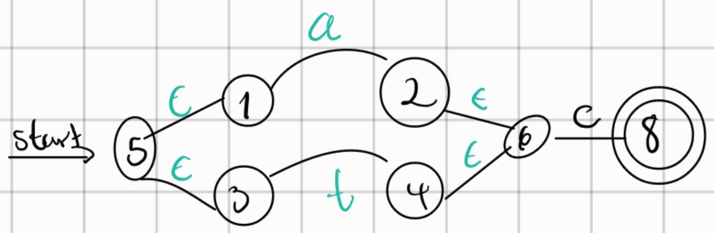
Ejercicio No. 1 (25%) – Convierta las siguientes expresiones regulares en autómatas finitos deterministas (para ello deberá primero convertir las expresiones regulares a AFN y luego convertir a AFD). Muestre todo su procedimiento, i.e., AFN construido con Thompson, tabla de transición, conversión a AFD. Para el inciso g, interprete \ como un escape de carácter, i.e., \(significa que su regex reconoce el caracter (.

a) $(a|t)c$



$S_0 = \{5, 1, 3\}$

$S_1 = \epsilon\text{-closure}(\text{mueve}(S_0, a)) = \{2\} = \{2, 6\}$

$S_2 = \epsilon\text{-closure}(\text{mueve}(S_0, t)) = \{4\} = \{4, 6\}$

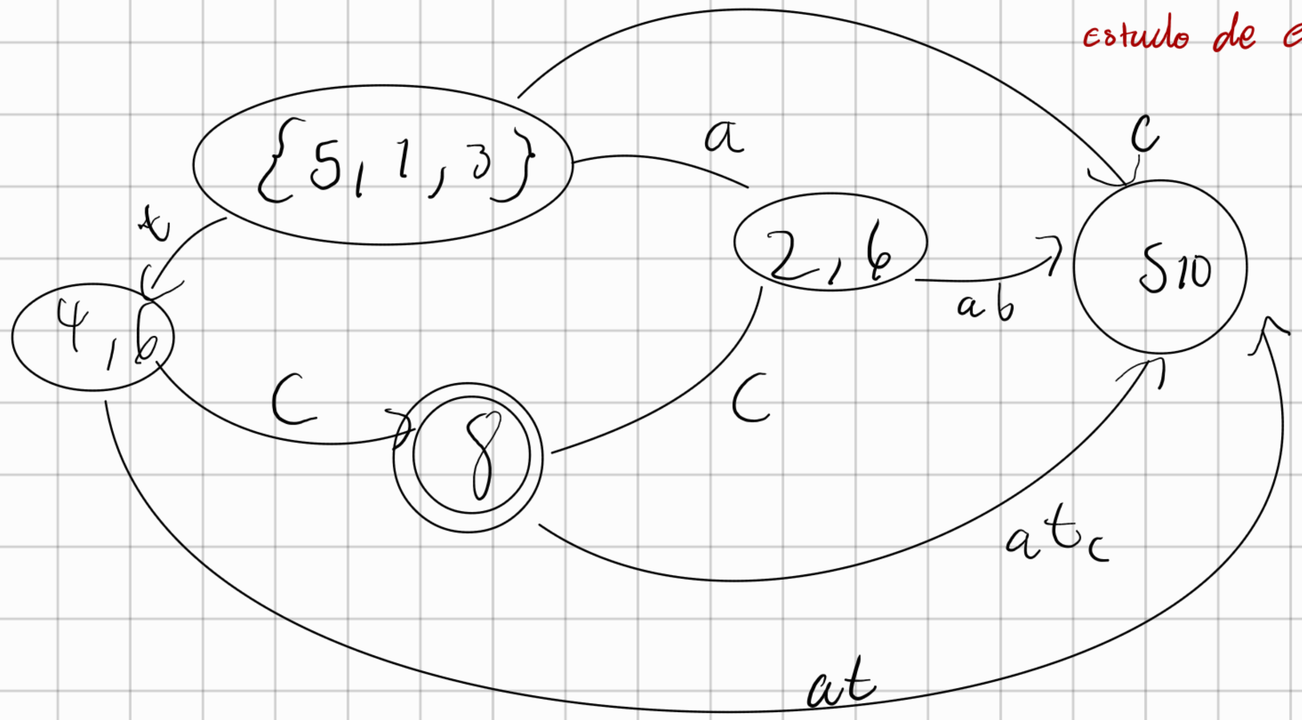
$S_3 = \epsilon\text{-closure}(\text{mueve}(S_0, c)) = \{\} = \{\}$

