CSEN 1002

Task 1: Regular Expression to Non Deterministic Finite Automata using Thompson's Construction

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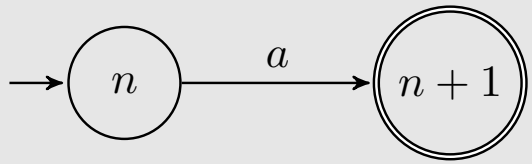
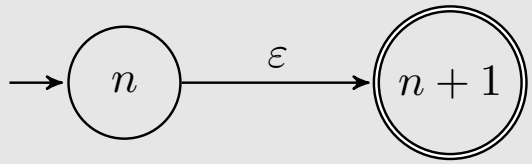
Symbol Expression

$a \in \Sigma$

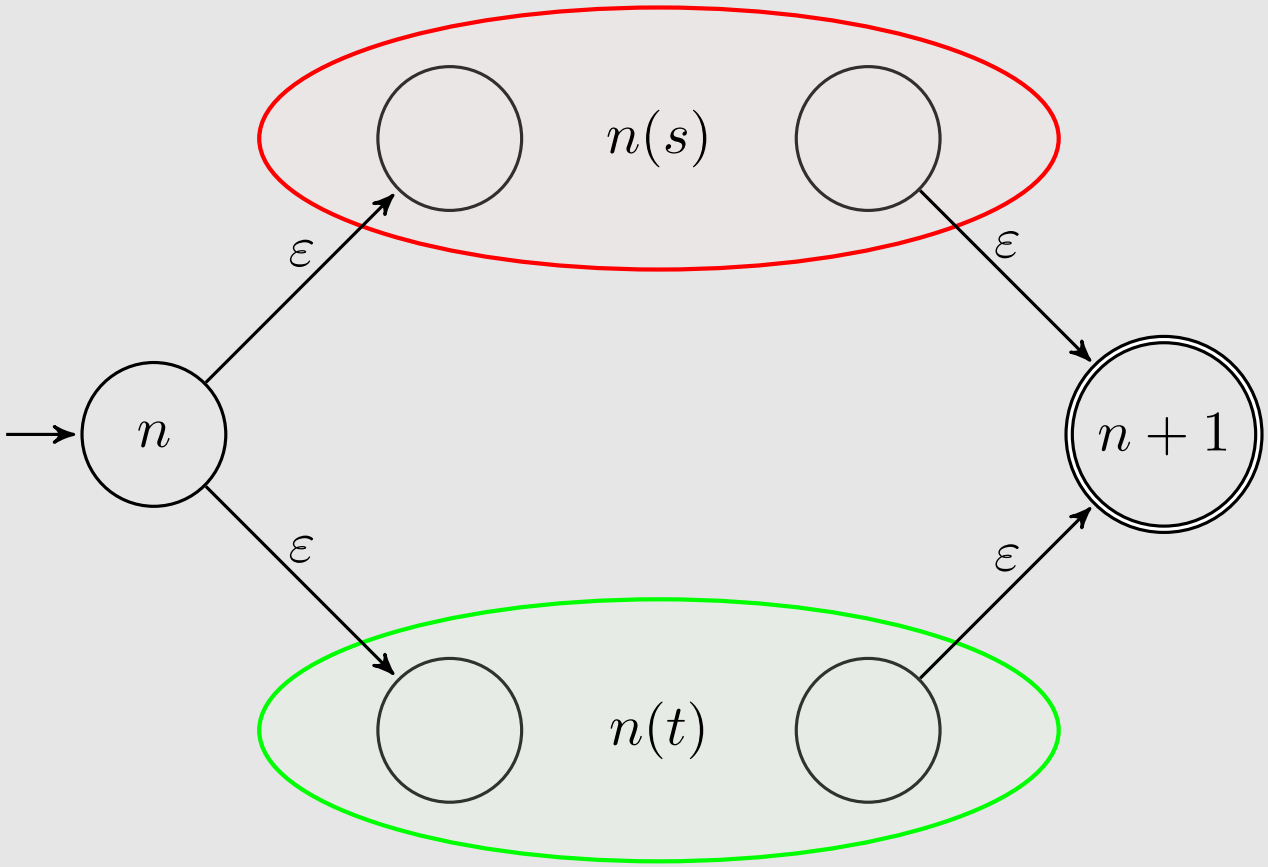


ε



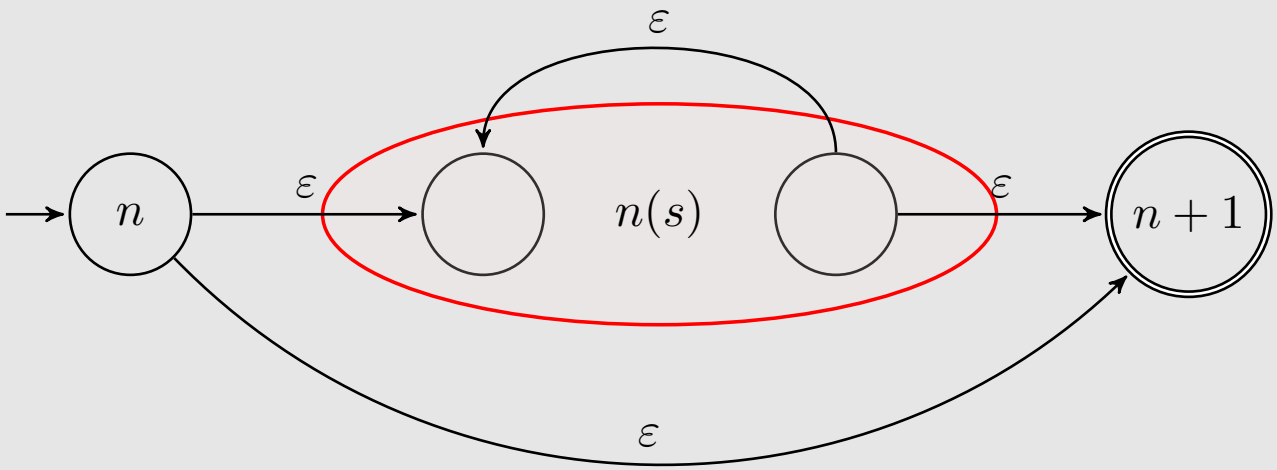
