. Obtenga un Autómata Finito Determinista (AFD) dado el lenguaje definido en el alfabeto $\Sigma = \{0, 1\}$, que acepte el conjunto de palabras que inician en "0".

$\Sigma = \{0, 1\}$

$Q = \{\text{START}, S0, S1\}$

$q_0 = \text{START}$

$F = \{S0\}$

$f(\text{START}, 0) = S0$

$f(S0, 0) = S0$

$f(S0, 1) = S0$

$f(\text{START}, 1) = S1$

$f(S1, 1) = S1$

$f(S1, 0) = S1$

ACCEPT:

010101

011111

000001

01

001

REJECT:

11000

11111

100000

101

111

Bulk Testing

Accept (one per line):

010101
011111
000001
01
001

Reject (one per line):

11000
11111
100000
101
111

Test Results:

Accept: 010101 -- Pass
Accept: 011111 -- Pass
Accept: 000001 -- Pass
Accept: 01 -- Pass
Accept: 001 -- Pass
Reject: 11000 -- Pass
Reject: 11111 -- Pass
Reject: 100000 -- Pass
Reject: 101 -- Pass
Reject: 111 -- Pass

```
graph LR; start((start)) -- 0 --> s0((s0)); start -- 1 --> s1((s1)); s0 -- 0 --> s0; s0 -- 1 --> s0; s1 -- 1 --> s1; s1 -- 0 --> s1; style start fill:#add8e6,stroke:#000,stroke-width:1px; style s0 fill:#add8e6,stroke:#000,stroke-width:1px; style s1 fill:#add8e6,stroke:#000,stroke-width:1px;
```

Ejercicio2. Obtenga un Autómata Finito Determinista (AFD) dado el lenguaje definido en el alfabeto $\Sigma = \{0, 1\}$, que acepte el conjunto de palabras que terminan en "1".

$\Sigma = \{0, 1\}$

$Q = \{\text{START}, S0, S1\}$

$q0 = \text{START}$

$F = \{S1\}$

$f(\text{START}, 0) = S0$

$f(S0, 0) = S0$

$f(S0, 1) = S1$

$f(\text{START}, 1) = S1$

$f(S1, 1) = S1$

$f(S1, 0) = S0$

ACCEPT:

000001

11111

010101

11111

000001111

REJECT:


11000

111110

100000

1001

100101

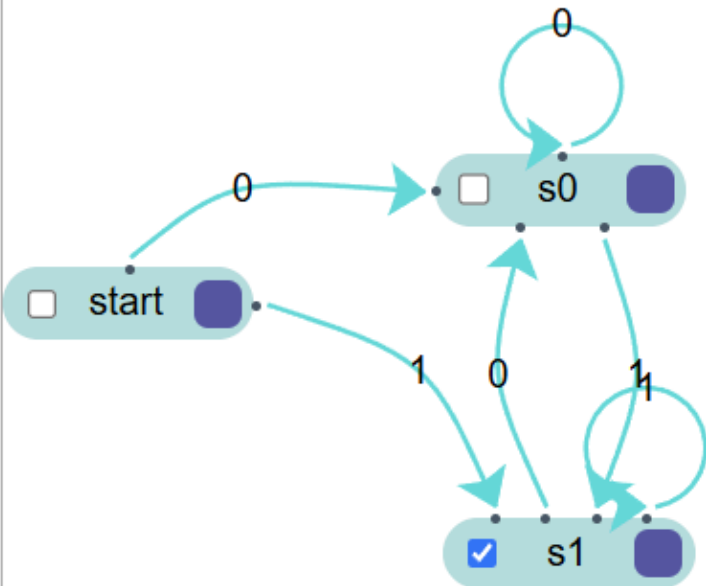
Bulk Testing 

Accept (one per line):

000001
1111
010101
11111
0000111

Reject (one per line):