$S_4 = \epsilon\text{-closure}(\text{mueve}(S_1, a)) = \{\} = \{\}$

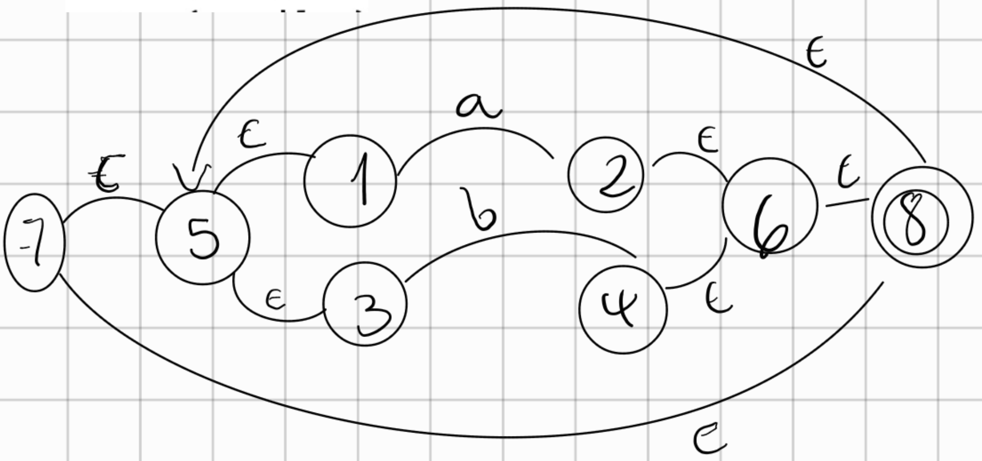
$S_5 = \epsilon\text{-closure}(\text{mueve}(S_1, b)) = \{\} = \{\}$

$S_6 = \epsilon\text{-closure}(\text{mueve}(S_1, c)) = \{8\} = \{8\}$

estado de escape



b) $(a|b)*$



$S_0 = \{5, 1, 3, 7, 8\}$

$S_1 = \epsilon\text{-closure}(\text{mueve}(S_0, a)) = \{2\} = \{6, 8, 5, 1, 3, 2\}$

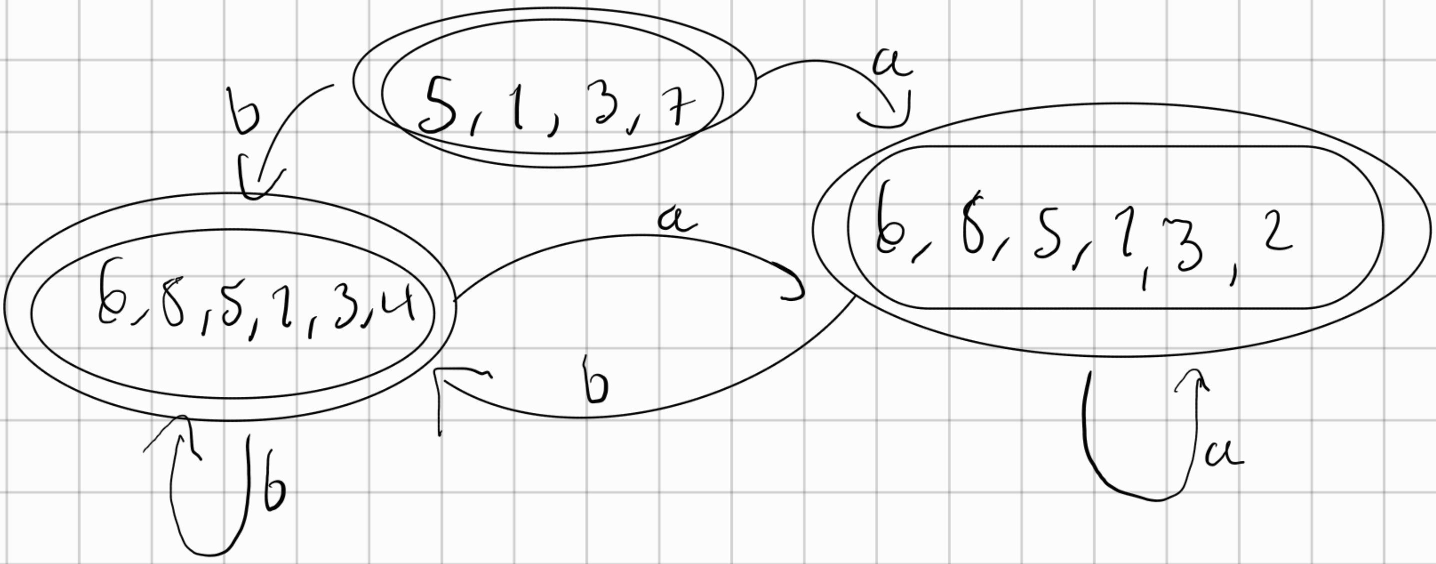
$S_2 = \epsilon\text{-closure}(\text{mueve}(S_0, b)) = \{4\} = \{6, 8, 5, 1, 3, 4\}$