Union Expression

$n(s) \cup n(t)$



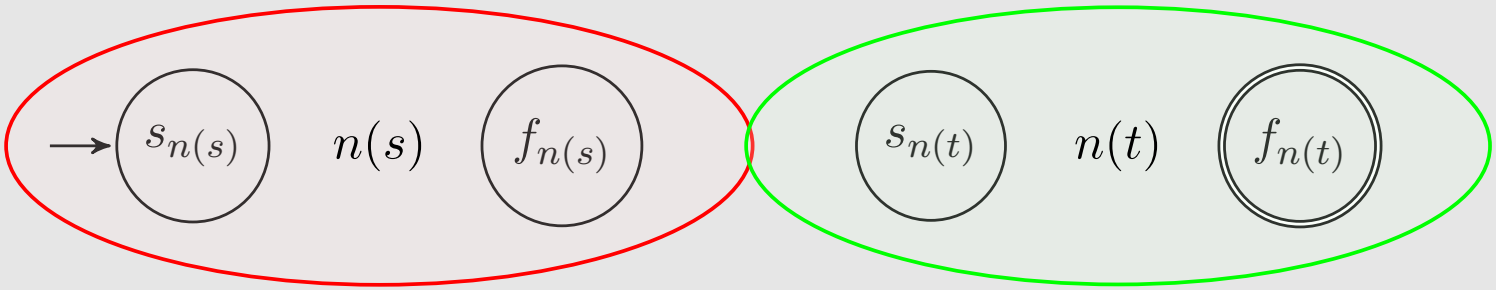
Kleene Star Expression

$n(s)*$

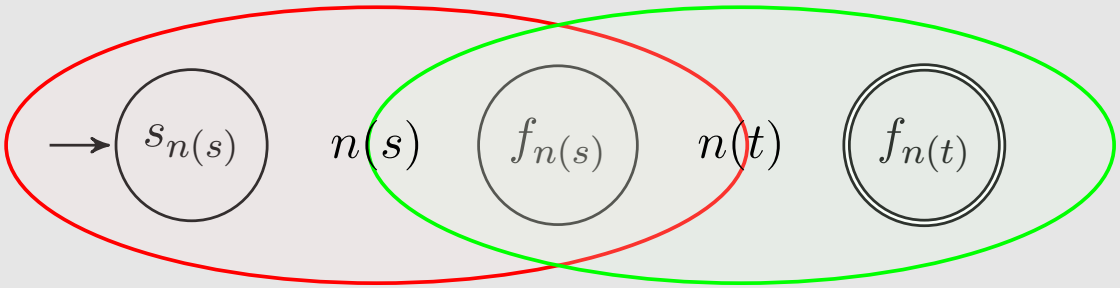


Concatenation Expression

$n(s) \circ n(t)$



$n(s) \circ n(t)$



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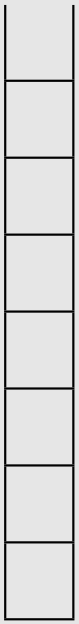
Postfix Notation