0101010
11110
010101010
1110
10100



```

graph LR
    start((start)) -- 0 --> s0((s0))
    start -- 1 --> s1((s1))
    s0 -- 0 --> s0
    s0 -- 1 --> s1
    s1 -- 0 --> s0
    s1 -- 1 --> s1
    style start fill:#add8e6,stroke:#000,stroke-width:1px
    style s0 fill:#add8e6,stroke:#000,stroke-width:1px
    style s1 fill:#add8e6,stroke:#000,stroke-width:1px
  
```

The diagram shows a Finite Automaton with two states: **start** and **s0** (the start state, indicated by a square), and **s1** (the final state, indicated by a double circle). Transitions are: start to s0 on 0, start to s1 on 1, s0 to s0 on 0, s0 to s1 on 1, s1 to s0 on 0, and s1 to s1 on 1.

Test Results:

Accept: 000001 -- Pass
Accept: 1111 -- Pass
Accept: 010101 -- Pass
Accept: 11111 -- Pass
Accept: 0000111 -- Pass
Reject: 0101010 -- Pass
Reject: 11110 -- Pass
Reject: 010101010 -- Pass
Reject: 1110 -- Pass
Reject: 10100 -- Pass

Ejercicio 3. Obtenga un Autómata Finito Determinista (AFD) dado el lenguaje definido en el alfabeto $\Sigma = \{0, 1\}$, que acepte el conjunto de palabras que contienen la subcadena "01".

$\Sigma = \{0,1\}$

$Q = \{\text{START}, S0, S1\}$

$q0 = \text{START}$

$F = \{S1\}$

$f(\text{START}, 0) = S0$

$f(S0, 0) = S0$

$f(S0, 1) = S1$

$f(\text{START}, 1) = \text{SART}$

$f(S1, 1) = S1$

$f(S1, 0) = S1$

ACCEPT:

01

00001

111101

00100

00111100

REJECT:

00

11111

110

10000

11110

Automaton Simulator

Test / Debug:



Bulk Testing

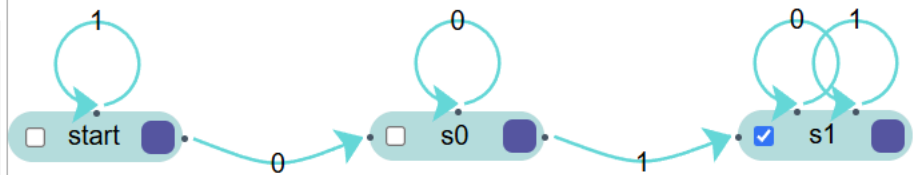


Accept (one per line):

01
00001
111101
00100
00111100

Reject (one per line):

00
11111
110
10000
11110



Test Results:

Accept: 01 -- Pass
Accept: 00001 -- Pass
Accept: 111101 -- Pass
Accept: 00100 -- Pass
Accept: 00111100 -- Pass
Reject: 00 -- Pass
Reject: 11111 -- Pass
Reject: 110 -- Pass
Reject: 10000 -- Pass
Reject: 11110 -- Pass

Ejercicio 4. Obtenga un Autómata Finito Determinista (AFD) dado el lenguaje definido en el alfabeto $\Sigma = \{0, 1\}$, que acepte el conjunto de palabras que no contienen la subcadena "01".

$\Sigma = \{0, 1\}$

$Q = \{\text{START}, S0, S1, S2\}$

$q_0 = \text{START}$

$F = \{S0, S2\}$

$f(\text{START}, 0) = S0$ $f(S2, 0) = S0$

$f(S0, 0) = S0$ $f(S2, 1) = S2$

$f(S0, 1) = S1$

$f(\text{START}, 1) = S2$

$f(S1, 1) = S1$

$f(S1, 0) = S1$

ACCEPT:

00

11111

110

10000

11110

REJECT:

01

00001

111101

00100

00111100

Automaton Simulator



Test / Debug:



Bulk Testing

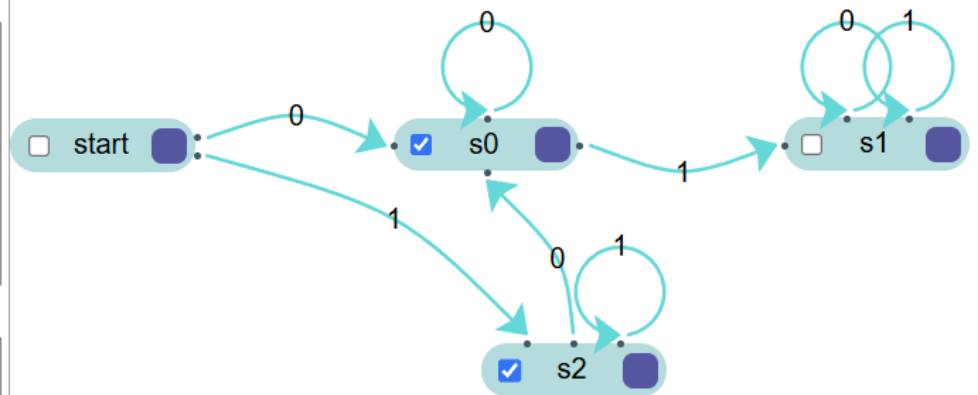


Accept (one per line):

```
00
11111
110
10000
11110
```

Reject (one per line):

```
01
00001
111101
00100
00111100
```



Test Results:

```
Accept: 00 -- Pass
Accept: 11111 -- Pass
Accept: 110 -- Pass
Accept: 10000 -- Pass
Accept: 11110 -- Pass
Reject: [Empty String] -- Pass
Reject: 01 -- Pass
Reject: 00001 -- Pass
Reject: 111101 -- Pass
Reject: 00100 -- Pass
Reject: 00111100 -- Pass
```


Ejercicio 5. Obtenga un Autómata Finito Determinista (AFD) dado el lenguaje definido en el alfabeto $\Sigma = \{a, b, c\}$, que acepte el conjunto de palabras que inician con la subcadena "ac" o terminan con la subcadena "ab".

$\Sigma = \{a, b, c\}$

$Q = \{\text{START}, S0, S1, S2, S3, S4, S5\}$

$q_0 = \text{START}$

$F = \{S1, S2\}$

$f(\text{START}, a) = S0$

$f(S0, c) = S2$

$f(S0, b) = S1$

$f(S2, a) = S2$

$f(S2, b) = S2$

$f(S2, c) = S2$

$f(S1, b) = S1$

$f(\text{START}, b) = S3$

$f(S1, a) = S5$

$f(S1, c) = S3$

$f(S1, b) = S3$

$f(S3, b) = S3$

$f(S3, a) = S5$

$f(S3, c) = S4$

$f(S4, b) = S3$

$f(S4, a) = S5$

$f(S4, c) = S4$

$f(S5, a) = S5$

$f(S5, c) = S4$

$f(S5, b) = S1$

$f(\text{START}, c) = S4$

ACCEPT:

acabbbac

ac

abab

ab

bbab

REJECT:

abc

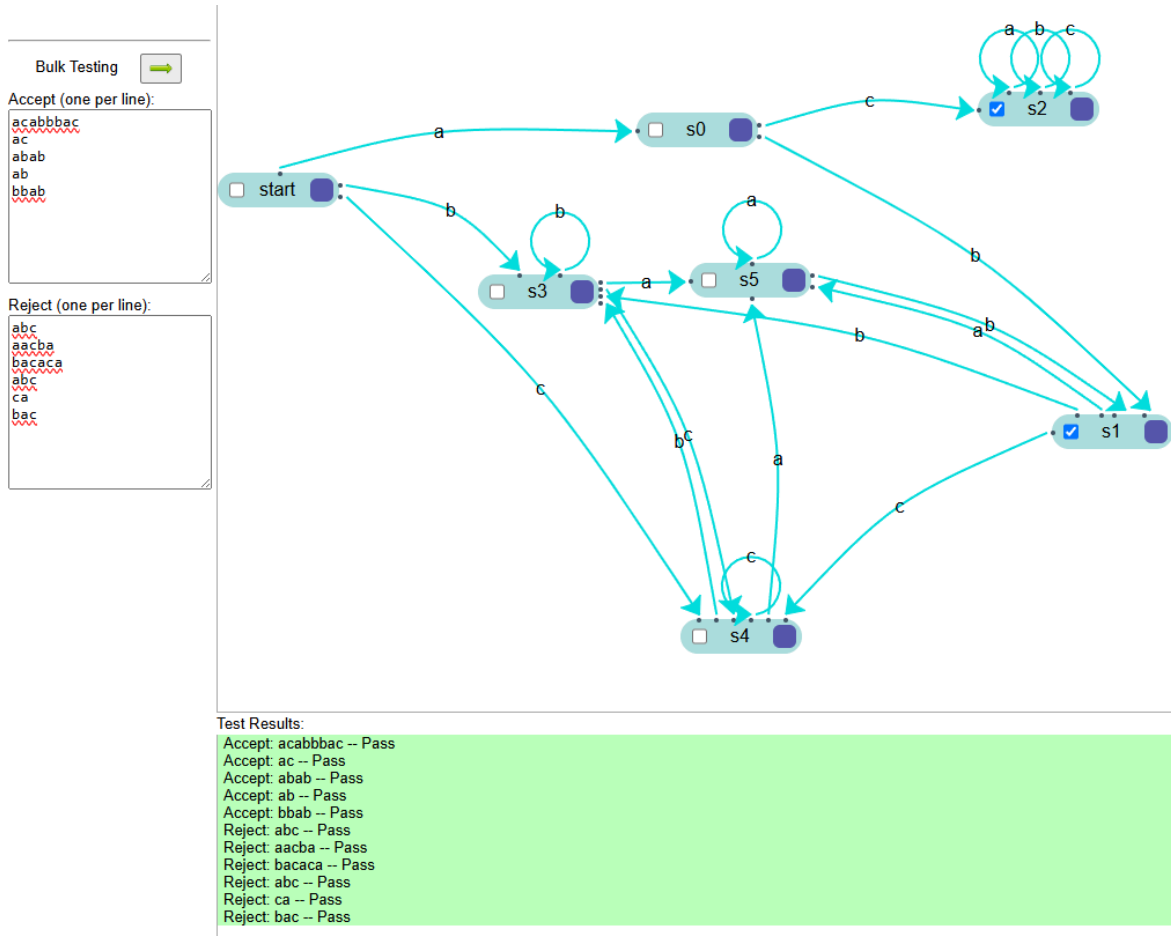
aacba

bacaca

abc

ca

bac



Ejercicio 6. Obtenga un Autómata Finito Determinista (AFD) dado el lenguaje definido en el alfabeto $\Sigma = \{a, b, c\}$, que acepte el conjunto de palabras que inician con la subcadena "ac" y no terminan con la subcadena "ab".

$\Sigma = \{a, b, c\}$

$Q = \{\text{START}, S0, S1, S2\}$

$q_0 = \text{START}$

$F = \{S3\}$

$f(\text{START}, a) = S0$

$f(\text{START}, b) = S1$

$f(S0, b) = S1$

$f(S0, c) = S3$

$f(\text{START}, C) = \text{SART}$

$f(S1, c) = S1$

$f(S3, a) = S3$

$f(S3, b) = S3$

$f(S3, c) = S3$

ACCEPT:

acabbbac

ac

acbac

acb

acba

REJECT:


ab

aacbab

bacaca

abc

ca

Bulk Testing 

Accept (one per line):