$S_3 = \epsilon\text{-closure}(\text{mueve}(S_1, a)) = \{2\} = S_1$

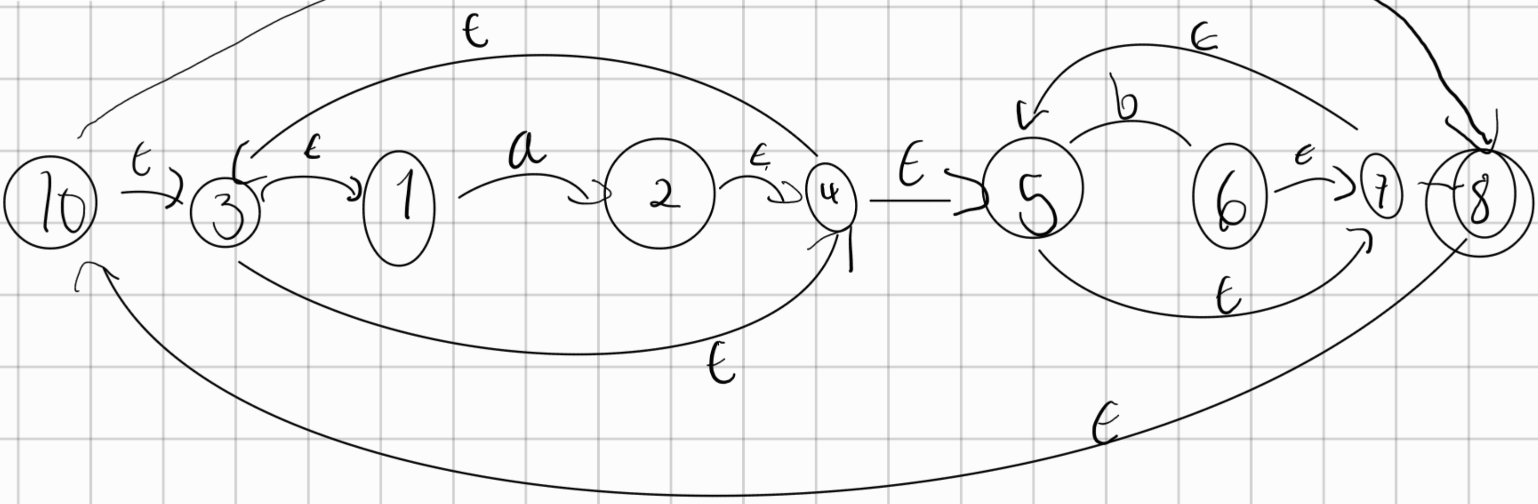
$S_4 = \epsilon\text{-closure}(\text{mueve}(S_1, b)) = \{4\} = S_2$

$S_5 = \epsilon\text{-closure}(\text{mueve}(S_2, a)) = \{2\} = S_1$

$S_6 = \epsilon\text{-closure}(\text{mueve}(S_2, b)) = \{4\} = S_2$



c) $(a*|b*)*$



$S_0 = \{10, 8, 3, 4, 5, 7\}$

$S_1 = \epsilon\text{-closures}\{S_0, a\} = \{2\} = \{4, 5, 3, 7, 8, 10, 1\}$

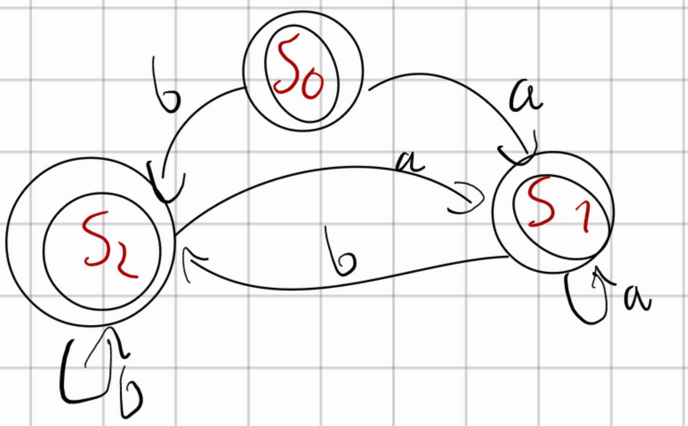
$S_2 = \epsilon\text{-closure}\{S_0, b\} = \{6\} = \{7, 5, 8, 10, 3, 4, 1\}$