$(((2+3)-1)*7)$

$$\begin{array}{cccccccc} & \downarrow & & & & & & \\ 2 & 3 & + & 1 & - & 7 & * \end{array}$$

Stack



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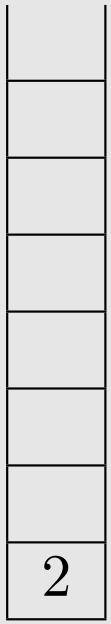

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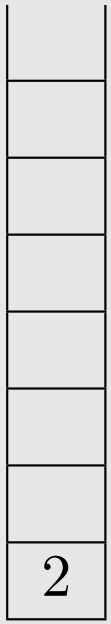

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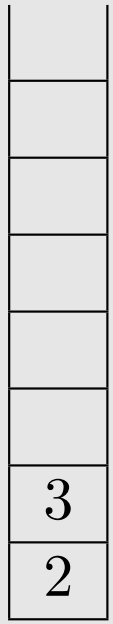

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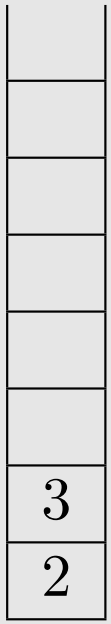

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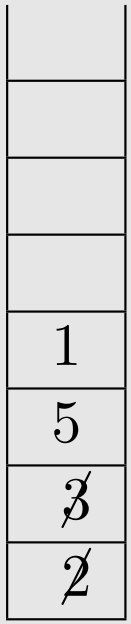

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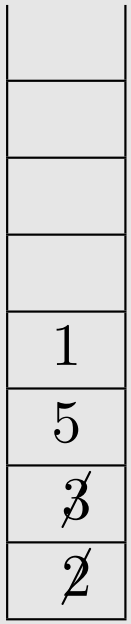

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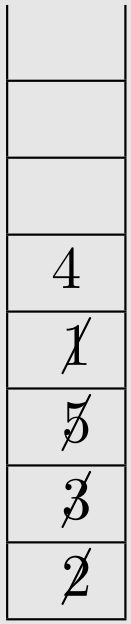

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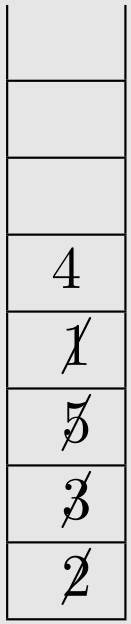

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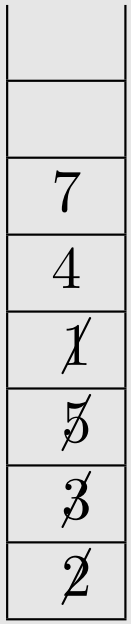

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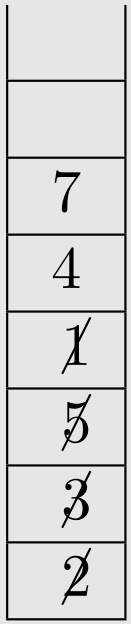

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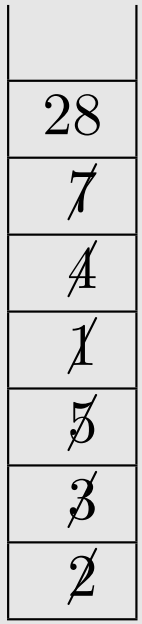

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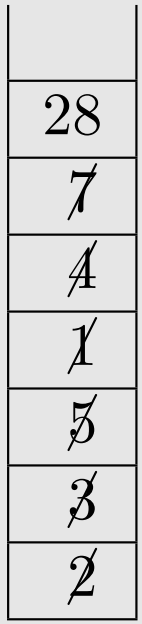

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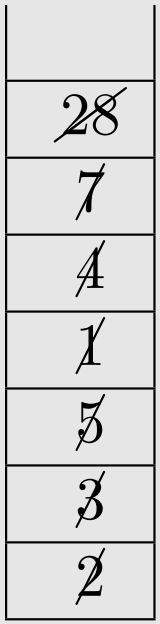

