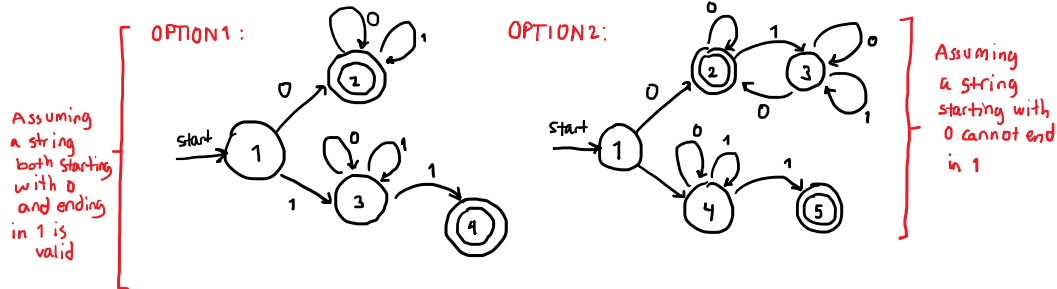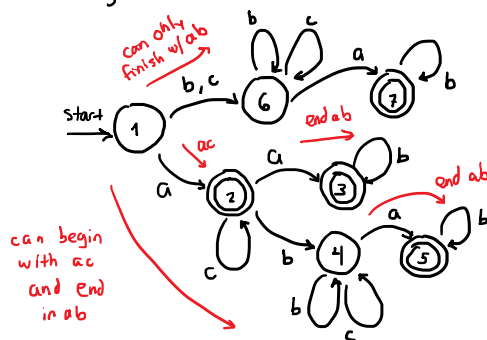# NDFA

MARIANA ÁVALOS ARCE

Tuesday, March 1, 2022   7:11 PM
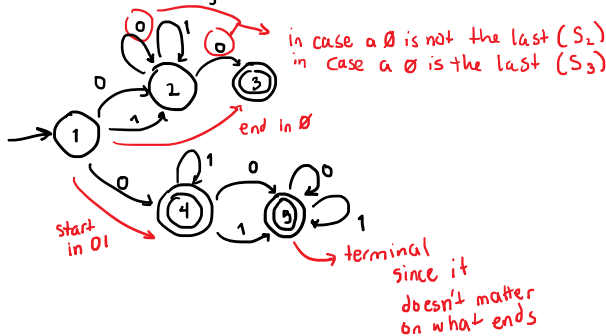
1. Construct a Non Deterministic Finite Automaton for the language in $\Sigma = \{0,1\}$ whose strings begin with "0" or end with "1".

OPTION 1:

Assuming a string both starting with 0 and ending in 1 is valid

OPTION 2:

Assuming a string starting with 0 cannot end in 1

2. Build an NDFA given the next language defined in the alphabet $\Sigma = \{a,b,c\}$. The set of strings that start in the substring "ac" or finish in the substring "ab"

can only finish w/ ab

end ab

can begin with ac and end in ab

end ab

3. Obtain an NDFA given the following language defined in the alphabet $\Sigma = \{0,1\}$. The set of strings that start in "01" or finish in "0"

in case a Ø is not the last (S_2)
in case a Ø is the last (S_3)

end in Ø

start in 01

terminal since it doesn't matter on what ends

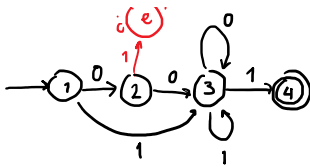4. Obtain an AFND given the next language defined in the alphabet $\Sigma = \{0,1\}$. The set of strings that do not start in "0" or not end in "1"
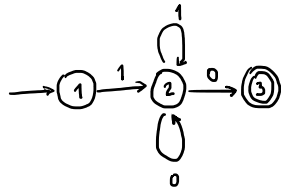
OR

010   a
100   a,b
101   b

011   none: no a no b
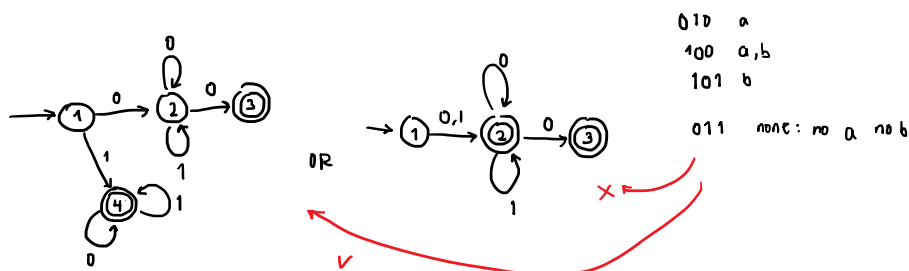
5. Obtain an AFND given the following language defined in the alphabet $\Sigma = \{0,1\}$. The set of strings that do not start in "01" and do not end "0".
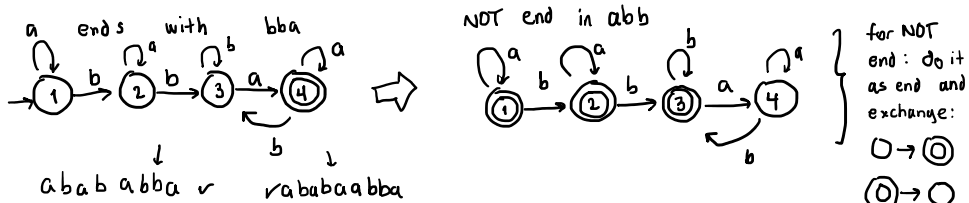
111   yes