$S_3 = \epsilon\text{-closure}\{S_1, a\} = \{2\} = \{S_1\}$

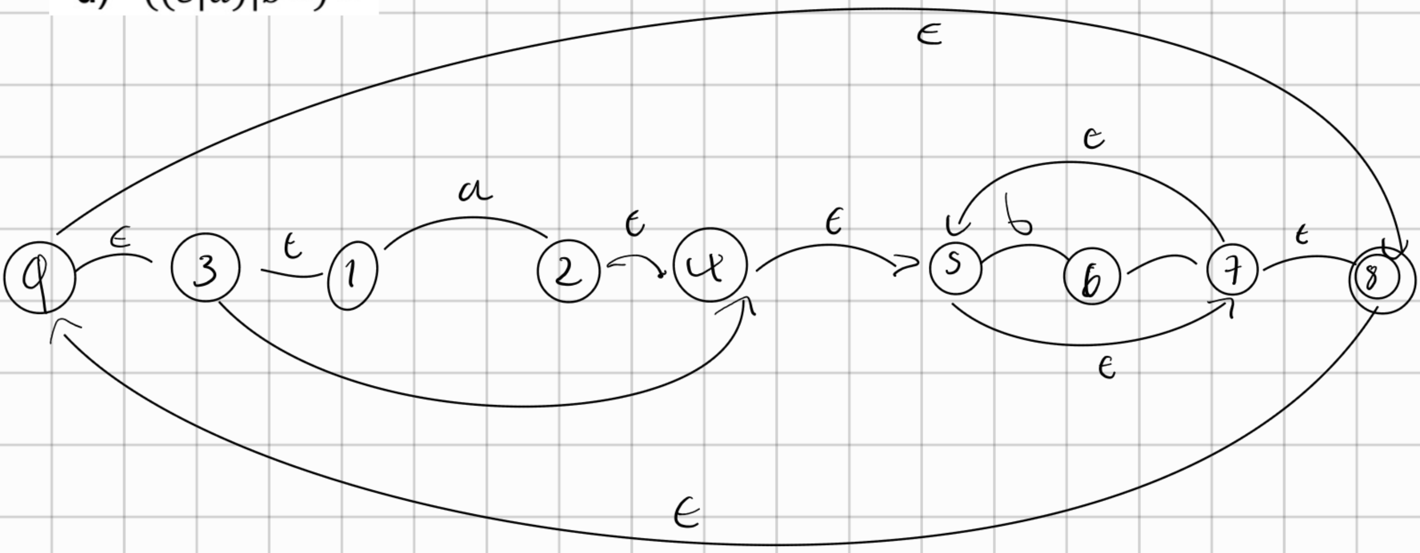
$S_4 = \epsilon\text{-closure}\{S_1, b\} = \{6\} = \{S_2\}$

$S_5 = \epsilon\text{-closure}\{S_2, a\} = \{2\} = \{S_1\}$

$S_6 = \epsilon\text{-closures}\{S_2, b\} = \{6\} = \{S_2\}$



d) $((\varepsilon|a)|b*)*$



$S_0 = \{9, 6, 3, 1, 4, 5, 7\}$

$S_1 = \varepsilon closure\{S_0, a\} = \{2\} = \{1, 2, 3, 4, 5, 7, 8, 9\}$

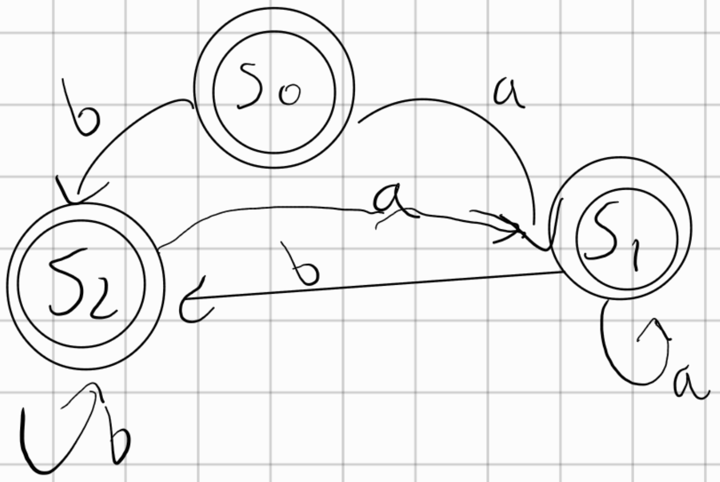
$S_2 = \varepsilon\text{-closure}\{S_0, b\} = \{6\} = \{1, 3, 4, 5, 6, 7, 8, 9\}$