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Example

`eab*|.a.*` $= ((\varepsilon \circ (a \cup (b*))) \circ a)*$

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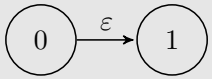

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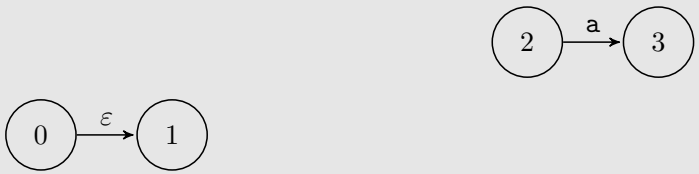

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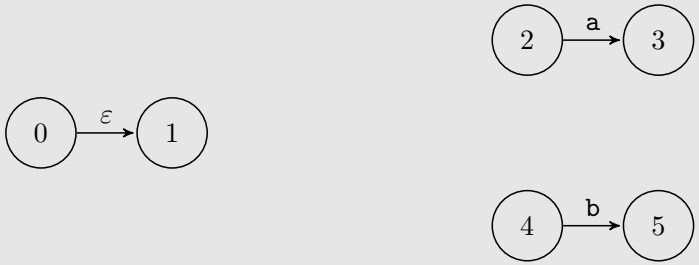

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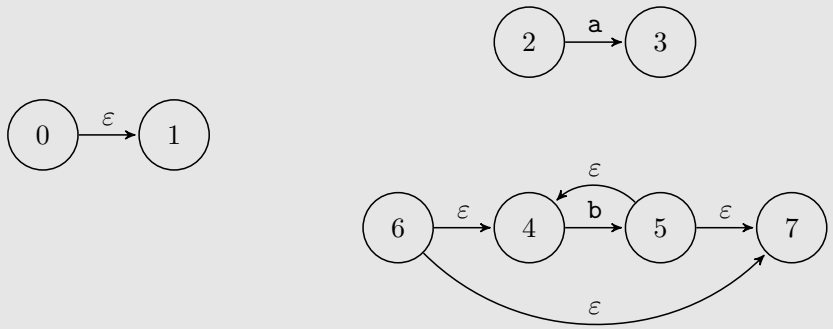
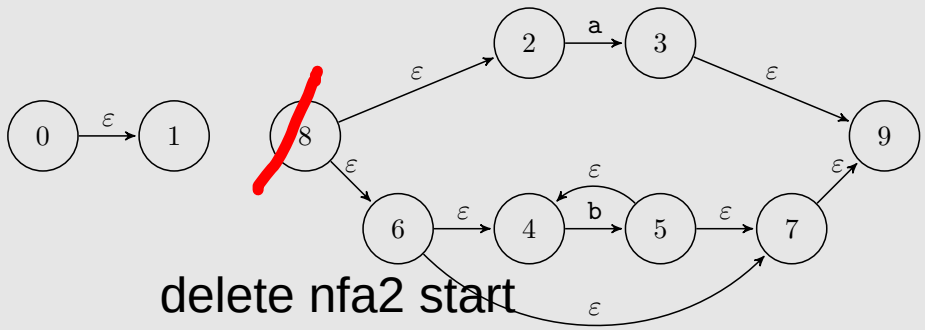


