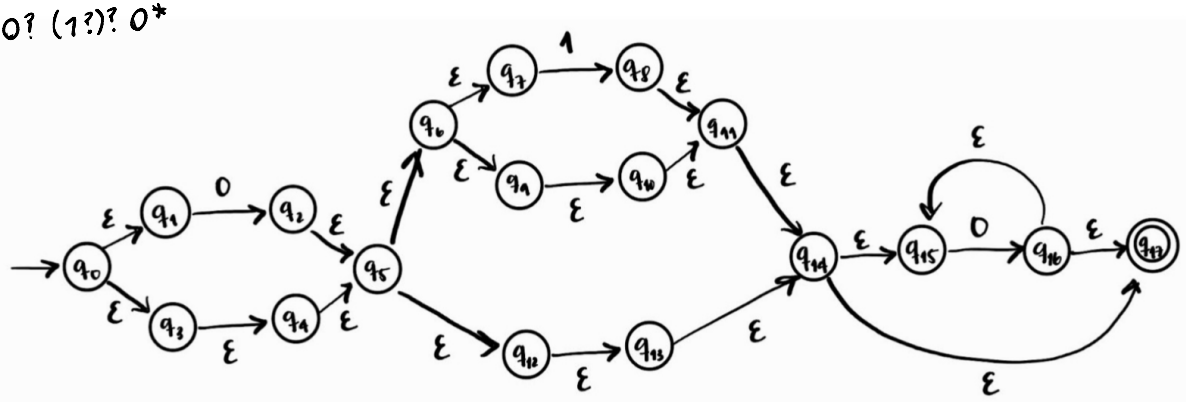
Ejercicio No. 2 (25%) – Utilice el Lema de Arden para encontrar el lenguaje generado por el siguiente Autómata Finito, i.e., convierta el autómata a su correspondiente expresión regular utilizando el Lema de Arden y el algoritmo visto en clase. Deje todo su procedimiento.

$0?\,(1?)?\,0^*$



$S_0 = \varepsilon^*\{0\} = \{0, 1, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 17\}$

$S_1 = \varepsilon^*\delta(S_0, 0) = \varepsilon^*\{2, 16\} = \{2, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17\}$

$S_2 = \varepsilon^*\delta(S_0, 1) = \varepsilon^*\{8\} = \{8, 11, 14, 15, 17\}$

$S_3 = \varepsilon^*\delta(S_1, 0) = \varepsilon^*\{16\} = \{16, 15, 17\}$

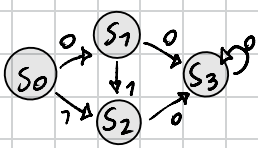
$\varepsilon^*\delta(S_1, 1) = \varepsilon^*\{8\} = S_2$

$\varepsilon^*\delta(S_2, 0) = \varepsilon^*\{16\} = S_3$

$\varepsilon^*\delta(S_2, 1) =$ No se puede

$\varepsilon^*\delta(S_3, 0) = \varepsilon^*\{16\} = S_3$

$\varepsilon^*\delta(S_3, 1) =$ No se puede



$S_0 = \varepsilon$

$S_1 = S_0 0$

$S_2 = S_0 1 + S_1 1$

$S_3 = S_1 0 + S_2 0 + S_3 0$

$S_1 = \varepsilon 0$

$S_2 = \varepsilon 1 + \varepsilon 01$

$S_3 = \varepsilon 00 + \varepsilon 10 + \varepsilon 010 + S_3 0$

$\varepsilon(00 + 10 + 010) + S_3 0$

$S_3 = \varepsilon(00 + 10 + 010)\,0^*$

$S_0 = 0S_1 + 1S_2 + \varepsilon$

$S_1 = 1S_2 + 0S_3 + \varepsilon$

$S_2 = 0S_3 + \varepsilon$

$S_3 = 0S_3 + \varepsilon$

$S_3 = \varepsilon\,0^*$

$S_2 = \varepsilon + 00^*$

$= \varepsilon + 0^+$

$= 0^*$

$S_1 = 10^* + 00^* + \varepsilon$

$= 10^* + \varepsilon + 0^+$

$= 10^* + 0^*$

$S_0 = 010^* + 00^* + 10^* + \varepsilon$

$= 010^* + 10^* + 0^*$

$= (01 + 1 + \varepsilon)0^*$

$= (01 \mid 1 \mid \varepsilon)0^*$