$S_3 = \varepsilon\text{-closure}\{S_1, a\} = \{2\} = \{S_1\}$

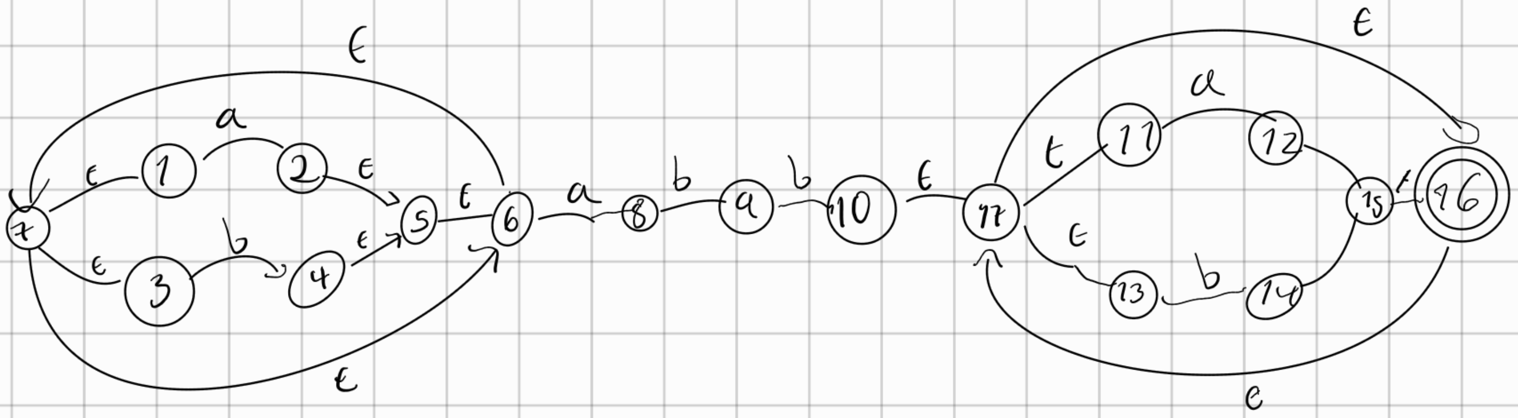
$S_4 = \varepsilon\text{-closure}\{S_1, b\} = \{6\} = \{S_2\}$

$S_5 = \varepsilon\text{-closure}\{S_2, a\} = \{2\} = \{S_1\}$

$S_6 = \varepsilon\text{-closure}\{S_2, b\} = \{6\} = \{S_2\}$



e) $(a|b) * abb(a|b) *$



$S_0 = \{7, 6, 1, 3, 5\}$

$S_1 = \varepsilon\text{-closure}(S_0, a\} = \{2, 8\} = \{1, 2, 3, 5, 6, 7, 8\}$

$S_2 = \varepsilon\text{-closure}(S_0, b\} = \{4\} = \{1, 3, 5, 6, 7, 4\}$

$S_3 = \varepsilon\text{-closure}(S_1, a) = \{2, 8\} = S_1$

$S_4 = \varepsilon\text{-closure}(S_1, b\} = \{4, 9\} = \{1, 3, 4, 5, 6, 7, 9\}$

$S_5 = \varepsilon\text{-closure}(S_2, a\} = \{2, 8\} = \{S_1\}$

$S_6 = \varepsilon\text{-closure}(S_4, a\} = \{2, 8\} = \{S_1\}$

$S_7 = \varepsilon\text{-closure}(S_4, b\} = \{4, 10\} = \{1, 3, 4, 5, 6, 7, 10, 11, 13, 16, 17\}$

$S_8 = \varepsilon\text{-closure}(S_7, a\} = \{2, 8, 12\} = \{1, 2, 3, 5, 6, 7, 8, 15, 16, 17, 11, 13\}$

$S_9 = \varepsilon\text{-closure}(S_7, b\} = \{4, 14\} = \{1, 3, 4, 5, 6, 7, 15, 16, 17, 11, 13\}$

$S_{10} = \varepsilon\text{-closure}(S_8, a\} = \{2, 8, 12\} = \{S_8\}$

$S_{11} = \varepsilon\text{-closure}(S_8, b\} = \{4, 9, 14\} = \{1, 3, 4, 5, 6, 7, 9, 15, 16, 10, 11, 13, 17\}$