Example

eab*|.a.* = $((\varepsilon \circ (a \cup (b*))) \circ a)*$

start : nfa1

end: nfa2

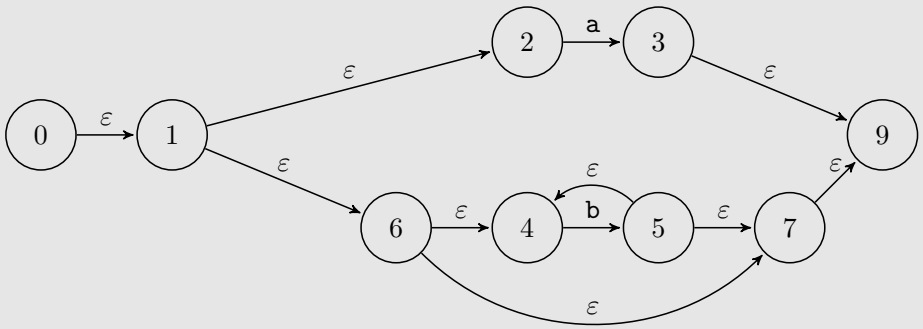


delete nfa2 start

convert its transitions to nfa1 end

Example

eab*|.a.* $= ((\varepsilon \circ (a \cup (b*))) \circ a)*$



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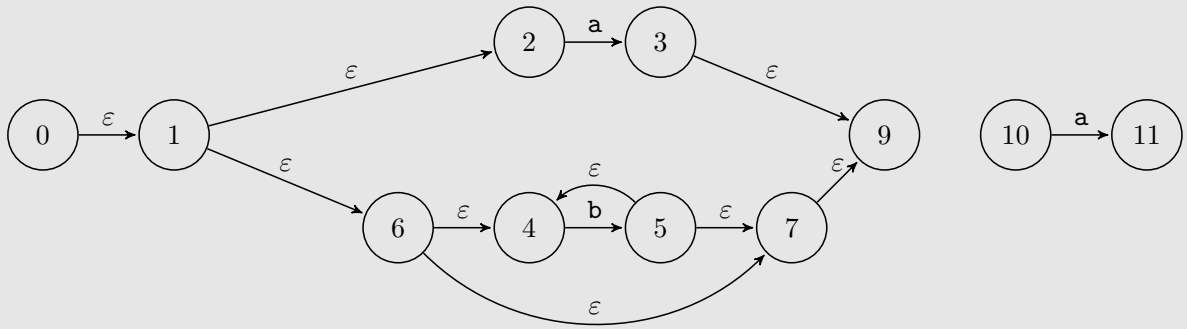

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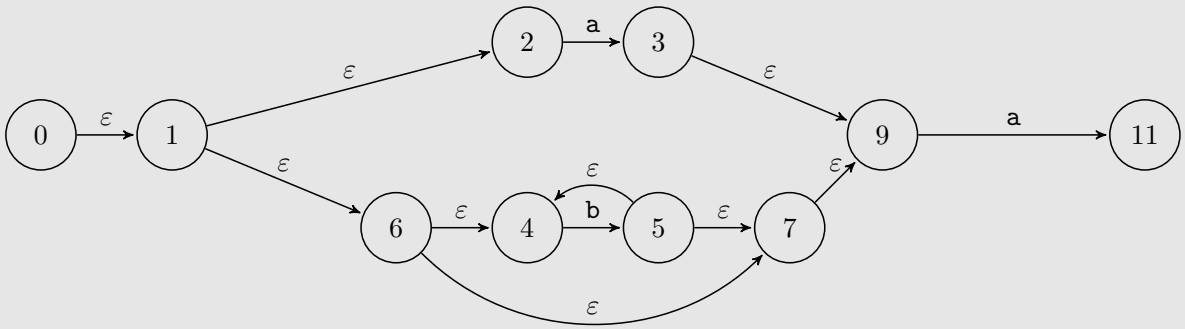

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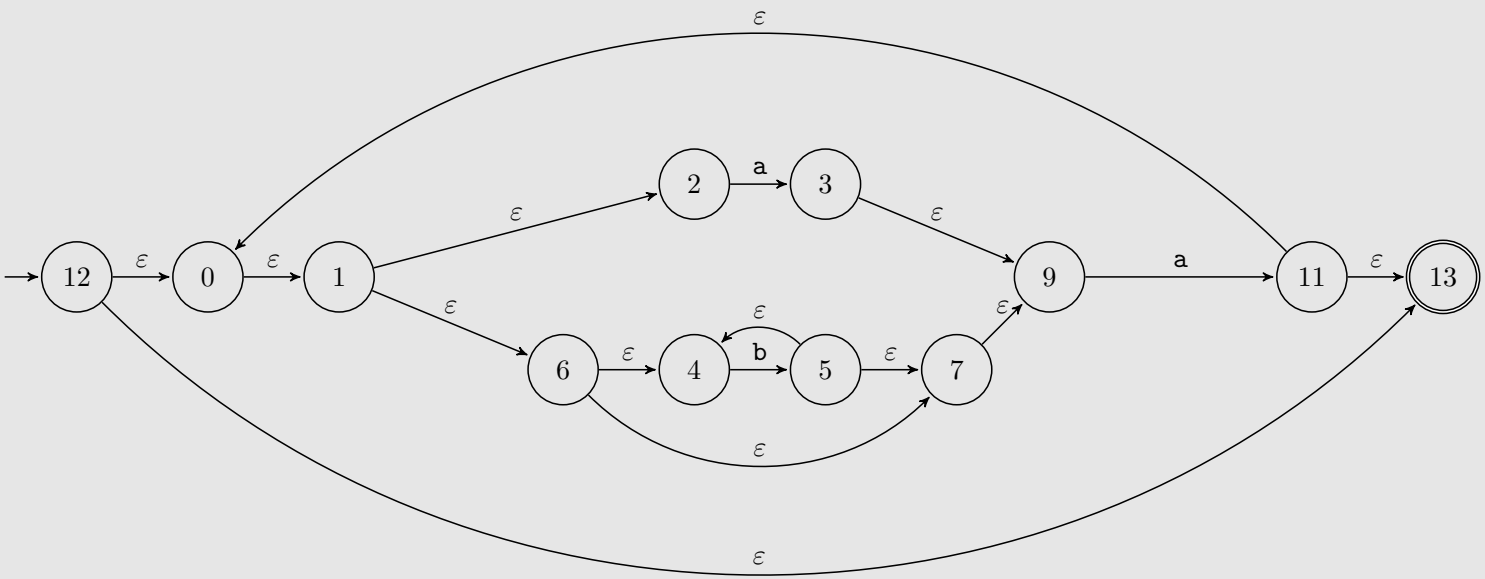