(top automaton with states 1,2,3,4 and transitions 0,1)

6. Obtain an AFND given the next language defined in the alphabet $\Sigma = \{0,1\}$. The set of strings that do not start in "0" AND not end in "1"
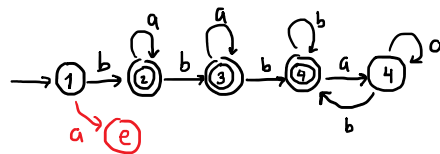

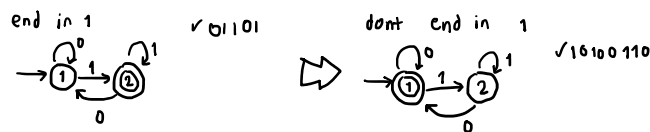all strings that don't start in $\emptyset$
and don't end in 1

7. Obtain an AFND given the language defined in the alphabet $\Sigma = \{a, b\}$. The set of strings that start in "b" and don't end in "bba"
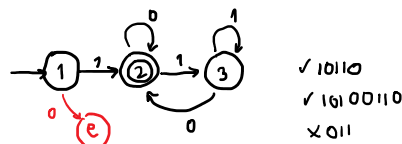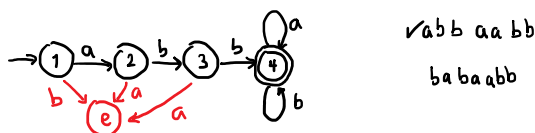

ends with bba   NOT end in abb

for NOT end: do it as end and exchange:

$\bigcirc \rightarrow \circledcirc$

$\circledcirc \rightarrow \bigcirc$

abab abba ✓   ✓ababaabba

Thus   start in b and not end in bba

a ↘ (e)

6. All strings that don't start in 0 or don't end in 1

end in 1   ✓ 01101   don't end in 1   ✓16100 110

Thus, don't start in 0 or don't end in 1

✓ 10110
✓ 10100110
✗ 011

7. Strings that start with abb

✓ abb aa bb
   baba abb

hdian guy : ends with ab
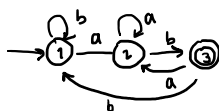
String derivation exercises
1. Build the syntax tree that recognizes the string
     abeaebe

choose the rule that has on the right the terminal you see.
     abeaebe

from the grammar:
  S → aSbS

a beae be

choose the rule that has on the right the terminal you see.

from the grammar:
S → aSbS
S → bSaS
S → e

a̶ ̶beae̶be

2. Given the grammar: give derivation for baabaab

S → AB
A → Aa
A → bB
B → a
B → Sb

bBADb
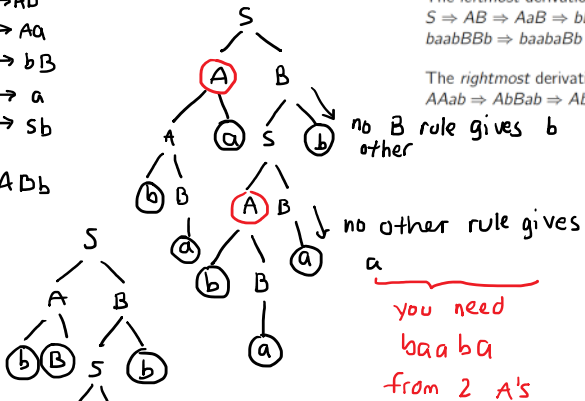
The *leftmost* derivation of baabaab is:
S ⇒ AB ⇒ AaB ⇒ bBaB ⇒ baaB ⇒ baaSb ⇒ baaABb ⇒ baabBBb ⇒ baabaBb ⇒ baabaab

The *rightmost* derivation is: S ⇒ AB ⇒ ASb ⇒ AABb ⇒ AAab ⇒ AbBab ⇒ Abaab ⇒ Aabaab ⇒ bBabaab ⇒ baabaab

no B rule gives b other

no other rule gives a

b̶a̶a̶b̶a̶a̶b̶

you need
baaba
from 2 A's

3. the grammar

S → abSc
S → A
A → cAd
A → cd

String: ababccddcc

no other s has c
no other s has c

we need ccdd from an S/A

only one w/d
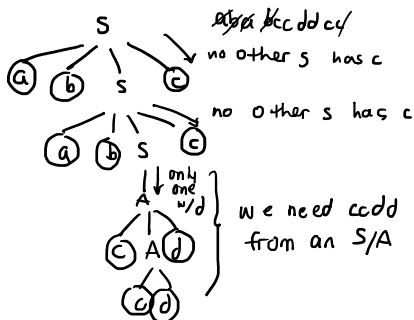
The grammar: the string: id id + id * id^
E → ET+
E → T
T → TF*
T → F
F → FP^
F → P
P → E
P → id

we need
id id + id *
from F

id id + id * id^