$S_{12} = \varepsilon\text{-closure}\{S_9, a\} = \{2, 8, 12\} = S_8$

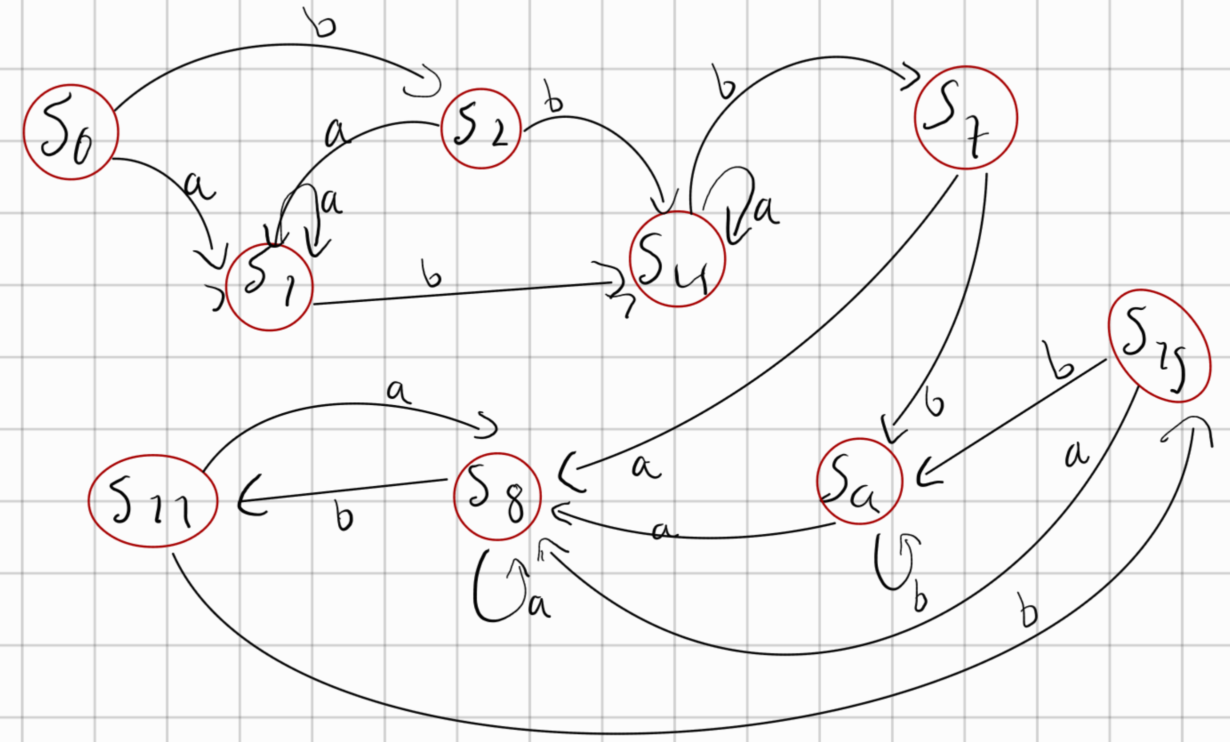
$S_{13} = \varepsilon\text{-closure}\{S_9, b\} = \{4, 14\} = S_9$

$S_{14} = \varepsilon\text{-closure}\{S_{11}, a\} = \{2, 8, 12\} = S_8$

$S_{15} = \varepsilon\text{-closure}\{S_{11}, b\} = \{4, 10, 14\} = \{1, 3, 4, 5, 6, 7, 10, 11, 13, 14, 16, 17\}$

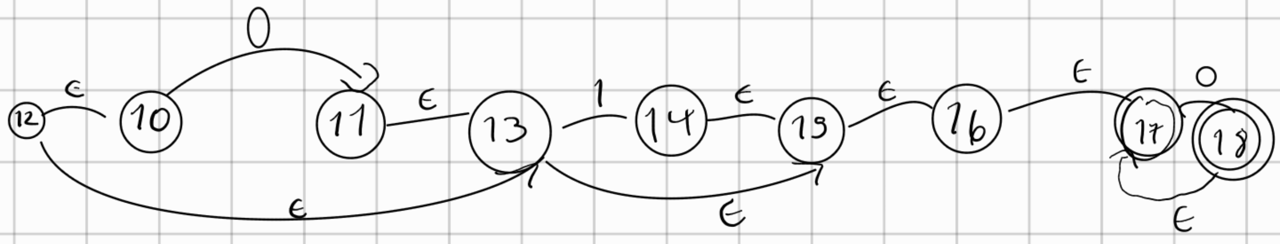
$S_{16} = \varepsilon\text{-closure}\{S_{15}, a\} = \{2, 8, 12\} = S_8$

$S_{17} = \varepsilon\text{-closure}\{S_{15}, b\} = \{4, 14\} = S_9$



f) 0?(1?)?0*

$(0|\epsilon)(1|\epsilon)\epsilon\ 0*$



$S_0 = \{12, 10, 13, 15, 16, 17\}$

$S_1 = \epsilon\text{-closure}\{S_0, 0\} = \{11, 18\} = \{13, 15, 16, 17, 11, 18\}$