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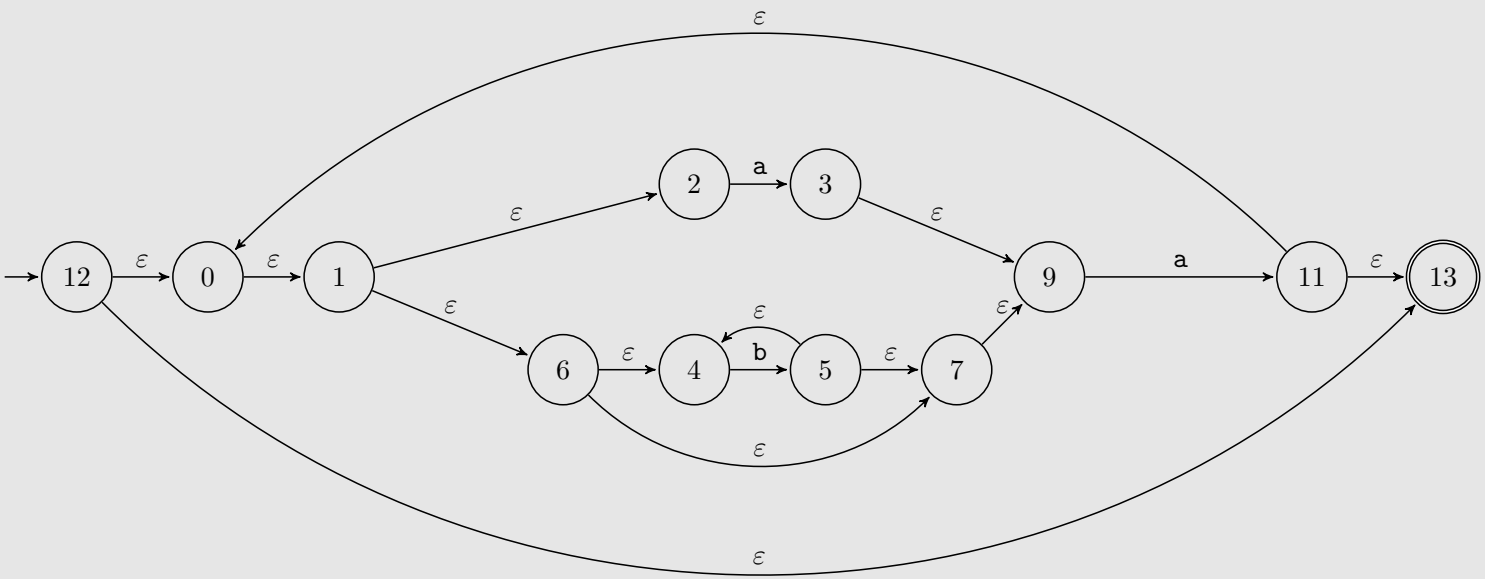

String Representation

```
0;1;2;3;4;5;6;7;9;11;12;13#a;b#0,e,1;1,e,2;1,e,6;2,a,3;
3,e,9;4,b,5;5,e,4;5,e,7;6,e,4;6,e,7;7,e,9;9,a,11;11,e,0;
11,e,13;12,e,0;12,e,13#12#13
```