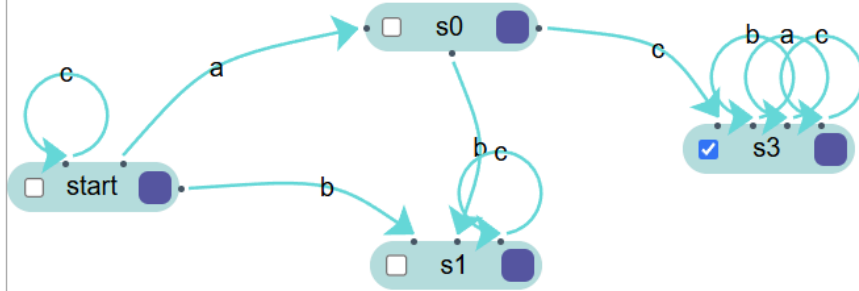
```

acabbbac
ac
acbac
acb
acba
  
```

Reject (one per line):

```

ab
aacbab
bacb
bacaca
abc
  
```



Test Results:

```

Accept: acabbbac -- Pass
Accept: ac -- Pass
Accept: acbac -- Pass
Accept: acb -- Pass
Accept: acba -- Pass
Reject: ab -- Pass
Reject: aacbab -- Pass
Reject: bacb -- Pass
Reject: bacaca -- Pass
Reject: abc -- Pass
Reject: ca -- Pass
  
```

Ejercicio 7. Obtenga un Autómata Finito Determinista (AFD) dado el lenguaje definido en el alfabeto $\Sigma = \{a, b, c\}$, que acepte el conjunto de palabras que inician con la subcadena “ac” o no terminan con la subcadena “ab”.

acabbbac

ac

abc

bacaca

abc

REJECT:

ccab

abab

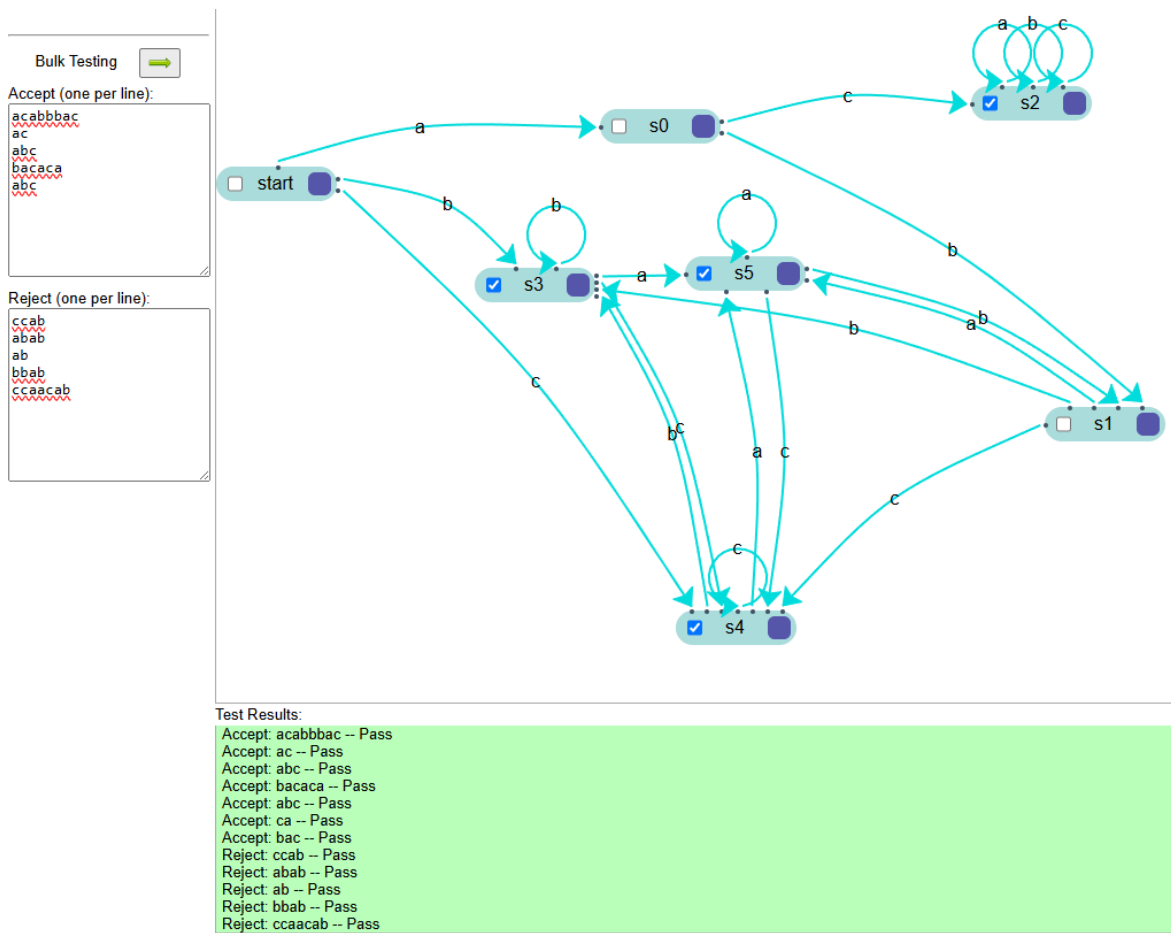
ab

bbab

ccaacab

$$f(\text{START}, b) = S3$$
$$f(S1, a) = S5$$
$$f(S1, b) = S3$$
$$f(S1, c) = S4$$
$$f(S3, b) = S3$$
$$f(S3, a) = S5$$
$$f(S3, c) = S4$$
$$f(S4, b) = S3$$
$$f(S4, a) = S5$$
$$f(S4, c) = S4$$
$$\mathbf{f}(S5, a) = S5$$
$$f(S5, c) = S4$$
$$f(S5, b) = S1$$
$$f(\text{START}, c) = S4$$

ACCEPT:



Ejercicio 8. Obtenga un Autómata Finito Determinista (AFD) dado el lenguaje definido en el alfabeto $\Sigma = \{a, b, c\}$, que acepte el conjunto de palabras que no inician con la subcadena "ac" y no terminan con la subcadena "ab".

$\Sigma = \{a, b, c\}$

$Q = \{\text{START}, S0, S1, S2, S3, S4, S5\}$

$q_0 = \text{START}$

$F = \{S3, S4, S5\}$

$f(\text{START}, a) = S0$

$f(S0, c) = S2$

$f(S0, b) = S1$

$f(S2, a) = S2$

$f(S2, b) = S2$

$f(S2, c) = S2$

$f(S1, b) = S1$

$f(\text{START}, b) = S3$

$f(S1, a) = S5$

$f(S1, b) = S3$

$f(S1, c) = S4$

$f(S3, b) = S3$

$f(S3, a) = S5$

$f(S3, c) = S4$

$f(S4, b) = S3$

$f(S4, a) = S5$

$f(S4, c) = S4$

$f(S5, a) = S5$

$f(S5, c) = S4$

$f(S5, b) = S1$

$f(\text{START}, c) = S4$

ACCEPT:

abc

bacaca

abc

abbb

ccccc

REJECT:

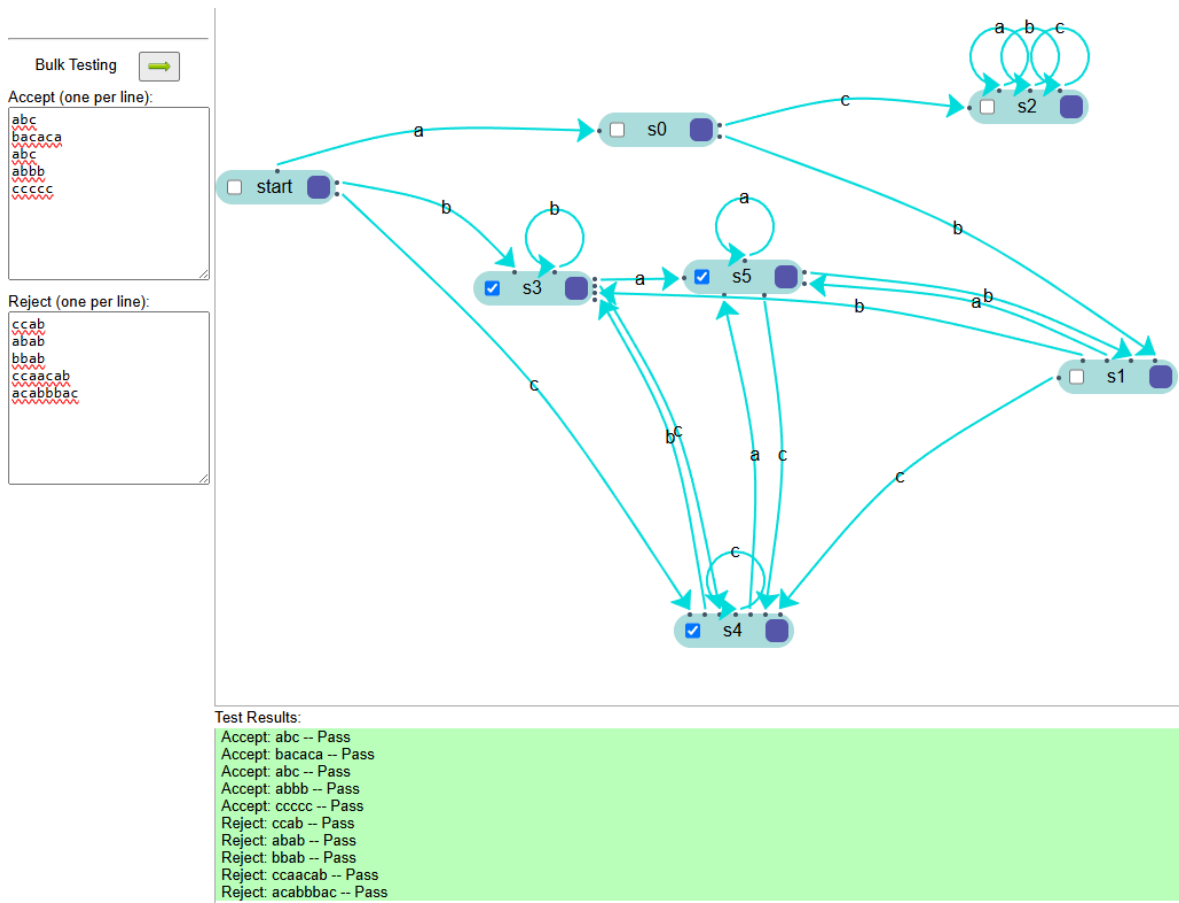
ccab

abab

bbab

ccaacab

acabbbac



Ejercicio 9. Obtenga un Autómata Finito No Determinista (AFND) dado el lenguaje definido en el alfabeto $\Sigma = \{0, 1\}$, que acepte el conjunto de palabras que no contienen la subcadena "01".

$\Sigma = \{0, 1\}$

$Q = \{\text{START}, S0, S1, S2\}$

$q_0 = \text{START}$

$F = \{S0, S2\}$

$f(\text{START}, 0) = S0$

$f(\text{START}, 1) = S2$

$f(S0, 0) = S0$

$f(S0, 1) = S1$

$f(S2, 0) = S0$

$f(S2, 1) = S2$

ACCEPT:

11111

10000

11110

111000

11

REJECT:

01

111101

10101

00001

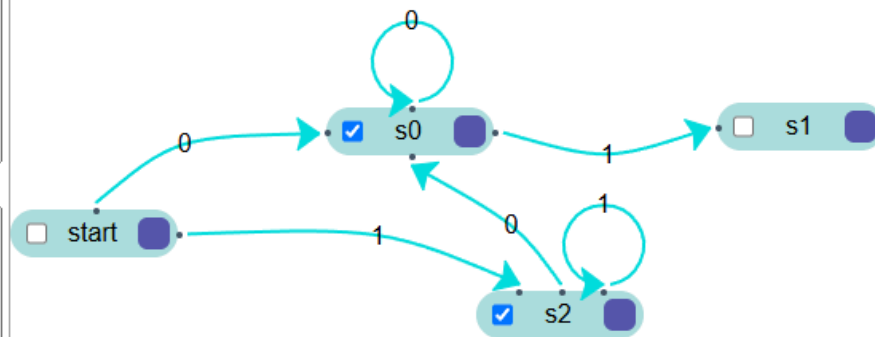
00001

Accept (one per line):

11111
10000
11110
111000
11

Reject (one per line):

01
111101
10101
00001
00001



Test Results:

Accept: 11111 -- Pass
Accept: 10000 -- Pass
Accept: 11110 -- Pass
Accept: 111000 -- Pass
Accept: 11 -- Pass
Reject: 01 -- Pass
Reject: 111101 -- Pass
Reject: 10101 -- Pass
Reject: 00001 -- Pass
Reject: 00001 -- Pass

Ejercicio 10. Obtenga un Autómata Finito No Determinista (AFND) dado el lenguaje definido en el alfabeto $\Sigma = \{a, b, c\}$, que acepte el conjunto de palabras que inician en la subcadena "ac" y terminan en la subcadena "ab".