$S_2 = \epsilon\text{-closure}\{S_0, 1\} = \{14\} = \{15, 16, 17, 14\}$

$S_3 = \epsilon\text{-closure}\{S_1, 0\} = \{18\} = \{17, 18\}$

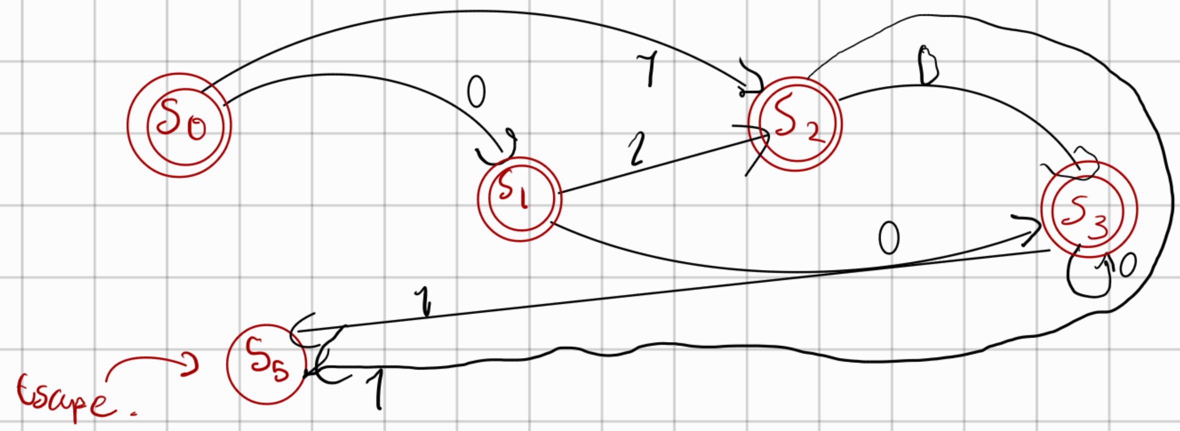
$S_4 = \epsilon\text{-closure}\{S_1, 1\} = \{14\} = \{S_2\}$

$S_5 = \epsilon\text{-closure}\{S_2, 0\} = \{18\} = S_3$

$S_6 = \epsilon\text{-closure}\{S_2, 1\} = \{\} = \{\}$

$S_7 = \epsilon\text{-closure}\{S_3, 0\} = \{18\} = \{S_3\}$

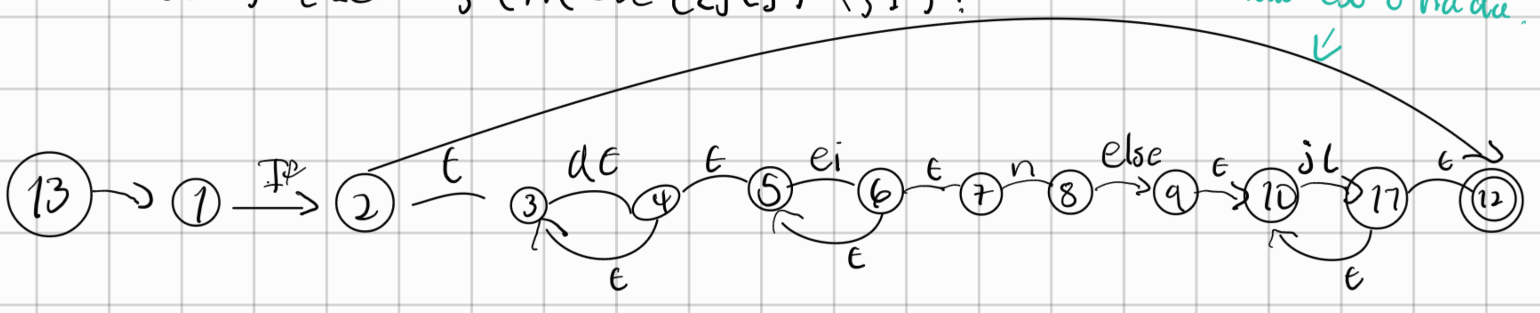
$S_8 = \epsilon\text{-closure}\{S_3, 1\} = \{\} = \{\}$



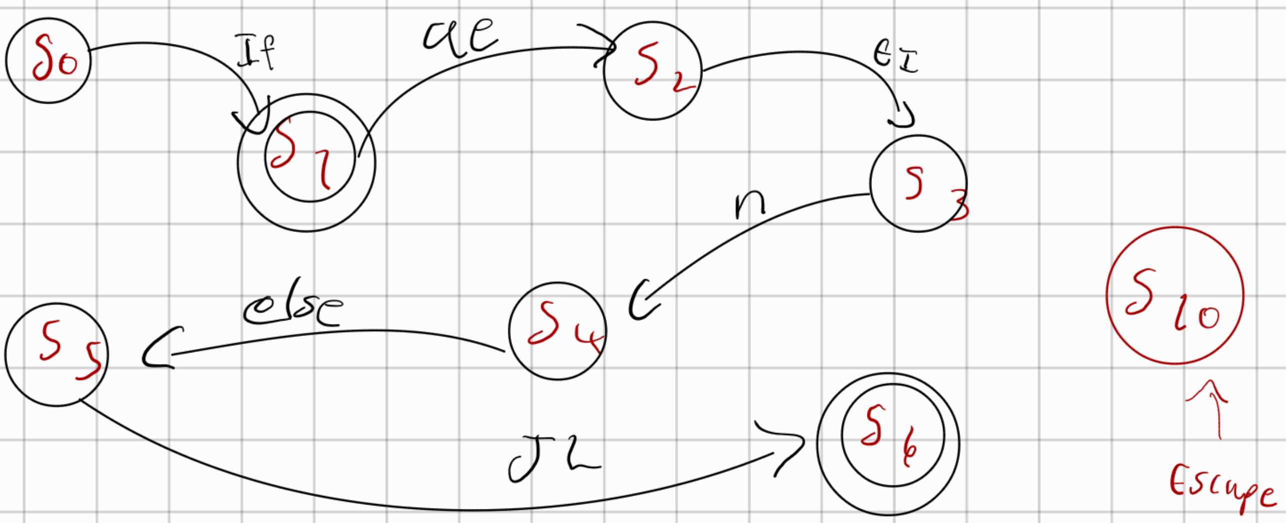
g) if\([ae]+\)\{[ei]+\}(\n(else\{[jl]+\}))?