$\Sigma = \{a, b, c\}$

$Q = \{\text{START}, S0, S1, S2, S3, S4, S5, S6, S7, S8\}$

$q_0 = \text{START}$

$F = \{S3\}$

$f(\text{START}, a) = S0$

$f(\text{START}, b) = S6$

$f(\text{START}, c) = S7$

$f(S0, c) = S1$

$f(S0, a) = S8$

$f(S0, b) = S6$

$f(S1, b) = S4$

$f(S1, a) = S2$

$f(S1, c) = S5$

$f(S2, a) = S2$

$f(S2, b) = S3$

$f(S2, c) = S5$

$f(S4, a) = S2$

$f(S4, b) = S4$

$f(S4, c) = S5$

$f(S5, a) = S2$

$f(S5, b) = S4$

$f(S5, c) = S5$

$f(S6, a) = S8$

$f(S6, b) = S6$

$f(S6, c) = S7$

$f(S7, a) = S8$

$f(S7, b) = S6$

$f(S7, c) = S7$

$f(S8, a) = S8$

$f(S8, b) = S6$

$f(S8, c) = S7$

ACCEPT:

acab

acbbbbcab

accab

acbbbab

acaaab

REJECT:

bab

cabcba

acbabc

abcba

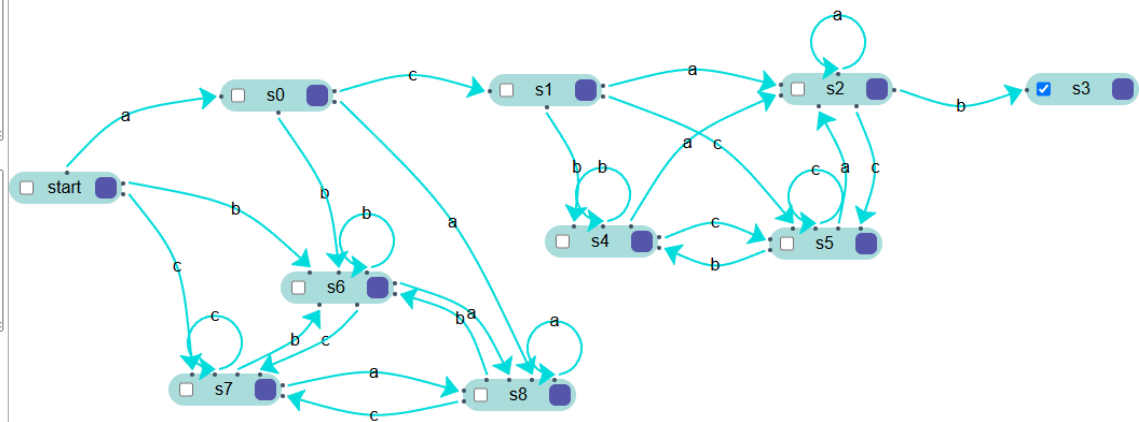
ababb

Accept (one per line):

acab
acbbbbcab
accab
acbbbab
acaaab

Reject (one per line):

bab
cabcba
acbabc
abcba
ababb



Test Results:

Accept: acab -- Pass
Accept: acbbbbcab -- Pass
Accept: accab -- Pass
Accept: acbbbab -- Pass
Accept: acaaab -- Pass
Reject: bab -- Pass
Reject: cabcba -- Pass
Reject: acbabc -- Pass
Reject: abcba -- Pass
Reject: ababb -- Pass