If ([ae]+) {[ei]+} (n(else{[jl]+\})) ?

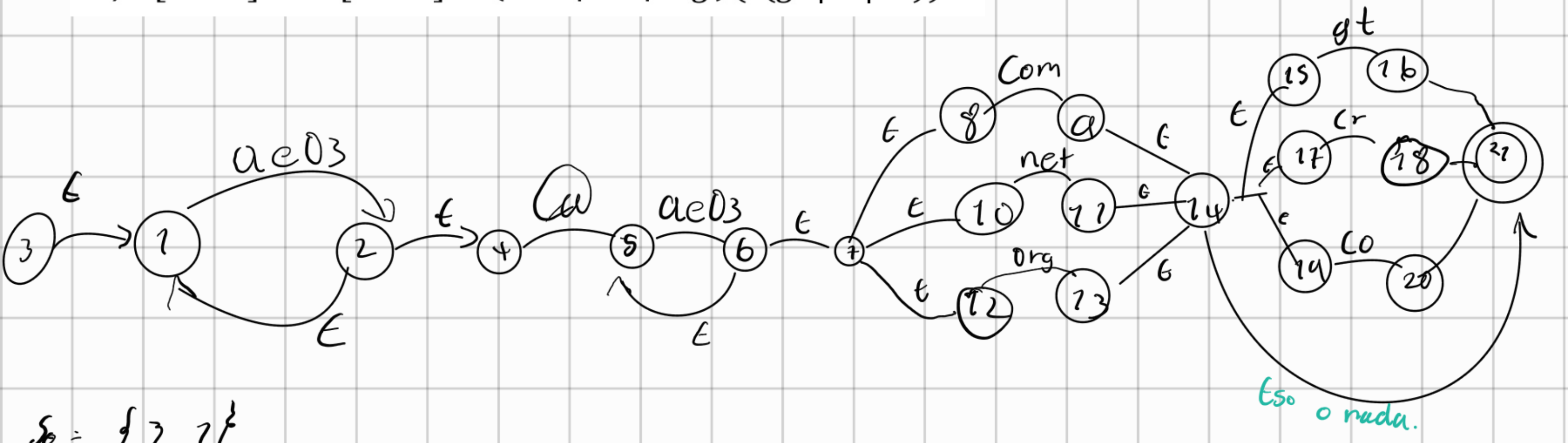
Esta se pone por el "?" que quiere decir que es todo eso o nada.



$S_0 = \{13, 1\}$
$S_1 = \{S_0, I*\} = \{2\} = \{3, 12, 2\}$
$S_2 = \epsilon\text{-closure} = \{S_1, ae\} = \{4\} = \{5, 4\}$
$S_3 = \epsilon\text{-closure} = \{S_2, ei\} = \{6\} = \{5, 6, 7\}$
$S_4 = \epsilon\text{-closure} = \{S_3, n\} = \{8\} = \{8\}$
$S_5 = \epsilon\text{-closure} = \{S_4, else\} = \{9\} = \{9, 10\}$
$S_6 = \epsilon\text{-closure} = \{S_5, JL\} = \{11\} = \{10, 11, 12\}$



h) $[ae03] + @[ae03]+.(com|net|org)(.(gt|cr|co))?$



$S_0 = \{7, 1\}$
$S_1 = \epsilon\text{-closure}\{S_0, ae03\} = \{2\} = \{1, 2, 4\}$
$S_2 = \epsilon\text{-closure}\{S_1, @\} = \{5\} = \{5\}$
$S_3 = \epsilon\text{-closure}\{S_2, ae03\} = \{6\} = \{5, 6, 7, 8, 10, 12\}$
$S_4 = \epsilon\text{-closure}\{S_3, com\} = \{9\} = \{14, 15, 17, 19, 21, 9\}$
$S_5 = \epsilon\text{-closure}\{S_3, net\} = \{11\} = \{11, 14, 15, 17, 19, 21\}$
$S_6 = \epsilon\text{-closure}\{S_3, org\} = \{13\} = \{13, 14, 15, 17, 19, 21\}$
$S_7 = \epsilon\text{-closure}\{S_4, gt\} = \{16\} = \{21\}$
$S_8 =$